

# Documentation 6.0

ZABBIX

29.04.2025

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# Zabbix Manual

Welcome to the user manual for Zabbix software. These pages are created to help users successfully manage their monitoring tasks with Zabbix, from the simple to the more complex ones.

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## 1 Introduction

Please use the sidebar to access content in the Introduction section.

### 1 Manual structure

#### Structure

The content of this manual is divided into sections and subsections to provide easy access to particular subjects of interest.

When you navigate to respective sections, make sure that you expand section folders to reveal full content of what is included in subsections and individual pages.

Cross-linking between pages of related content is provided as much as possible to make sure that relevant information is not missed by the users.

#### Sections

**Introduction** provides general information about current Zabbix software. Reading this section should equip you with some good reasons to choose Zabbix.

**Zabbix definitions** explain the terminology used in Zabbix, while **Zabbix processes** provides details on Zabbix components.

**Installation** and **Quickstart** sections should help you to get started with Zabbix. **Zabbix appliance** is an alternative for getting a quick taster of what it is like to use Zabbix.

**Configuration** is one of the largest and more important sections in this manual. It contains loads of essential advice about how to set up Zabbix to monitor your environment, from setting up hosts to getting essential data to viewing data to configuring notifications and remote commands to be executed in case of problems.

**Service monitoring** details how to use Zabbix for a high-level overview of your monitoring environment.

**Web monitoring** should help you learn how to monitor the availability of web sites.

**Virtual machine monitoring** presents a how-to for configuring VMware environment monitoring.

**Maintenance**, **Regular expressions**, **Event acknowledgment** and **Configuration export/import** are further sections that reveal how to use these various aspects of Zabbix software.

**Discovery** contains instructions for setting up automatic discovery of network devices, active agents, file systems, network interfaces, etc.

**Distributed monitoring** deals with the possibilities of using Zabbix in larger and more complex environments.

**Encryption** helps explaining the possibilities of encrypting communications between Zabbix components.

**Web interface** contains information specific for using the web interface of Zabbix.

**API** section presents details of working with Zabbix API.

Detailed lists of technical information are included in **Appendixes**. This is where you will also find a FAQ section.

## 2 What is Zabbix

### Overview

Zabbix was created by Alexei Vladishev, and currently is actively developed and supported by Zabbix SIA.

Zabbix is an enterprise-class open source distributed monitoring solution.

Zabbix is a software that monitors numerous parameters of a network and the health and integrity of servers, virtual machines, applications, services, databases, websites, the cloud and more. Zabbix uses a flexible notification mechanism that allows users to configure email based alerts for virtually any event. This allows a fast reaction to server problems. Zabbix offers excellent reporting and data visualization features based on the stored data. This makes Zabbix ideal for capacity planning.

Zabbix supports both polling and trapping. All Zabbix reports and statistics, as well as configuration parameters, are accessed through a web-based frontend. A web-based frontend ensures that the status of your network and the health of your servers can be assessed from any location. Properly configured, Zabbix can play an important role in monitoring IT infrastructure. This is equally true for small organizations with a few servers and for large companies with a multitude of servers.

Zabbix is free of cost. Zabbix is written and distributed under the GPL General Public License version 2. It means that its source code is freely distributed and available for the general public.

[Commercial support](#) is available and provided by Zabbix Company and its partners around the world.

Learn more about [Zabbix features](#).

### Users of Zabbix

Many organizations of different size around the world rely on Zabbix as a primary monitoring platform.

## 3 Zabbix features

### Overview

Zabbix is a highly integrated network monitoring solution, offering a multiplicity of features in a single package.

#### Data gathering

- availability and performance checks
- support for SNMP (both trapping and polling), IPMI, JMX, VMware monitoring
- custom checks
- gathering desired data at custom intervals
- performed by server/proxy and by agents

#### Flexible threshold definitions

- you can define very flexible problem thresholds, called triggers, referencing values from the backend database

#### Highly configurable alerting

- sending notifications can be customized for the escalation schedule, recipient, media type
- notifications can be made meaningful and helpful using macro variables
- automatic actions include remote commands

#### Real-time graphing

- monitored items are immediately graphed using the built-in graphing functionality

#### Web monitoring capabilities

- Zabbix can follow a path of simulated mouse clicks on a web site and check for functionality and response time

#### Extensive visualization options

- ability to create custom graphs that can combine multiple items into a single view
- network maps
- slideshows in a dashboard-style overview
- reports
- high-level (business) view of monitored resources

#### Historical data storage

- data stored in a database
- configurable history
- built-in housekeeping procedure

### **Easy configuration**

- add monitored devices as hosts
- hosts are picked up for monitoring, once in the database
- apply templates to monitored devices

### **Use of templates**

- grouping checks in templates
- templates can inherit other templates

### **Network discovery**

- automatic discovery of network devices
- agent autoregistration
- discovery of file systems, network interfaces and SNMP OIDs

### **Fast web interface**

- a web-based frontend in PHP
- accessible from anywhere
- you can click your way through
- audit log

### **Zabbix API**

- Zabbix API provides programmable interface to Zabbix for mass manipulations, third-party software integration and other purposes.

### **Permissions system**

- secure user authentication
- certain users can be limited to certain views

### **Full featured and easily extensible agent**

- deployed on monitoring targets
- can be deployed on both Linux and Windows

### **Binary daemons**

- written in C, for performance and small memory footprint
- easily portable

### **Ready for complex environments**

- remote monitoring made easy by using a Zabbix proxy

## **4 Zabbix overview**

### Architecture

Zabbix consists of several major software components. Their responsibilities are outlined below.

#### Server

**Zabbix server** is the central component to which agents report availability and integrity information and statistics. The server is the central repository in which all configuration, statistical and operational data are stored.

#### Database storage

All configuration information as well as the data gathered by Zabbix is stored in a database.

#### Web interface

For an easy access to Zabbix from anywhere and from any platform, the web-based interface is provided. The interface is part of Zabbix server, and usually (but not necessarily) runs on the same physical machine as the one running the server.

#### Proxy

**Zabbix proxy** can collect performance and availability data on behalf of Zabbix server. A proxy is an optional part of Zabbix deployment; however, it may be very beneficial to distribute the load of a single Zabbix server.

## Agent

Zabbix agents are deployed on monitoring targets to actively monitor local resources and applications and report the gathered data to Zabbix server. Since Zabbix 4.4, there are two types of agents available: the **Zabbix agent** (lightweight, supported on many platforms, written in C) and the **Zabbix agent 2** (extra-flexible, easily extendable with plugins, written in Go).

## Data flow

In addition it is important to take a step back and have a look at the overall data flow within Zabbix. In order to create an item that gathers data you must first create a host. Moving to the other end of the Zabbix spectrum you must first have an item to create a trigger. You must have a trigger to create an action. Thus if you want to receive an alert that your CPU load is too high on *Server X* you must first create a host entry for *Server X* followed by an item for monitoring its CPU, then a trigger which activates if the CPU is too high, followed by an action which sends you an email. While that may seem like a lot of steps, with the use of templating it really isn't. However, due to this design it is possible to create a very flexible setup.

## 5 What's new in Zabbix 6.0.0

See **breaking changes** for this version.

### High availability cluster for Zabbix server

The new version comes with a native high availability solution for Zabbix server.

The solution consists of multiple `zabbix_server` instances or nodes, where only one node can be active (working) at a time, while other nodes are on standby, ready to take over in case the current node is stopped or fails.

See also: **High availability cluster**.

### Updated service monitoring

Several updates have been made to the monitoring of **services**. Service monitoring offers a high-level view of the monitored infrastructure in Zabbix.

### Tag-based mapping of services to problems

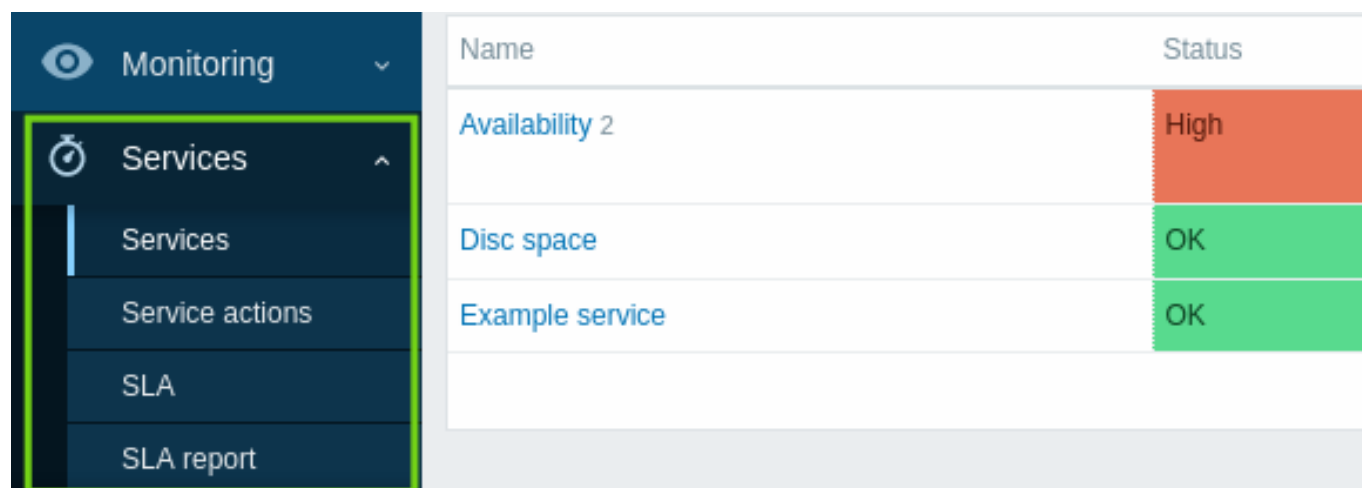
The availability of **services** in previous Zabbix versions depended on triggers and their states. In the new version that is replaced by a tag-based mapping to problems for the respective service.

In service configuration, hard and soft dependencies no longer exist. Instead, a service can have multiple parent services.

### Services menu

There is now a new Services menu in Zabbix, with four menu sections:

- **Services** - for service overview and service configuration (moved from *Monitoring* -> *Services*)
- **Service actions** - for service actions (new action type)
- **SLA** - for configuring SLAs
- **SLA report** - for SLA reports (also available as dashboard widget)



The screenshot shows the Zabbix 6.0.0 interface. On the left, a dark blue sidebar contains a 'Monitoring' menu with a dropdown arrow. Below it, a 'Services' menu is highlighted with a green border, containing sub-items: 'Services', 'Service actions', 'SLA', and 'SLA report'. The main content area on the right displays a table with two columns: 'Name' and 'Status'.

| Name            | Status |
|-----------------|--------|
| Availability 2  | High   |
| Disc space      | OK     |
| Example service | OK     |

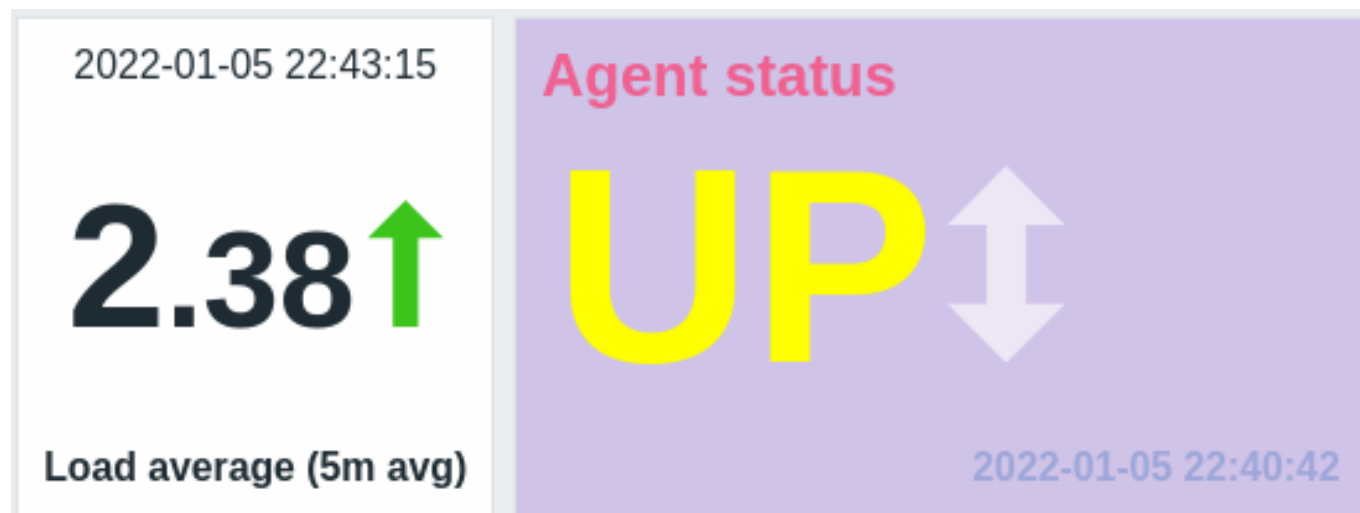
Note that a separate section for service configuration no longer exists (previously in *Configuration* → *Services*).





An *Item value* widget has been added to dashboard widgets.

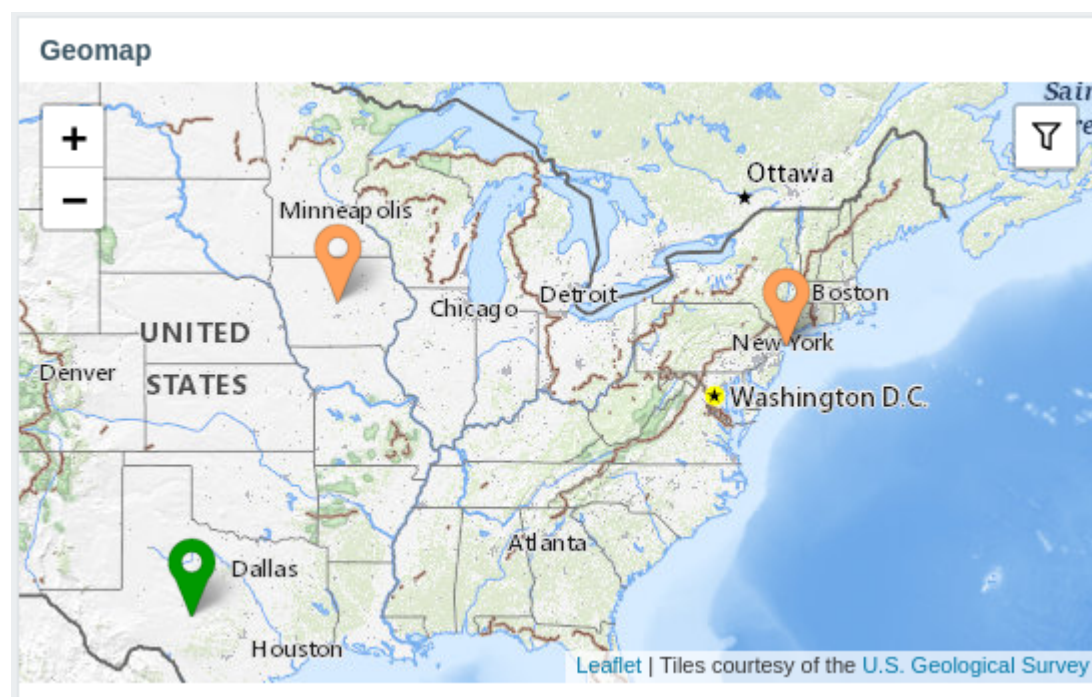
This type of widget is useful for displaying values of single items prominently. Different visual styles of display are possible:



For more information, see [Item value widget](#).

#### Geomap

A new geomap widget for the dashboards has been introduced providing a way to display hosts on geographical maps. For more information see the [Geomap dashboard widget](#) and [geographical maps](#).



#### Functions Functions for Prometheus histograms

It has been possible to collect [Prometheus metrics](#) in Zabbix for a while now, but some of the metrics are difficult to work with. Specifically, the metrics of histogram type can be presented in Zabbix as multiple items with the same key names, but different parameters. However, even though such items are logically related and represent the same data, it has been difficult to analyze the collected data without specialized functions. To cover this functionality gap in the new version, **rate()** and **histogram\_quantile()** functions, producing the same result as their PromQL counterparts, have been added.

Other new additions to complement this functionality are the **bucket\_rate\_foreach()** and the **bucket\_percentile()** functions. For more information see:

- [History functions](#) (see **rate()**)
- [Aggregate functions](#) (see **histogram\_quantile()**, **bucket\_percentile()**)
- [Foreach functions](#) (see **bucket\_rate\_foreach()**)

#### Monotonic change

It is now possible to check for monotonic increase or decrease in item values using the new **monoinc()** or **monodec()** [history functions](#).

#### Change count

A new [history function](#) **changecount()** has been added allowing to count the number of changes between adjacent values. The function supports three different modes for counting all changes, only decreases, or only increases. As an example, it can be used to track changes in the number of users or the number of system uptime decreases.

#### Entity count

New [functions](#) have been added to simplify the counting of specific hosts, items, or values, returned by [foreach functions](#).

#### Aggregate functions:

- **count** - total number of values in an array returned by a foreach function (returns an integer);
- **item\_count** - total number of currently enabled items that match filter criteria (returns an integer).

#### Foreach function:

- **exists\_foreach** - number of currently enabled items that match filter criteria (returns an array).

#### Baseline monitoring

Set of available baseline monitoring options has been extended with the two new functions **baselinedev** and **baselinewma**.

- **baselinedev** - compares the last data period with the same data periods in preceding seasons and returns the number of deviations;
- **baselinewma** - calculates the baseline by averaging data from the same timeframe in multiple equal time periods ('seasons') using the weighted moving average algorithm.

In context of these functions, the term 'season' refers to a configurable timeframe, which could be hours, days, weeks, months or years. The length of a season and the number of seasons to analyse is set in function parameters.

See [history functions](#) for more info.

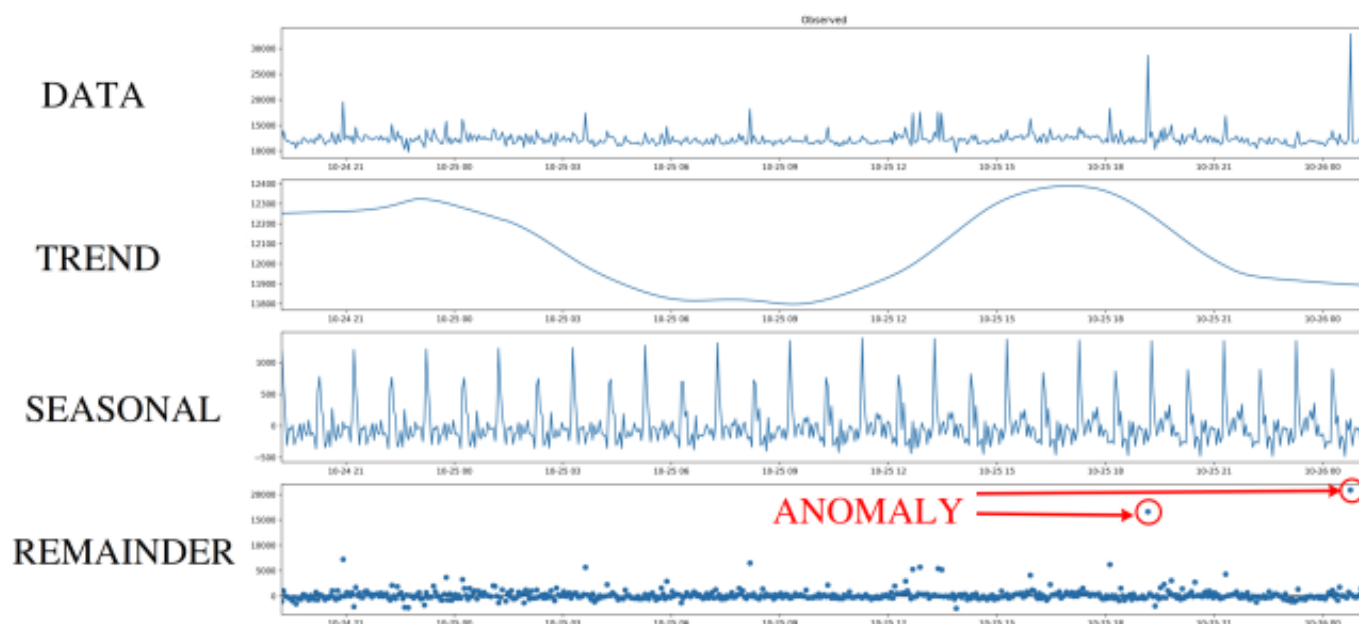
#### Anomaly detection

Zabbix 5.2 introduced new trend functions useful for baseline monitoring. However, they still require defining relative thresholds (e.g. check that web traffic in September, 2021 is less than 2x higher compared to September, 2020). There are use cases when such thresholds are hard to define. For instance, the web traffic of a new but highly popular web site can organically grow many times over a year but the growth rate is unknown. Yet, a sudden traffic spike due to DDOS attack must generate an alert regardless of organic traffic growth.

Anomaly detection algorithms do exactly this - find data that doesn't look normal (outliers) in a context of other values.

New [trend function](#) **trendstl()** has been added which uses 'decomposition' method to calculate the anomaly rate. It splits a single time series sequence into three other sequences:

- trend sequence that only contains big changes in the original data (e.g. website traffic shows growth)
- season sequence that only contains seasonal changes (e.g. less website traffic in summer, more in autumn)
- remainder sequence that only contains residual values that can not be interpreted as parts of trend or season



Anomaly detection works with remainder sequence and checks if there are values that are too far from the majority of remainder values. "Far" means that the absolute value from the remainder sequence is N times greater than the standard or mean deviation.

## String functions

**String function concat** now allows concatenating more than two parameters. It can be used to combine strings and values in different combinations or append two or more values to each other. Numeric data types are also supported.

## Items Automated type selection

Item configuration form now automatically suggests the matching type of information, if selected item key returns data only of the specific type (for example, **log[]** item requires *Type of information: Log*). *Type of information* parameter is now located under the *Key* parameter on the primary *Item* tab and is duplicated on the *Preprocessing* tab if at least one preprocessing step is specified. If Zabbix detects a possible mismatch of the selected type of information and key, a warning icon will be displayed next to the *Type of information* field.

## Agent items

Several **new** items have been added to Zabbix agent/agent 2:

- **agent.hostmetadata** - return host metadata
- **kernel.openfiles** - return the number of open file descriptors
- **net.tcp.socket.count[]** - return the number of TCP sockets that match parameters
- **net.udp.socket.count[]** - return the number of UDP sockets that match parameters
- **vfs.dir.get[]** - return list of directory files as JSON
- **vfs.file.get[]** - return information about a file as JSON
- **vfs.file.owner[]** - return the ownership of a file
- **vfs.file.permissions[]** - return a 4-digit string containing octal number with Unix permissions

Additionally:

- **vfs.file.cksum[]** now supports a second mode parameter (*crc32*, *md5*, *sha256*)
- **vfs.file.size[]** now supports a second mode parameter (*bytes* or *lines*)
- **vfs.fs.discovery** and **vfs.fs.get** now return an `{#FSLABEL}` macro on Windows (with volume names)

For more details see [agent items](#).

## Calculated items

Calculated items now support not only numeric, but also **text**, **log**, and **character** types of information.

## Bulk processing for Prometheus metrics

Bulk processing of dependent items has been introduced in the preprocessing queue to improve the performance of retrieving Prometheus metrics.

See [Prometheus checks](#) for more details.

## JavaScript methods

HTTP methods PATCH, HEAD, OPTIONS, TRACE, CONNECT have been added to the JavaScript engine. Also, the engine now allows sending custom HTTP method requests with the new JS method `HttpRequest.customRequest`.

See also: [Additional JavaScript objects](#).

## Compressed content in web monitoring

The ability to handle compressed content has been added to Zabbix web monitoring. All encoding formats supported by **libcurl** are supported.

## Preprocessing Prometheus query language

Zabbix Prometheus preprocessing [query language](#) now supports two additional label matching operators:

- **!=** -- select labels that are not equal to the provided string;
- **!~** -- select labels that do not regex-match the provided string.

## Result processing for Prometheus pattern

A Prometheus pattern step in the preprocessing can produce a result where multiple lines are matched. To handle this situation, a new result processing [parameter](#) has been added to the Prometheus pattern preprocessing step that allows to aggregate the data of potentially multiple matching lines by introducing functions such as `sum`, `min`, `max`, `avg`, and `count`.

## Macros New macros

New macros are now supported for trigger expression debugging and internal actions.

Expression debugging macros simplify the process of debugging trigger expressions:

- {TRIGGER.EXPRESSION.EXPLAIN}, {TRIGGER.EXPRESSION.RECOVERY.EXPLAIN} - resolve to a partially evaluated trigger or recovery expression, where only item-based functions are applied;
- {FUNCTION.VALUE<1-9>}, {FUNCTION.RECOVERY.VALUE<1-9>} - resolve to the results of the Nth item-based function at the time of the event.

Macros for internal actions contain the reason why an item, an LLD-rule, or a trigger became unsupported:

- {ITEM.STATE.ERROR} - for item-based internal notifications;
- {LLDRULE.STATE.ERROR} - for LLD-rule based internal notifications;
- {TRIGGER.STATE.ERROR} - for trigger-based internal notifications.

For more details, see [Supported macros](#).

Simple macros replaced by expression macros

A new expression syntax for triggers and calculated items was introduced in [Zabbix 5.4](#). However, the old syntax still remained in use in simple macros. In the new version, the functionality of simple macros has been transferred to expression macros and the new expression syntax is used. See the comparison below for details of the change:

| In Zabbix 6.0                                      | Before Zabbix 6.0                               |
|--|---|
| {?avg(/host/key,1h)}                               | {host:key.avg(1h)}                              |
| Example of an expression macro in the new version. | Example of a simple macro in previous versions. |

The existing simple macros will be converted to expression macros during the upgrade. The scope of expression macros covers the same that was offered by simple macros. Thus, expression macros can be used in:

- problem notifications and commands
- problem update notifications and commands
- map element labels
- map link labels
- map shape labels
- graph names

Positional macros no longer supported

The support for positional macros in item name (\$1, \$2...\$9), deprecated since Zabbix 4.0, has been fully removed.

User macros in item name no longer supported

The support for user macros in item names (including discovery rule names), deprecated since Zabbix 4.0, has been fully removed.

**Databases** To create the optimal user experience and ensure the best Zabbix performance in various production environments, the support of some older database releases has been dropped. This primarily applies to the database versions that are nearing their end of service life point and versions with unfixed issues that may interfere with normal performance.

Starting from Zabbix 6.0, the following [database](#) versions are officially supported:

- *MySQL/Percona* 8.0.X
- *MariaDB* 10.5.X - 10.6.X
- *PostgreSQL* 13.X - 14.X
- *Oracle* 19c - 21c
- *TimescaleDB* 2.0.1-2.3
- *SQLite* 3.3.5-3.34.X

By default, Zabbix server and proxy will not start if an unsupported database version is detected. It is now possible, though not recommended, to turn off DB version check by modifying AllowUnsupportedDBVersions configuration parameter for the [server](#) or [proxy](#).

Primary keys

Primary keys are now used for all tables, including history tables, in new installations.

There is no automatic upgrade to primary keys for existing installations. Instructions for a **manual upgrade** of history tables to primary keys in pre-existing installations are available for [MySQL/MariaDB](#), [PostgreSQL](#), [TimescaleDB v1](#) and [v2](#), and [Oracle](#).

utf8mb4 support for MySQL

utf8mb4 encoding with utf8mb4\_bin collation is now supported for Zabbix installations with the MySQL/MariaDB database.

Previously only utf8 encoding was supported, which with MySQL stands for utf8mb3 encoding and thus supports only a subset of proper UTF-8 characters. In the new version utf8mb4 support has been added with support for the [full](#) UTF-8 character set. Old installations using utf8mb3 are kept intact and may continue using that encoding.

See also instructions on executing [utf8mb4 conversion](#) post-upgrade to 6.0.

**Processes** User parameter reload without agent restart

User parameters now can be reloaded from the configuration file without restarting the agent. To do so, run the new `userparameter_reload` runtime control option, e. g.:

```
zabbix_agentd -R userparameter_reload
```

or

```
zabbix_agent2 -R userparameter_reload
```

UserParameter is the only agent configuration option that will be reloaded with this command.

PCRE2 support

Support for PCRE2 has been added and Zabbix installation packages for RHEL 7 and newer, SLES (all versions), Debian 9 and newer, Ubuntu 16.04 and newer have been updated to use PCRE2. PCRE is still supported, but Zabbix can only be compiled with one of the libraries PCRE or PCRE2, both cannot be used at the same time.

Zabbix get and Zabbix sender timeout

Zabbix get and Zabbix sender utilities now support a `-t <seconds>` or `--timeout <seconds>` timeout parameter. The valid range is:

- 1-30 seconds for Zabbix get (default: 30 seconds)
- 1-300 seconds for Zabbix sender (default: 60 seconds)

Extended SNMP gateway functionality

SNMP gateway can now provide information about triggers in a problem state and reveal host information in trigger details.

Additionally, it is now possible to limit the rate of SNMP traps sent by SNMP gateway.

The list of supported OIDs has been extended with a new OID **.10** for a comma-delimited list of trigger hostnames.

New parameters have been added to the SNMP gateway configuration file:

- *ProblemBaseOID* - OID of the problem trigger table;
- *ProblemMinSeverity* - minimum severity, triggers having lower severity will not be included;
- *ProblemHideAck* - if specified, only triggers with unacknowledged problems will be included;
- *ProblemTagFilter* - if specified, only triggers with the specified tag name will be included;
- *TrapTimer* - if set, Zabbix will send no more than one trap of the highest severity in the given time frame.

For details, see [Zabbix SNMP Gateway](#).

Separate processing for ODBC checks

Processing ODBC checks has been moved from regular poller processes to separate server/proxy processes *ODBC pollers*. This change allows limiting the number of connections to the database created by poller processes. Previously, ODBC checks were performed by regular pollers, which also work with Zabbix agent items, SSH checks, etc.

A new configuration parameter *StartODBCPollers* has been added to Zabbix **server** and **proxy** configuration files.

You can use internal item `zabbix[process,<type>]` to monitor ODBC pollers load.

Runtime command transfer

Zabbix server and proxy runtime commands are now sent via socket instead of Unix signals. This change allowed to improve user experience working with runtime control options:

- Results of the command execution are now printed to the console.
- It is possible to send longer input parameters, such as HA node name instead of node number.

Runtime controls on BSD-based OS

Previously, Zabbix server and Zabbix proxy runtime control options were not supported on BSD-based systems. Changing the runtime command transfer method has allowed to withdraw this limitation. Now the majority of the commands are supported on, *FreeBSD*, *NetBSD*, *OpenBSD*, and other operating systems from the **\*BSD** family.

For the exact list, see *Runtime control* for Zabbix [server](#) or [proxy](#).

Zabbix agent 2 plugins

### Separate configuration files

Each Zabbix agent 2 plugin now has a separate [configuration file](#). By default, these files are located in the `./zabbix_agent2.d/plugins.d/` directory. The path is specified in the `Include` parameter of the agent 2 configuration file and can be relative to the [zabbix\\_agent2.conf](#) or [zabbix\\_agent2.win.conf](#) file location.

### External plugin loader

Previously, plugins could only be compiled into Zabbix agent 2, which required recompiling the agent every time you need to change the set of available plugins. Now, with the addition of the external plugin loader, plugins don't have to be integrated into the agent 2 directly and can be added as separate external add-ons (loadable plugins), thus making the creation process of additional plugins for gathering new monitoring metrics easier.

Introduction of loadable plugins caused the following configuration parameter changes:

- `Plugins.<PluginName>.Path` parameter has been moved to `Plugins.<PluginName>.System.Path`.
- `Plugins.<PluginName>.Capacity` parameter, while still supported, has been deprecated, please use `Plugins.<PluginName>.System.Capacity` instead.

**Templates** New official templates are available for monitoring.

Kubernetes

- *Kubernetes nodes by HTTP*
- *Kubernetes cluster state by HTTP*
- *Kubernetes API server by HTTP*
- *Kubernetes Controller manager by HTTP*
- *Kubernetes Scheduler by HTTP*
- *Kubernetes kubelet by HTTP*

To enable Kubernetes monitoring, you need to use the new tool [Zabbix Helm Chart](#), which installs Zabbix proxy and Zabbix agents in the Kubernetes cluster.

To learn more about configuring templates, see [HTTP template operation](#).

Mikrotik

- *MikroTik <device model> SNMP* - 53 new model-specific templates for monitoring various models of MikroTik ethernet routers and switches, see [full list](#);
- *Mikrotik SNMP* - a generic template for monitoring MikroTik devices.

You can get these templates:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

**Notifications** Webhook integrations

A new integration is available allowing to use the [webhook](#) media type for creating [Github issues](#) from Zabbix notifications.

Notification about canceled escalations

When configuring [action operations](#), it is now possible to cancel notifications about canceled escalations by unmarking the checkbox of the corresponding option.

**Frontend** Password requirements

Custom password complexity requirements can now be provided for Zabbix internal [authentication method](#). To prevent Zabbix users from setting weak passwords, it is possible to enforce the following restrictions:

- Set the minimum password length.
- Require a password to contain a combination of uppercase and lowercase letters, digits, and/or special characters.



- Prohibit usage of most common and easily guessable passwords.

## Audit log

### Records

The audit log now contains records about all configuration changes for all Zabbix objects, including changes that occurred as a result of executing an LLD rule, a network discovery action, an autoregistration action, or a script execution. Previously, configuration changes initiated from Zabbix server, for example, as a result of executing a discovery rule, were not recorded. Now such object modifications will be stored as audit records attributed to the user System.

### Record filter

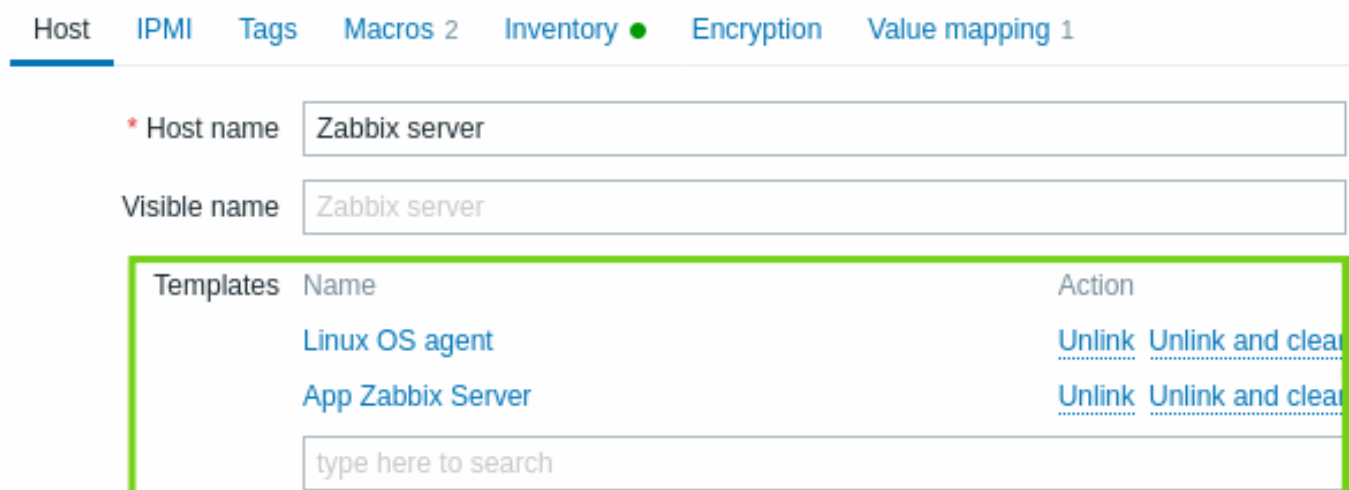
A functionality for filtering records by the frontend operation that caused these entries has been added. If several log records have been created as a result of a single operation, for example, linking/unlinking a template, such records will have the same *Recordset ID*.

### Audit settings

New [section Audit log](#) has been added to the *Administration*→*General* menu allowing to enable or disable audit logging. House-keeping settings for audit, previously located under the *Housekeeper* section, have also been moved to the new *Audit log* section.

### Template linking more visible

To make template linking more visible, it is now placed in the first tab of the host, host prototype and template configuration forms and host/template mass update forms.



| Host   | IPMI              | Tags                    | Macros 2 | Inventory ● | Encryption | Value mapping 1 |           |      |        |  |                |                         |  |                   |                         |  |  |  |
|--|-------------------|-------------------------|----------|-------------|------------|-----------------|-----------|------|--------|--|----------------|-------------------------|--|-------------------|-------------------------|--|--|--|
| <p>* Host name <input type="text" value="Zabbix server"/></p> <p>Visible name <input type="text" value="Zabbix server"/></p> <table border="1"> <thead> <tr> <th>Templates</th> <th>Name</th> <th>Action</th> </tr> </thead> <tbody> <tr> <td></td> <td>Linux OS agent</td> <td>Unlink Unlink and clear</td> </tr> <tr> <td></td> <td>App Zabbix Server</td> <td>Unlink Unlink and clear</td> </tr> <tr> <td colspan="3"> <input type="text" value="type here to search"/> </td> </tr> </tbody> </table> |                   |                         |          |             |            |                 | Templates | Name | Action |  | Linux OS agent | Unlink Unlink and clear |  | App Zabbix Server | Unlink Unlink and clear | <input type="text" value="type here to search"/> |  |  |
| Templates  | Name              | Action                  |          |             |            |                 |           |      |        |  |                |                         |  |                   |                         |  |  |  |
|  | Linux OS agent    | Unlink Unlink and clear |          |             |            |                 |           |      |        |  |                |                         |  |                   |                         |  |  |  |
|  | App Zabbix Server | Unlink Unlink and clear |          |             |            |                 |           |      |        |  |                |                         |  |                   |                         |  |  |  |
| <input type="text" value="type here to search"/>   |                   |                         |          |             |            |                 |           |      |        |  |                |                         |  |                   |                         |  |  |  |

Consequently, a separate tab for template linking has been removed from all the respective forms.

In a related development, in host prototype configuration the fields for host group/host group prototype selection have also been moved from a separate tab to the first tab.

### Subfilter in latest data

A subfilter has been added in the *Latest data* section. The subfilter is useful for a quick one-click access to groups of related items.

The subfilter shows **clickable links** allowing to filter items based on a common entity - the host, tag name or tag value. As soon as the entity is clicked, items are immediately filtered.

For more details, see the [latest data](#) section.

### Usability improvements to custom graphs

The graph page in *Monitoring* → *Hosts* → *Graphs* has seen several usability improvements:

- There is no longer a 20 graph limit in the page
- A subfilter has been added allowing to quickly select groups of related graphs based on a common tag or tag value
- Simple graphs for the host can be displayed alongside custom graphs

For more details, see the [graph](#) page.

### Creating hosts from Monitoring

It is now also possible to create new hosts from *Monitoring* → *Hosts*.

## Hosts

[Create host](#)

| Name ▼        | Interface       | Availability      | Tags    | Problems |
|---------------|-----------------|-------------------|---------|----------|
| Zabbix server | 127.0.0.1:10050 | ZBX SNMP IPMI JMX | fff1: 1 | 1        |

The *Create host* button is available for Admin and Super Admin users.

Host editing as popup

The form for host creation and editing is now opened in a modal (popup) window, in *Configuration → Hosts*, *Monitoring → Hosts* and in any page, where there is a host menu or other direct link to the host configuration.

Direct links to the host edit page still work and are opening the host edit page in full page.

Better navigation between item configuration and latest data

A new context menu for items has been introduced in *Latest data* allowing to access the item configuration and available graphs:

| <input type="checkbox"/> Host          | Name ▲              | Last check |
|--|---------------------|------------|
| <input type="checkbox"/> Zabbix server | /: Free inodes in % | 5s         |
| <input type="checkbox"/> Zabbix server | /: Free space ?     | 33s        |
| <input type="checkbox"/> Zabbix server | /: Sp               | 6s         |
| <input type="checkbox"/> Zabbix server | /: Tot              | 7s         |
| <input type="checkbox"/> Zabbix server | /: Us               | 8s         |
| <input type="checkbox"/> Zabbix server | A Int               | 19s        |

ITEM

Graph

Values

500 latest values

Configuration

Conversely, a new context menu has been introduced in the *item list* in configuration menu allowing to access the latest data for the item and other useful options:

## Items

|                           |  |     |      |      |           |             |           |          |
|---------------------------|--|-----|------|------|-----------|-------------|-----------|----------|
| All hosts / Zabbix server | Enabled  | ZBX | SNMP | IPMI | Items 146 | Triggers 67 | Graphs 27 | Discover |
| <input type="checkbox"/>  | Name   |     |      |      |           |             |           |          |
| <input type="checkbox"/>  | Template Module Linux generic by Zabbix agent: Maximum number of open file descriptors |     |      |      |           |             |           |          |
|                           | MAXIMUM NUMBER OF OPEN FILE DES...   |     |      |      |           |             |           |          |
|                           | Latest data  |     |      |      |           |             |           |          |
|                           | Create trigger   |     |      |      |           |             |           |          |
|                           | Triggers   |     |      |      |           |             |           |          |
|                           | Create dependent item  |     |      |      |           |             |           |          |
|                           | Create dependent discovery rule  |     |      |      |           |             |           |          |

Configured max number of open filedescript

This menu replaces the wizard option in previous versions. A similar menu has also been introduced for *template items* and *item prototypes*.



Monitoring → Latest data updated

Several improvements have been made to the Latest data section:

- Time since last check (for example, 1m 20s) is now displayed instead of the last item execution time.
- Hovering over an item's last value will show the raw value without units or value mapping applied.
- If a host is in maintenance, an orange wrench icon will be visible next to the host name.

Monitoring → Overview removed

The Overview section in the Monitoring menu has been removed completely. The same functionality can be still accessed by using the *Data overview* and *Trigger overview* dashboard **widgets**.

Miscellaneous

- Maximum field size has been increased for the following fields:
  - **Item preprocessing** parameters
  - **Media type** message
- The default language of Zabbix web interface has been changed from British to American English. Support of British English has been dropped.
- The Share link in the main menu has been replaced by an Integrations link, leading to the **Integrations** page on the Zabbix website.
- If Zabbix web interface is opened in one of the languages available on the Zabbix website, clicking the Integrations link will open the Integrations page in the appropriate language. For all other languages, including English, the Integrations page will be opened in English.
- A custom expression, used in **action configuration** for calculating conditions, now can be up to 1024 characters long (previously 255).
- *Monitoring->Hosts* section now shows link to host problems screen even if no problems are currently open.

## Breaking changes Audit log

In order to implement the changes in **audit log functionality**, the previously existing database structure had to be reworked. During the upgrade `auditlog` and `auditlog_details` DB tables will be replaced by the new table `auditlog` with a different format.

**Existing audit log records will be deleted.**

Supported DB versions check

Zabbix **server** and **proxy** will now check the database version before launch and will not start if the version is out of the supported range. For more details, see **databases**.

PCRE2 support

Zabbix now supports both PCRE and PCRE2. Zabbix packages for RHEL 7 and newer, SLES (all versions), Debian 9 and newer, Ubuntu 16.04 and newer have been updated to compile with PCRE2 instead of PCRE. When compiling from sources, users can choose to specify `--with-libpcre` or `--with-libpcre2` flag. If you are upgrading an existing installation, changing PCRE to PCRE2 may lead to some regular expressions behaving differently - see **Known issues** for details.

## 6 What's new in Zabbix 6.0.1

### Zabbix agent 2 items

- Native support for the **items net.dns** and **net.dns.record** has been added. These items, used with Zabbix agent 2, now support concurrent check processing. On Windows, custom DNS IP addresses are allowed in the `ip` parameter, `timeout` and `count` parameters are no longer ignored.
- *smart.disk.discovery* and *smart.attribute.discovery* **items**, supported for S.M.A.R.T. plugin, have been updated and now return `{#DISKTYPE}` macro value in the lower case.

**Discovery of disabled systemd units** It is now also possible to discover **disabled** systemd units using the *systemd.unit.discovery* item key, supported by Zabbix agent 2. Note that to have items and triggers created from prototypes for disabled systemd units, it may be necessary to adjust (or remove) prohibiting LLD filters for the `{#UNIT.ACTIVESTATE}` and `{#UNIT.UNITFILESTATE}` macros.

For more details, see **Discovery of systemd services**.

**SNI support in encrypted connections** Encrypted TCP connections between Zabbix agent and Zabbix server or proxy now support SNI.

**SourceIP support in LDAP simple checks** SourceIP support has been added to LDAP **simple checks**. Note that with OpenLDAP, version 2.6.1 or above is required.

## 7 What's new in Zabbix 6.0.2

Zabbix agent 2 active check configuration

A new optional **configuration parameter** *ForceActiveChecksOnStart* has been added to Zabbix agent 2. Setting the parameter to *ForceActiveChecksOnStart=1* will ensure item data for active checks is collected immediately upon Zabbix agent restart, except for items with *Scheduling update interval*. Otherwise, the first data collection after an agent restart will happen at random time, which is less than item update interval, to prevent spikes in resource usage.

It is also possible to set this option only for a specific plugin by using *Plugins.<PluginName>.System.ForceActiveChecksOnStart* (for example, *Plugins.Uptime.System.ForceActiveChecksOnStart=1*). If set, a plugin-level parameter will override the global setting.

**JMX monitoring** The template *Generic Java JMX* now contains discovery rules for low-level discovery of memory pools and garbage collectors.

**Keyboard navigation** Keyboard control has been implemented for info icons in the frontend. Thus it is now possible to focus on info icons, and open the hints, using the keyboard.

## 8 What's new in Zabbix 6.0.3

PostgreSQL metrics

A new **item** has been added to PostgreSQL plugin for Zabbix agent 2. The metric **pgsql.queries** is used for monitoring query execution time.

Templates

A new template *OpenWeatherMap by HTTP* is now available allowing to monitor OpenWeatherMap via HTTP. See **HTTP template operation** for setup instructions.

The following changes have been made in the existing templates:

- In the templates *Windows services by Zabbix agent*, *Windows services by Zabbix agent active*, *Windows by Zabbix agent*, *Windows by Zabbix agent active* `{SERVICE.NAME.NOT_MATCHES}` macro value has been updated to filter out an extended list of services.
- The template *PostgreSQL by Zabbix agent 2* now will check the number of slow queries and generate a problem if the amount exceeds a threshold.

You can get these templates:

- In *Configuration → Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration → Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

## 9 What's new in Zabbix 6.0.4

**Text data for Top hosts widget** It is now possible to select items with any type of information (including *Character*, *Text*, and *Log*) in the **Top hosts** widget. For example, it is now possible to use this widget to display the versions of Zabbix agents running on each host.

**OpenSSL 3.0 support** OpenSSL 3.0.x is now supported. Note that this change does not affect frontend encryption (which uses its own openssl-php package) and Java gateway JMX encrypted connections to monitoring targets (which uses its own Java encrypted libraries).

**Templates** New templates are available:

- *TrueNAS SNMP* - monitoring of TrueNAS storage OS by SNMP
- *Proxmox VE by HTTP* - see setup instructions for [HTTP templates](#)

New macros allowing to define warning and critical thresholds of the filesystem utilization for virtual file system monitoring have been added to the templates *HOST-RESOURCES-MIB storage SNMP*, *Linux by Prom*, *Linux filesystems SNMP*, *Linux filesystems by Zabbix agent active*, *Linux filesystems by Zabbix agent*, *Mellanox SNMP*, *PFSense SNMP*, *Windows filesystems by Zabbix agent active*, *Windows filesystems by Zabbix agent*. Filesystem utilization triggers have been updated to use these macros.

You can get these templates:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

**GLPi integration** A new [GLPi integration](#) is available allowing to use the [webhook](#) media type to create problems in GLPi Assistance section based on Zabbix problem notifications.

**S.M.A.R.T. monitoring** *Smart plugin*, supported for Zabbix agent 2, now provides more efficient disk discovery and allows returning information about a specific disk, instead of all discovered disks. Zabbix agent 2 items **smart.disk.discovery** and **smart.disk.get** have been updated. The templates *SMART by Zabbix agent 2* and *SMART by Zabbix agent 2 (active)* have also been modified to incorporate the new functionality.

## 10 What's new in Zabbix 6.0.5

**Templates** New templates are available:

- CockroachDB by HTTP
- Envoy Proxy by HTTP
- HashiCorp Consul Cluster by HTTP
- HashiCorp Consul Node by HTTP

See setup instructions for [HTTP templates](#).

You can get these templates:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

**Handling of NaN values in Prometheus preprocessing** There is a new behavior for handling (skipping) NaN values. So, if a dataset consists of valid numeric values and NaNs, then NaN values are skipped and:

- 'avg', 'max', 'min', 'sum' return a result that is calculated from the valid values
- 'count' returns the number of valid values

If all values in a dataset are NaNs then 'avg', 'max', 'min', and 'sum' return a "no data (at least one value is required)" error, while 'count' returns 0.

Previously, if NaN was the first value in a dataset then:

- 'avg', 'max', 'min', 'sum' returned a "Value "NaN" of type "string" is not suitable for value type "Numeric (float)" error
- 'count' returned the number of values (including NaN values)

Also previously, if NaN was not the first value in a dataset then:

- 'avg', 'sum' returned a "Value "NaN" of type "string" is not suitable for value type "Numeric (float)" error
- 'max' returned the maximum of values until the first NaN was encountered
- 'min' returned the minimum of values until the first NaN was encountered
- 'count' returned the number of values (including NaN values)

**Latest data link for hosts shows numbers** The latest data link for hosts in *Monitoring -> Hosts* now shows the number of items with latest data.

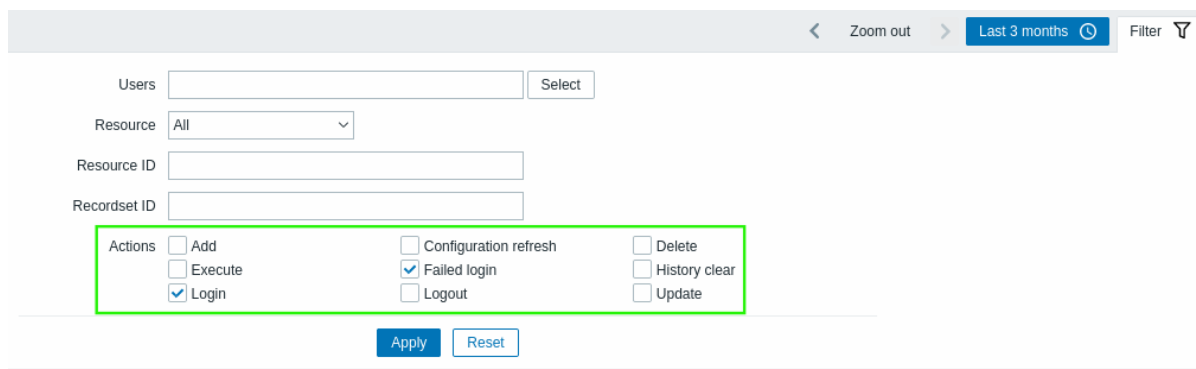
**Frontend languages** German and Vietnamese languages are now enabled in the frontend.

**Expandable lists in latest data subfilter** Expandable lists have been introduced in the *latest data* subfilter:

- For each entity group (e.g. tags, hosts) up to 10 rows of entities are now displayed. If there are more entities, this list can be expanded to a maximum of 1000 entries (the value of SUBFILTER\_VALUES\_PER\_GROUP in *frontend definitions*) by clicking on a three-dot icon displayed at the end. Previously a non-expandable maximum of 100 entries was the limit.
- In the list of *Tag values* up to 10 rows of tag names are now displayed. If there are more tag names with values, this list can be expanded to a maximum of 200 tag names by clicking on a three-dot icon displayed at the bottom. Previously, a non-expandable maximum of 20 rows with tag names was the limit.

For each tag name up to 10 rows of values are displayed (expandable to 1000 entries (the value of SUBFILTER\_VALUES\_PER\_GROUP in *frontend definitions*)).

**Audit log filter** Multiple actions now can be selected in the audit log filter in *Reports -> Audit*:



This is useful to see all related actions (for example, successful and failed logins into the frontend) in the audit list.

## 11 What's new in Zabbix 6.0.6

**PHP 8 support** PHP 8.0 and 8.1 is now supported.

**MariaDB 10.7 support** The maximum supported version for MariaDB is now 10.7.X.

**Loadable MongoDB plugin** MongoDB [plugin](#) is no longer part of Zabbix agent 2 and is now available as a loadable plugin instead. List of supported MongoDB versions has been extended to 2.6-5.3.

Plugin functionality and set of supported *items* haven't change.

**Templates** New templates

New templates are available:

- HPE MSA 2040 Storage by HTTP
- HPE MSA 2060 Storage by HTTP
- HPE Primera by HTTP

See setup instructions for [HTTP templates](#).

You can get these templates:

- In *Configuration -> Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration -> Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

**ExpressMS messenger webhook API changed** API version changed to v4 in ExpressMS messenger webhook.

## 12 What's new in Zabbix 6.0.7

**MariaDB 10.8 support** The maximum supported version for MariaDB is now 10.8.X.

**TimescaleDB 2.6 support** The maximum supported version for TimescaleDB is now 2.6.

**Templates** New templates

A new template *HPE Synergy by HTTP* is available.

See setup instructions for [HTTP templates](#).

You can get this template:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

Updated templates

PostgreSQL Agent 2 template has been updated.

A trigger for detecting checksum failures has been added to the Dbstat item of the [PostgreSQL Agent 2 template](#).

You can get this template:

- In *Configuration* → *Templates* in new installations;
- If you are upgrading from previous versions, you can download new templates from Zabbix [Git repository](#) or find them in the `templates` directory of the downloaded latest Zabbix version. Then, while in *Configuration* → *Templates* you can import them manually into Zabbix.

## 13 What's new in Zabbix 6.0.8

**Month abbreviated with capital letter** A "month" is now abbreviated with the capital "M" in the frontend. Previously it was abbreviated with the small "m", overlapping with the abbreviation of a minute.

**TimescaleDB 2.7 support** The maximum supported version for TimescaleDB is now 2.7.

**Templates** A new [template](#) *OPNsense by SNMP* is available.

You can get this template:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

**RHEL packages renamed** RHEL packages have been renamed by adding a "release" word in the name:

| Naming | Package name  |
|--------|---|
| Old    | <code>zabbix-agent-6.0.7-1.el9.x86_64.rpm</code>        |
| New    | <code>zabbix-agent-6.0.8-release1.el9.x86_64.rpm</code> |

There is no functional change associated with this change.

This is necessary as preparation for providing packages of minor version (i.e. 6.0.x) release candidates, expected to start with 6.0.9. The naming change will ensure that for someone who has both stable and unstable repositories enabled on their system, repository updates will be received in the correct order. This naming change is for RHEL packages only.

## 14 What's new in Zabbix 6.0.9

**Expression macros** {ITEM.KEY<1-9>} macros are now supported inside **expression macros**.

**Packages** SQL scripts have been moved from the `/usr/share/doc` directory to `/usr/share` in Zabbix packages.

## 15 What's new in Zabbix 6.0.10

Filter settings remembered

In several Monitoring pages (*Problems*, *Hosts*, *Latest data*) the current filter settings are now remembered in the user profile. When the user opens the page again, the filter settings will have stayed the same.

Additionally, the marking of a changed (but not saved) favorite filter is now a green dot next to the filter name, instead of the filter name in italics.

**TimescaleDB 2.8 support** The maximum supported version for TimescaleDB is now 2.8.

**PostgreSQL 15 support** PostgreSQL 15 is now supported. Note that TimescaleDB **does not** support PostgreSQL 15 yet.

**Possible to build Zabbix agent 2 offline** Zabbix agent 2 now can be built offline. The source tarball now includes the `src/go/vendor` directory, which should make sure that go lang is not forced to download dependency modules automatically. It is still possible to update to the latest modules manually by using `go mod tidy` or `go get` commands.

**PostgreSQL plugin loadable** The PostgreSQL **plugin** is now loadable in Zabbix agent 2 (previously built-in).

See also: [PostgreSQL loadable plugin](#) repository

**Frontend** Miscellaneous

- Warnings about incorrect housekeeping configuration for TimescaleDB are now displayed if history or trend tables contain compressed chunks, but *Override item history period* or *Override item trend period* options are disabled. For more information, see [TimescaleDB setup](#).

## 16 What's new in Zabbix 6.0.11

**Reporting file systems with zero inodes** `vfs.fs.get` agent items are now capable of reporting file systems with the inode count equal to zero, which can be the case for file systems with dynamic inodes (e.g. `btrfs`).

Additionally `vfs.fs.inode` items now will not become unsupported in such cases with mode set to 'pfree' or 'pused'. Instead the pfree/pused values for such file systems will be reported as "100" and "0" respectively.

**Optimized API queries** API database queries, used when searching through names in *hosts* and *items* tables, have been optimized and will now be processed more efficiently.

## 17 What's new in Zabbix 6.0.12

**Improved performance of history syncers** The performance of history syncers has been improved by introducing a new read-write lock. This reduces locking between history syncers, trappers and proxy pollers by using a shared read lock while accessing the configuration cache. The new lock can be write locked only by the configuration syncer performing a configuration cache reload.

## 18 What's new in Zabbix 6.0.13

### Breaking changes Loadable plugin versioning

**Loadable plugins** for Zabbix agent 2 now use the same versioning system as Zabbix itself. The following version changes have been made:

- MongoDB 1.2.0 -> MongoDB 6.0.13
- PostgreSQL 1.2.1 -> PostgreSQL 6.0.13

These plugins are supported for any minor version of Zabbix 6.0. Note that source code repository for each plugin now contains a dedicated *release/6.0* branch (previously, there was only *master* branch).

**MariaDB 10.10 support** The maximum supported version for MariaDB is now 10.10.X.

**TimescaleDB 2.9 support** The maximum supported version for TimescaleDB is now 2.9.

**Configuration import** Previously, the import process would fail on a UUID mismatch of an importable entity (host group, item, graph, etc). For example, it was not possible to import a host group if a host group with the same name already existed on the host.

In the new version the import will not fail because of a UUID mismatch; instead the entity will be matched by the uniqueness criteria such as entity ID (name). The entity will be imported, and the UUID will be updated to the UUID of the imported entity.

In another improvement, when removing template linkage (the *Delete missing* option for template linkage) through the imported template or host, the inherited entities of the unlinked template are no longer removed (template gets unlinked, not unlinked and cleared), unless these entities are missing in the import file **and** the *Delete missing* option for the specific entity is marked.

Due to this change, the warning message when marking the *Delete missing* option for template linkage will no longer be displayed.

**Query separate tablespaces in Oracle databases with Zabbix agent 2** The following **Zabbix agent 2 items**, supported for the Oracle plugin, now have additional optional parameters:

- `oracle.diskgroups.stats[<existingParameters>,<diskgroup>]`
- `oracle.archive.info[<existingParameters>,<destination>]`
- `oracle.cdb.info[<existingParameters>,<database>]`
- `oracle.pdb.info[<existingParameters>,<database>]`
- `oracle.ts.stats[<existingParameters>,<tablespace>,<type>]`

These parameters allow to query separate instances of data instead of all data, thus improving performance.

**Retrieving additional information with `docker.container_info[]`** The `docker.container_info[]` **Zabbix agent 2 item** now supports the option to retrieve either partial (short) or full low-level information about a Docker container.

**Runtime commands for profiling** Runtime commands for profiling have been added to Zabbix server and Zabbix proxy.

- `prof_enable` - enable profiling
- `prof_disable` - disable profiling

Profiling can be enabled per server/proxy process. Enabled profiling provides details of all rwlocks/mutexes by function name.

See also:

- [Zabbix server runtime commands](#)
- [Zabbix proxy runtime commands](#)

**HMAC function for JavaScript** A new function has been added to the JavaScript engine allowing to return HMAC hash:

- `hmac('<hash type>',key,string)`

This is useful for cases when hash-based message authentication code (HMAC) is required for signing requests. MD5 and SHA256 hash types are supported, e. g.:

- `hmac('md5',key,string)`
- `hmac('sha256',key,string)`

**Templates** New templates are available:

- AWS EC2 by HTTP
- AWS by HTTP
- AWS RDS instance by HTTP
- AWS S3 bucket by HTTP
- Azure by HTTP
- Control-M server by HTTP
- Control-M enterprise manager by HTTP
- Veeam Backup Enterprise Manager by HTTP
- Veeam Backup and Replication by HTTP

See setup instructions for [HTTP templates](#).

The template [Oracle by Zabbix agent 2](#) has been updated (multiple static items removed; multiple item prototypes added) according to the changes made to multiple [Zabbix agent 2 items](#).

For more information about the updates, see [Template changes](#).

You can get these templates:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

**Webhook integrations** A new media type *LINE* is now available allowing to use the [webhook](#) feature for sending notifications about Zabbix events to *LINE* messenger.

**Frontend languages** Catalan and Romanian languages are now enabled in the frontend.

**Go library for Windows updated** Go library used by Zabbix agent 2 in conjunction with MongoDB or PostgreSQL plugins to monitor Windows now is [github.com/Microsoft/go-winio](https://github.com/Microsoft/go-winio), version 0.6.0 (previously [github.com/natefinch/npipes](https://github.com/natefinch/npipes)). See also [Go libraries](#), [MongoDB plugin dependencies](#), and [PostgreSQL plugin dependencies](#).

**Open file descriptor limit increase for Zabbix agent 2** The systemd service file shipped in Zabbix agent 2 packages now declares the open file descriptor limit of 8196. Previously, the system default limit of 1024 has been used. The new limit is sufficient for the default Zabbix agent 2 configuration. If you have a non-standard agent 2 configuration, for example, use additional plugins or extended features, this limit may need to be manually increased further. In this case, adjust the `LimitNOFILE` parameter in the systemd unit file.

## 19 What's new in Zabbix 6.0.14

**Loadable plugins** Encrypted MongoDB plugin connection

MongoDB plugin now supports TLS encryption when connecting to MongoDB using named sessions.

Updated plugin (MongoDB plugin 1.2.1) is included into Zabbix official packages starting from Zabbix 6.0.14. Note that MongoDB is a loadable plugin and can be installed separately either from packages or from sources. The plugin will work with any minor version of Zabbix 6.0. For more details see [MongoDB plugin](#).

**PHP support** The maximum supported version for PHP is now 8.2.

**Limits for JavaScript objects in preprocessing** The following limits for [JavaScript objects](#) in preprocessing have been introduced:

- The total size of all messages that can be logged with the `log()` method has been limited to 8 MB per script execution.
- The initialization of multiple `HttpRequest` objects has been limited to 10 per script execution.
- The total length of header fields that can be added to a single `HttpRequest` object with the `addHeader()` method has been limited to 128 Kbytes (special characters and header names included).



## 20 What's new in Zabbix 6.0.15

**MariaDB 10.11 support** The maximum **supported version** for MariaDB is now 10.11.X.

**TimescaleDB 2.10 support** The maximum **supported version** for TimescaleDB is now 2.10.

**Connection options for Oracle plugin** The Oracle plugin, supported for Zabbix agent 2, now allows to specify `as sysdba`, `as sysoper`, or `as sysasm` login option. The option can be appended either to the user item key parameter or to the plugin configuration parameter `Plugins.Oracle.Sessions.<SessionName>.User` in the format `user as sysdba` (login option is case-insensitive; must not contain a trailing space).

**Signing data using RS256** A new `sign(hash,key,data)` JavaScript function has been implemented allowing to use the RS256 encryption algorithm to calculate the signature.

For more details see: [Additional JavaScript objects](#).

## 21 What's new in Zabbix 6.0.16

Configuration sync optimization for Oracle

For Zabbix installations with Oracle, it is now possible to manually change item and item preprocessing database field types from `nclob` to `nvarchar2` by applying a database patch.

Patch application may increase the speed of configuration sync in environments with large number of items and item preprocessing steps, but will reduce the maximum field size limit from 65535 bytes to 4000 bytes for some item parameters. See [Known issues](#) for details.

## 22 What's new in Zabbix 6.0.17

**Webhook integrations** New **webhook** media type for pushing Zabbix notifications to [Event-Driven Ansible](#) has been added.

**Mixing item key and session parameters in Zabbix agent 2 plugins** Zabbix agent 2 now allows to override **named session** parameters by specifying new values in the item key parameters. Previously, users had to select if they prefer to provide connection string values in a named session or in an item key. If a named session has been used, related item key parameters had to be empty. Now, if using named sessions, only the first parameter (usually, a URI) has to be specified in the named session, whereas other parameters can be defined either in the named session or in the item key.

**HTML support in Geomap attribution dropped** The attribution text for the **Geomap dashboard widget** can now only contain plain text; HTML support has been dropped.

In **Geographical maps** settings in the Administration → General section, the field *Attribution* is now only visible when *Tile provider* is set to *Other*.

## 23 What's new in Zabbix 6.0.18

**Items** `docker.container_stats`

The `docker.container_stats` item on Zabbix agent 2 now also returns a `pids_stats` property with the current number of processes/threads on the container.

**Cleaner configuration export** YAML files generated during Zabbix entity configuration export no longer contain empty lines between entities in an array, which makes such files shorter and more convenient to work with. See [Configuration export/import](#) section for updated export examples.

**UTF-8 BOM in configuration import** **Configuration import** now supports files with a UTF-8 byte-order mark (BOM).

**Cosmos DB monitoring** The template *Azure by HTTP* now also works with Azure Cosmos DB for MongoDB.

You can get this template:

- In *Configuration* → *Templates* in new installations.
- If you are upgrading from previous versions, you can download this template from Zabbix [Git repository](#) or find it in the *zabbix/templates* directory of the downloaded latest Zabbix version. Then, while in *Configuration* → *Templates* you can import it manually into Zabbix.

**Proxy history housekeeping** The limitation on the amount of outdated information deleted from the proxy database per proxy history housekeeping cycle has been removed.

Previously the **housekeeper** deleted only no more than 4 times the **HousekeepingFrequency** hours of outdated information. For example, if **HousekeepingFrequency** was set to "1", no more than 4 hours of outdated information (starting from the oldest entry) was deleted. In cases when a proxy would constantly receive data older than set in **ProxyOfflineBuffer**, this could result in excessive data accumulation.

Now this limitation has been removed, providing a more effective proxy history housekeeping solution.

**Google Cloud Platform Monitoring** A new [template](#) *Google Cloud Platform by HTTP (GCP by HTTP)* is available.

See setup instructions for [HTTP templates](#).

You can get this template:

- In *Configuration* → *Templates* in new installations.
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

**Default values for Zabbix agent 2** Zabbix agent 2 plugins now allow to define default values for connecting to monitoring targets in the configuration file. If no value is specified in an item key or a named session, the plugin will use the value defined in the corresponding default parameter. New parameters have the structure `Plugins.<PluginName>.Default.<Parameter>` - for example, `Plugins.MongoDB.Default.Uri=tcp://localhost:27017`. See for more info:

- [Configuring plugins](#)
- [Plugin configuration file parameters](#)

## 24 What's new in Zabbix 6.0.19

**Aggregate functions** The **count\_foreach** function now returns '0' for a matching item in the array, if no data are present for the item or the data do not match the filter. Previously such items would be ignored (no data added to the aggregation).

**TimescaleDB 2.11 support** Support for TimescaleDB version 2.11 is now available.

**Configurable TLS and connection parameters in MQTT plugin** The **MQTT plugin** for Zabbix agent 2 now provides additional configuration options, which can be defined in the plugin configuration file as **named session** or **default** parameters:

- Connection-related parameters: broker URL, topic, username, and password;
- TLS encryption parameters: location of the top-level CA(s) certificate, MQTT certificate or certificate chain, private key.

All of the new parameters are optional.

**JavaScript preprocessing** The heap limit for scripts has been upped from 64 to 512 megabytes.

**Supported platforms** Support for Debian 12 (Bookworm) has been added, and official packages are available for download on [Zabbix website](#).

## 25 What's new in Zabbix 6.0.20

**Templates** New templates are available:

- [AWS ECS Cluster by HTTP](#) (along with its [Serverless Cluster version](#))
- [Cisco SD-WAN by HTTP](#)
- [OpenStack by HTTP](#), which includes *OpenStack Nova by HTTP* template for monitoring OpenStack Nova service
- [PostgreSQL by ODBC](#)

You can get these templates:

- In *Configuration → Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration → Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

**Frontend** Spellcheck disabled in non-descriptive text areas

Spellcheck has been disabled for the text areas in which non-descriptive text is entered, such as scripts, expressions, macro values, etc.

**Miscellaneous** Database TLS connection for MySQL on SLES 12

The packages for server/proxy installation on SUSE Linux Enterprise Server version 12 are now built using MariaDB Connector/C library, thus enabling the encryption of connection to MySQL using the `DBTLSConnect` [parameter](#). The supported encryption values are "required" and "verify\_full".

## 26 What's new in Zabbix 6.0.21

MySQL 8.1 support

The maximum [supported version](#) for MySQL is now 8.1.X.

MariaDB 11.0 support

The maximum [supported version](#) for MariaDB is now 11.0.X.

Log file monitoring

For `log[]`, `logrt[]`, `log.count[]`, `logrt.count[]` items, regular expression runtime errors are now logged in the Zabbix agent log file. See [more details](#).

**Items** New item for Zabbix agent 2

A new item has been added to MySQL plugin for Zabbix agent 2. This new item, `mysql.custom.query`, can be used for executing custom MySQL queries.

**Templates** New template is available:

- [AWS Cost Explorer by HTTP](#)

You can get this template:

- In *Configuration → Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration → Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

**Notifications** Webhook integrations

New [webhook](#) media type for pushing Zabbix notifications to [Mantis Bug Tracker](#) has been added.

**Installation** Support for ARM64/AArch64

ARM64/AArch64 installation packages are now available for Debian, RHEL 8, 9 and its derivatives, as well as SLES/OpenSUSE Leap 15.

## 27 What's new in Zabbix 6.0.22

### Aggregate functions

The **last\_foreach** function is now also supported in the following **aggregate functions**: kurtosis, mad, skewness, stddevpop, stddevsamp, sumofsquares, varpop, and varsamp.

### Return value limit

The return value limit for receiving data from external sources (such as scripts or other programs) has been raised to 16MB. This affects:

- Agent items **system.run[]** and **vfs.file.contents[]**
- Custom agent checks defined in **user parameters**
- **SSH agent**, **External check** items and frontend **scripts** items
- **Remote commands**

**Templates** New templates are available:

- [Acronis Cyber Protect Cloud by HTTP](#)
- [HashiCorp Nomad by HTTP](#)
- [MantisBT by HTTP](#)

You can get these templates:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

## 28 What's new in Zabbix 6.0.23

See **breaking changes** for this version.

**Databases** Supported versions

PostgreSQL **16** and MariaDB **11.1** are now supported. See also: **Requirements**.

**Plugins** New item for PostgreSQL Zabbix agent 2 plugin

New **item**, **pgsql.version**, has been added to PostgreSQL Zabbix agent 2 plugin. This item is used for returning the PostgreSQL version.

**Templates** New templates

New templates are available:

- [FortiGate by HTTP](#)
- [FortiGate by SNMP](#)
- [Nextcloud by HTTP](#)

You can get these templates:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

Updated templates

[PostgreSQL by ODBC](#) and [PostgreSQL by Zabbix agent 2](#) templates now include the item and trigger for monitoring PostgreSQL version.

[Cisco Meraki organization by HTTP](#) template has been supplemented with items, item prototypes, LLD rules, and macros related to authentication, licenses, networks, SAML roles, and VPN statuses.

#### **Frontend** Miscellaneous

The *Clear history* button located in *Configuration → Hosts → Items* has been renamed *Clear history and trends* to more accurately describe its function, which is the same as the *Clear history and trends* button in the item *configuration form*.

In *trigger action* configuration, the condition type *Trigger name* has been renamed *Event name* to better describe its function. Note that by default, the event name matches the trigger name unless a custom event name is specified in *trigger configuration*.

## **29 What's new in Zabbix 6.0.24**

#### **Databases** TimescaleDB 2.12 support

Support for TimescaleDB version 2.12 is now available.

#### **Plugins** New items in Zabbix agent 2 plugins

The items for returning the database server version are now available in [MongoDB plugin](#) (*mongodb.version*) and [Oracle Database plugin](#) (*oracle.version*).

#### **Items** Content conversion to UTF-8

HTTP agent items, web scenarios, web checks and JavaScript items have been improved to convert to UTF-8 from the character set specified in the HTTP header or HTTP meta tag.

#### **Templates** New templates

New template is available:

- [HPE iLO by HTTP](#)

You can get this template:

- In *Configuration → Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration → Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

Updated templates

Integration with OpenShift has been added to [Kubernetes cluster state by HTTP](#) template.

## **30 What's new in Zabbix 6.0.25**

#### TimescaleDB 2.13 support

Support for TimescaleDB version 2.13 is now available.

#### **Items** Additional ssh.run options

The **ssh.run[]** item has been updated and now allows passing additional SSH options as a part of the item key. These options are supported only using libssh of version 0.9.0 and higher or libssh2. Supported option keys and values depend on the SSH library. See [SSH checks](#) for details.

#### **Plugins** Cache mode parameter for PostgreSQL plugin

New parameters for controlling the cache mode by default or on session name level have been added to the PostgreSQL plugin *configuration*:

- `Plugins.PostgreSQL.Default.CacheMode`
- `Plugins.PostgreSQL.Sessions.<SessionName>.CacheMode`

The cache mode parameter may have one of two allowed values: *prepare* (default) or *describe*. Note that "describe" is primarily useful when the environment does not allow prepared statements such as when running a connection pooler like PgBouncer.

## 31 What's new in Zabbix 6.0.26

### Templates New templates

The set of [Azure by HTTP](#) templates has been supplemented with the Azure Cost Management by HTTP template.

You can get this template:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

### Updated templates

[MSSQL by ODBC](#) template has been updated for working with AlwaysOn features such as Failover Cluster Instances (FCI) and Availability Groups (AG). It is now possible to use the template for monitoring a host in cluster, standalone host and host by cluster name. A macro for instance name is no longer used; when the master is switched, it is not required to change any macros:

- new LLD rules and metrics for quorum and quorum members have been added;
- the type of the LLD rules has been changed from "Database monitor" to "Dependent item";
- items with `db.odbc.discovery` key have been turned into items dependent on the `db.odbc.get` item
- new item has been added - MSSQL DB '{#DBNAME}': Recovery model, which returns the database recovery model under the database discovery;
- new macros, namely, `{MSSQL.BACKUP_FULL.USED}`, `{MSSQL.BACKUP_DIFF.USED}`, `{MSSQL.BACKUP_LOG.USED}`, have been added - those can be used for disabling backup age triggers for a certain database.

### Frontend PHP support

The maximum supported version for PHP is now 8.3.

### X-Frame-Options HTTP header

The *X-Frame-Options* header parameter has been renamed to *Use X-Frame-Options header*, now consists of a checkbox and an input field (allowing you to disable the header by unmarking a checkbox instead of specifying "null" in the input field), and supports additional values.

Other security parameters now also follow the same structure. For more information, see the [security](#) parameters in *Administration* → *General*.

### Databases MySQL 8.2 support

The maximum [supported version](#) for MySQL is now 8.2.X.

## 32 What's new in Zabbix 6.0.27

### Databases MySQL 8.3 support

The maximum [supported version](#) for MySQL is now 8.3.X.

### MariaDB 11.2 support

The maximum [supported version](#) for MariaDB is now 11.2.X.

### Plugins MSSQL

A new plugin for direct monitoring of MSSQL by Zabbix agent 2 has been added.

For more information, see:

- [MSSQL plugin readme](#)

- [Agent 2 items](#)
- [MSSQL plugin parameters](#)
- [Agent 2 installation](#)

#### **Templates** New templates

A new template is available:

- [YugabyteDB by HTTP](#), which includes the *YugabyteDB Cluster by HTTP* template for monitoring each YugabyteDB cluster.

You can get this template:

- In *Configuration → Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration → Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

#### **Platforms** Zabbix agent 2 support on Windows

To prevent critical security vulnerabilities, the minimum Windows version for Zabbix agent 2 has been raised to Windows 10/Windows Server 2016. See note under [Supported platforms](#) for more information.

### **33 What's new in Zabbix 6.0.28**

#### **Databases** TimescaleDB 2.14 support

The maximum [supported version](#) for TimescaleDB is now 2.14.X.

#### **Templates** New templates

New templates are available:

- [AWS ELB Application Load Balancer by HTTP](#)
- [Check Point Next Generation Firewall by SNMP](#)
- [MSSQL by Zabbix agent 2](#)

You can get these templates:

- In *Configuration → Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration → Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

### **34 What's new in Zabbix 6.0.29**

#### **Databases** MariaDB 11.3 support

The maximum [supported version](#) for MariaDB is now 11.3.X.

#### **Templates** New templates

A new template is available:

- [Oracle Cloud by HTTP](#), a master template that discovers various Oracle Cloud Infrastructure (OCI) services and resources.

You can get this template:

- In *Configuration → Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration → Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

## Updated templates

- [FortiGate by SNMP](#) template has been supplemented with metrics regarding VPN, high availability (HA), wireless termination points (WTPs), SD-WAN health checks, and HW sensors.
- [MySQL by ODBC](#) template has been supplemented with the items "MySQL: Get database" and "MySQL: Get replication". The LLD rules "Database discovery" and "Replication discovery" have been changed to the "Dependent item" type.
- [Oracle by ODBC](#) template has been supplemented with the items "Oracle: Get archive log", "Oracle: Get ASM disk groups", "Oracle: Get database", "Oracle: Get PDB", and "Oracle: Get tablespace". The LLD rules "Archive log discovery", "ASM disk groups discovery", "Database discovery", "PDB discovery", and "Tablespace discovery" have been changed to the "Dependent item" type.
- The VMware Hypervisor template within the [VMware](#) and [VMware FQDN](#) template sets has been supplemented with a new LLD rule, "Sensor discovery".

## 35 What's new in Zabbix 6.0.30

### Frontend Frontend languages

Dutch, Georgian, and Spanish languages are now enabled in the frontend.

### Plugins Ember+

A new plugin for direct monitoring of Ember+ by Zabbix agent 2 has been added.

For more information, see:

- [Ember+ plugin readme](#)
- [Agent 2 items](#)
- [Ember+ plugin parameters](#)
- [Agent 2 installation](#)

### Templates New templates

The AWS ELB template set has been supplemented with the template [AWS ELB Network Load Balancer by HTTP](#).

You can get this template:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

## Updated templates

The [OS templates](#) (agent, SNMP, and Prometheus-based) have been given a mounted filesystem update. In mounted filesystem discovery, the "Space is low" and "Space is critically low" triggers no longer have the absolute threshold and burst condition.

### Macros Macro support for email media types

When configuring an [email media type](#), it is now possible to use macros in the [username and password fields](#).

## 36 What's new in Zabbix 6.0.31

### Items More secure JavaScript preprocessing

The JavaScript function [atob](#) now returns an array of 8-bit unsigned integers instead of a decoded string.

### Frontend Preprocessing test result truncation

When [testing preprocessing steps](#), test results are now truncated to a maximum size of 512KB when sent to the frontend. Note that data larger than 512KB is still processed fully by Zabbix server.

### GSM modem validation for SMS media type

In SMS media type configuration, the GSM modem path is now validated to be a modem device or symlink to such.



## **Templates** New templates

A new template is available:

- [Jira Data Center by JMX](#), a template for monitoring Jira Data Center health.

You can get this template:

- In *Configuration → Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration → Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

## **37 What's new in Zabbix 6.0.32**

### **Databases** MySQL 8.4 support

The maximum **supported version** for MySQL is now 8.4.X.

MariaDB 11.4 support

The maximum **supported version** for MariaDB is now 11.4.X.

TimescaleDB 2.15 support

The maximum **supported version** for TimescaleDB is now 2.15.X.

## **Templates** New templates

The set of [Azure by HTTP](#) templates has been supplemented with the Azure VM Scale Set by HTTP template.

You can get this template:

- In *Configuration → Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration → Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

Updated templates

The templates [Zabbix server health](#), [Remote Zabbix server health](#), [Zabbix proxy health](#), and [Remote Zabbix proxy health](#) have been updated for improved data visualization in item graphs by regrouping the displayed metrics.

## **38 What's new in Zabbix 6.0.33**

### **Databases** MySQL 9.0 support

The maximum **supported version** for MySQL is now 9.0.X.

## **Templates** New templates

- [AWS Lambda by HTTP](#), a template for monitoring AWS Lambda metrics.

You can get this template:

- In *Configuration → Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration → Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

## **39 What's new in Zabbix 6.0.34**

## Databases TimescaleDB 2.16 support

The maximum **supported version** for TimescaleDB is now 2.16.X.

## MariaDB 11.5 support

The maximum **supported version** for MariaDB is now 11.5.X.

## Notifications Webhook integrations

A new integration is available that allows to integrate Zabbix with the [MS Teams workflow feature](#) using the Zabbix **webhook** media type.

## Items Special characters supported in ODBC check user password

Special characters are now supported when specifying the **ODBC check** user password in the frontend.

## Templates New templates

- [GitHub repository by HTTP](#), a template for monitoring GitHub repositories.
- [Microsoft 365 reports by HTTP](#), a template for monitoring Microsoft 365 services.

You can get these templates:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

## 40 What's new in Zabbix 6.0.35

### Items Internal item for monitoring high-availability manager

The `ha_manager` (high-availability manager) process now can be monitored by the `zabbix[process*]` **internal item**.

### Templates New templates

- [Huawei OceanStor V6 by SNMP](#), a template for monitoring SAN Huawei OceanStor V6.

Updated templates

- In all [APC templates](#), the discovery rule for external defective battery packs has been supplemented with a filter to avoid creating unsupported items.
- In the templates [MSSQL by Zabbix agent 2](#) and [MSSQL by ODBC](#), a timeout has been added and certain item keys have been adjusted to increase monitoring stability.

You can get these templates:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

## 41 What's new in Zabbix 6.0.36

### TimescaleDB 2.17 support

The maximum **supported version** for TimescaleDB is now 2.17.X.

### PostgreSQL 17 support

PostgreSQL 17 is now **supported**.

MSSQL instance names supported in agent 2 plugin

It is now possible to specify MSSQL instance names as part of the connection string in MSSQL agent 2 plugin items, for example:

```
mssql.custom.query[sqlserver://localhost/InstanceName,...]
```

Note that in this case **no port** must be specified. If port is specified, then the instance name will be ignored and the specified port will be used for connection.

Performance counter query updated in MSSQL agent 2 plugin

The [performance counter query](#) of the MSSQL agent 2 plugin has been updated, resolving issues in the data retrieval of unnamed (default) MSSQL instances.

New templates

- [Nutanix Prism Element by HTTP](#), a template set that also includes the templates *Nutanix Cluster Prism Element by HTTP* and *Nutanix Host Prism Element by HTTP*.

You can get this template:

- In *Configuration → Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration → Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

Updated templates

- The template *VMware Hypervisor* within the [VMware](#) and [VMware FQDN](#) template sets has been updated with the option to be used as a standalone template.
- [Proxmox VE by HTTP](#) has been updated with new items and trigger prototypes for disk space usage in LXC containers.
- In the template [MSSQL by ODBC](#), the performance counter query has been updated to improve data retrieval. Both *MSSQL by ODBC* and [MSSQL by Zabbix agent 2](#) template documentation has been reviewed and updated.

## 42 What's new in Zabbix 6.0.37

This minor version does not have any functional changes.

## 43 What's new in Zabbix 6.0.38

See [breaking changes](#) for this version.

## 44 What's new in Zabbix 6.0.39

See [breaking changes](#) for this version.

TimescaleDB 2.18 support

The maximum [supported version](#) for TimescaleDB is now 2.18.X.

New templates

- The [Azure by HTTP](#) template set has been supplemented with the template *Azure SQL Managed Instance by HTTP*.

You can get this template:

- In *Configuration → Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration → Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

Updated templates

- All [Dell HTTP and SNMP](#) templates have been updated with improvements, including fixes for items, macros, and scripts.

## 45 What's new in Zabbix 6.0.40

### New templates

- The template set [Zabbix server health](#) has been supplemented with the templates *Zabbix server health by Zabbix agent*, *Zabbix server health by Zabbix agent active*, and [Zabbix proxy health](#) - with *Zabbix proxy health by Zabbix agent* and *Zabbix proxy health by Zabbix agent active*, enabling the monitoring of internal Zabbix metrics via Zabbix agent.

You can get this template:

- In *Configuration* → *Templates* in new installations;
- When upgrading from previous versions, the latest templates can be downloaded from the [Zabbix Git repository](#) and manually imported into Zabbix in the *Configuration* → *Templates* section. If a template with the same name already exists, check the *Delete missing* option before importing to achieve a clean import. This way the items that have been excluded from the updated template will be removed (note that history of the deleted items will be lost).

## 2 Definitions

**Overview** In this section you can learn the meaning of some terms commonly used in Zabbix.

### Definitions **host**

- any physical or virtual device, application, service, or any other logically-related collection of monitored parameters.

### **host group**

- a logical grouping of hosts; it may contain hosts and templates. Hosts and templates within a host group are not in any way linked to each other. Host groups are used when assigning access rights to hosts for different user groups.

### **item**

- a particular piece of data that you want to receive from a host, a metric of data.

### **value preprocessing**

- a transformation of received metric value before saving it to the database.

### **trigger**

- a logical expression that defines a problem threshold and is used to "evaluate" data received in items.

When received data are above the threshold, triggers go from 'Ok' into a 'Problem' state. When received data are below the threshold, triggers stay in/return to an 'Ok' state.

### **event**

- a single occurrence of something that deserves attention such as a trigger changing state or a discovery/agent autoregistration taking place.

### **event tag**

- a pre-defined marker for the event. It may be used in event correlation, permission granulation, etc.

### **event correlation**

- a method of correlating problems to their resolution flexibly and precisely.

For example, you may define that a problem reported by one trigger may be resolved by another trigger, which may even use a different data collection method.

### **problem**

- a trigger that is in "Problem" state.

### **problem update**

- problem management options provided by Zabbix, such as adding comment, acknowledging, changing severity or closing manually.

### **action**

- a predefined means of reacting to an event.

An action consists of operations (e.g. sending a notification) and conditions (when the operation is carried out)

### **escalation**

- a custom scenario for executing operations within an action; a sequence of sending notifications/executing remote commands.

### **media**

- a means of delivering notifications; delivery channel.

### **notification**

- a message about some event sent to a user via the chosen media channel.

### **remote command**

- a pre-defined command that is automatically executed on a monitored host upon some condition.

### **template**

- a set of entities (items, triggers, graphs, low-level discovery rules, web scenarios) ready to be applied to one or several hosts.

The job of templates is to speed up the deployment of monitoring tasks on a host; also to make it easier to apply mass changes to monitoring tasks. Templates are linked directly to individual hosts.

### **web scenario**

- one or several HTTP requests to check the availability of a web site.

### **frontend**

- the web interface provided with Zabbix.

### **dashboard**

- customizable section of the web interface displaying summaries and visualizations of important information in visual units called widgets.

### **widget**

- visual unit displaying information of a certain kind and source (a summary, a map, a graph, the clock, etc.), used in the dashboard.

### **Zabbix API**

- Zabbix API allows you to use the JSON RPC protocol to create, update and fetch Zabbix objects (like hosts, items, graphs and others) or perform any other custom tasks.

### **Zabbix server**

- a central process of Zabbix software that performs monitoring, interacts with Zabbix proxies and agents, calculates triggers, sends notifications; a central repository of data.

### **Zabbix proxy**

- a process that may collect data on behalf of Zabbix server, taking some processing load from the server.

### **Zabbix agent**

- a process deployed on monitoring targets to actively monitor local resources and applications.

### **Zabbix agent 2**

- a new generation of Zabbix agent to actively monitor local resources and applications, allowing to use custom plugins for monitoring.

#### **Attention:**

Because Zabbix agent 2 shares much functionality with Zabbix agent, the term "Zabbix agent" in documentation stands for both - Zabbix agent and Zabbix agent 2, if the functional behavior is the same. Zabbix agent 2 is only specifically named where its functionality differs.

### **encryption**

- support of encrypted communications between Zabbix components (server, proxy, agent, zabbix\_sender and zabbix\_get utilities) using Transport Layer Security (TLS) protocol.

### **network discovery**

- *automated discovery of network devices.*

#### **low-level discovery**

- *automated discovery of low-level entities on a particular device (e.g. file systems, network interfaces, etc).*

#### **low-level discovery rule**

- *set of definitions for automated discovery of low-level entities on a device.*

#### **item prototype**

- *a metric with certain parameters as variables, ready for low-level discovery.* After low-level discovery the variables are automatically substituted with the real discovered parameters and the metric automatically starts gathering data.

#### **trigger prototype**

- *a trigger with certain parameters as variables, ready for low-level discovery.* After low-level discovery the variables are automatically substituted with the real discovered parameters and the trigger automatically starts evaluating data.

Prototypes of some other Zabbix entities are also in use in low-level discovery - graph prototypes, host prototypes, host group prototypes.

#### **agent autoregistration**

- *automated process whereby a Zabbix agent itself is registered as a host and started to monitor.*

### **3 Zabbix processes**

Please use the sidebar to access content in the Zabbix process section.

#### **1 Server**

##### Overview

Zabbix server is the central process of Zabbix software.

The server performs the polling and trapping of data, it calculates triggers, sends notifications to users. It is the central component to which Zabbix agents and proxies report data on availability and integrity of systems. The server can itself remotely check networked services (such as web servers and mail servers) using simple service checks.

The server is the central repository in which all configuration, statistical and operational data is stored, and it is the entity in Zabbix that will actively alert administrators when problems arise in any of the monitored systems.

The functioning of a basic Zabbix server is broken into three distinct components; they are: Zabbix server, web frontend and database storage.

All of the configuration information for Zabbix is stored in the database, which both the server and the web frontend interact with. For example, when you create a new item using the web frontend (or API) it is added to the items table in the database. Then, about once a minute Zabbix server will query the items table for a list of the items which are active that is then stored in a cache within the Zabbix server. This is why it can take up to two minutes for any changes made in Zabbix frontend to show up in the latest data section.

##### Running server

If installed as package

Zabbix server runs as a daemon process. The server can be started by executing:

```
systemctl start zabbix-server
```

This will work on most of GNU/Linux systems. On other systems you may need to run:

```
/etc/init.d/zabbix-server start
```

Similarly, for stopping/restarting/viewing status, use the following commands:

```
systemctl stop zabbix-server
systemctl restart zabbix-server
systemctl status zabbix-server
```

Start up manually

If the above does not work you have to start it manually. Find the path to the zabbix\_server binary and execute:

zabbix\_server

You can use the following command line parameters with Zabbix server:

|                               |   |
|-------------------------------|---|
| -c --config <file>            | path to the configuration file (default is /usr/local/etc/zabbix_server.conf) |
| -f --foreground               | run Zabbix server in foreground   |
| -R --runtime-control <option> | perform administrative functions  |
| -h --help                     | give this help  |
| -V --version                  | display version number  |

Examples of running Zabbix server with command line parameters:

```
zabbix_server -c /usr/local/etc/zabbix_server.conf
zabbix_server --help
zabbix_server -V
```

Runtime control

Runtime control options:

| Option                          | Description  | Target  |
|---------------------------------|--|---|
| config_cache_reload             | Reload configuration cache. Ignored if cache is being currently loaded.  |   |
| diaginfo[=<section>]            | Gather diagnostic information in the server log file.  | <b>historycache</b> - history cache statistics<br><b>valuecache</b> - value cache statistics<br><b>preprocessing</b> - preprocessing manager statistics<br><b>alerting</b> - alert manager statistics<br><b>lld</b> - LLD manager statistics<br><b>locks</b> - list of mutexes (is empty on <i>BSD</i> systems) |
| ha_status                       | Log high availability (HA) cluster status.   |   |
| ha_remove_node=tag              | Remove the high availability (HA) node specified by its name or ID.<br>Note that active/standby nodes cannot be removed. | <b>target</b> - name or ID of the node (can be obtained by running ha_status)   |
| ha_set_failover_delay=tag delay | Set high availability (HA) failover delay.<br>Time suffixes are supported, e.g. 10s, 1m.                                 |   |
| secrets_reload                  | Reload secrets from Vault.   |   |
| service_cache_reload            | Reload the service manager cache.  |   |
| snmp_cache_reload               | Reload SNMP cache, clear the SNMP properties (engine time, engine boots, engine id, credentials) for all hosts.          |   |
| housekeeper_execute             | Start the <b>housekeeping</b> procedure.<br>Ignored if the housekeeping procedure is currently in progress.              |   |

| Option                          | Description   | Target  |
|---------------------------------|---|---|
| trigger_housekeeping[=<target>] | Start the trigger housekeeping procedure for <b>services</b> to remove problems caused by triggers that have since been deleted, including service problems generated by such problems (considered as resolved at the time of housekeeping).<br>Note that, until the housekeeping procedure is started, problems caused by now-deleted triggers might still generate service problems and assign them to services.<br><br>If your setup involves many service <b>status calculation rules</b> based on frequently discovered/undiscovered triggers, consider increasing the frequency of the trigger housekeeping procedure by adjusting the <b>ProblemHousekeepingFrequency</b> server configuration parameter.<br><br>Ignored if the trigger housekeeping procedure is currently in progress. |   |
| log_level_increase[=<target>]   | Increases <b>log</b> level, affects all processes if target is not specified.<br>Not supported on <i>BSD</i> systems.   | <b>process type</b> - All processes of specified type (e.g., poller)<br>See all <b>server process types</b> .<br><b>process type,N</b> - Process type and number (e.g., poller,3)<br><b>pid</b> - Process identifier (1 to 65535). For larger values specify target as 'process type,N'.  |
| log_level_decrease[=<target>]   | Decreases <b>log</b> level, affects all processes if target is not specified.<br>Not supported on <i>BSD</i> systems.   |   |
| prof_enable[=<target>]          | Enable profiling.<br>Affects all processes if target is not specified.<br>Enabled profiling provides details of all rwlocks/mutexes by function name.<br>Supported since Zabbix 6.0.13.   | <b>process type</b> - All processes of specified type (e.g. history syncer)<br>Supported process types as profiling targets: alerter, alert manager, availability manager, configuration syncer, discoverer, escalator, history poller, history syncer, housekeeper, http poller, icmp pinger, ipmi manager, ipmi poller, java poller, lld manager, lld worker, odbc poller, poller, preprocessing manager, preprocessing worker, proxy poller, self-monitoring, service manager, snmp trapper, task manager, timer, trapper, unreachable poller, vmware collector<br><b>process type,N</b> - Process type and number (e.g., history syncer,1)<br><b>pid</b> - Process identifier (1 to 65535). For larger values specify target as 'process type,N'.<br><b>scope</b> - rwlock, mutex, processing can be used with the process type and number (e.g., history syncer,1,processing) or all processes of type (e.g., history syncer,rwlock) |
| prof_disable[=<target>]         | Disable profiling.<br>Affects all processes if target is not specified.<br>Supported since Zabbix 6.0.13.   | <b>process type</b> - All processes of specified type (e.g. history syncer)<br>Supported process types as profiling targets: see <b>prof_enable</b><br><b>process type,N</b> - Process type and number (e.g., history syncer,1)<br><b>pid</b> - Process identifier (1 to 65535). For larger values specify target as 'process type,N'.  |

Example of using runtime control to reload the server configuration cache:



```
zabbix_server -c /usr/local/etc/zabbix_server.conf -R config_cache_reload
```

Examples of using runtime control to gather diagnostic information:

```
# Gather all available diagnostic information in the server log file:
```

```
zabbix_server -R diaginfo
```

```
# Gather history cache statistics in the server log file:
```

```
zabbix_server -R diaginfo=historycache
```

Example of using runtime control to reload the SNMP cache:

```
zabbix_server -R snmp_cache_reload
```

Example of using runtime control to trigger execution of housekeeper:

```
zabbix_server -c /usr/local/etc/zabbix_server.conf -R housekeeper_execute
```

Examples of using runtime control to change log level:

```
# Increase log level of all processes:
```

```
zabbix_server -c /usr/local/etc/zabbix_server.conf -R log_level_increase
```

```
# Increase log level of second poller process:
```

```
zabbix_server -c /usr/local/etc/zabbix_server.conf -R log_level_increase=poller,2
```

```
# Increase log level of process with PID 1234:
```

```
zabbix_server -c /usr/local/etc/zabbix_server.conf -R log_level_increase=1234
```

```
# Decrease log level of all http poller processes:
```

```
zabbix_server -c /usr/local/etc/zabbix_server.conf -R log_level_decrease="http poller"
```

Example of setting the HA failover delay to the minimum of 10 seconds:

```
zabbix_server -R ha_set_failover_delay=10s
```

Process user

Zabbix server is designed to run as a non-root user. It will run as whatever non-root user it is started as. So you can run server as any non-root user without any issues.

If you will try to run it as 'root', it will switch to a hardcoded 'zabbix' user, which must be **present** on your system. You can only run server as 'root' if you modify the 'AllowRoot' parameter in the server configuration file accordingly.

If Zabbix server and **agent** are run on the same machine it is recommended to use a different user for running the server than for running the agent. Otherwise, if both are run as the same user, the agent can access the server configuration file and any Admin level user in Zabbix can quite easily retrieve, for example, the database password.

Configuration file

See the **configuration file** options for details on configuring zabbix\_server.

Start-up scripts

The scripts are used to automatically start/stop Zabbix processes during system's start-up/shutdown. The scripts are located under directory misc/init.d.

Server process types

- **alert manager** - alert queue manager
- **alert syncer** - alert DB writer
- **alerter** - process for sending notifications
- **availability manager** - process for host availability updates
- **configuration syncer** - process for managing in-memory cache of configuration data
- **discoverer** - process for discovery of devices
- **escalator** - process for escalation of actions
- **ha manager** - process for managing high availability
- **history poller** - process for handling calculated and internal checks requiring a database connection
- **history syncer** - history DB writer
- **housekeeper** - process for removal of old historical data
- **http poller** - web monitoring poller
- **icmp pinger** - poller for icmping checks
- **ipmi manager** - IPMI poller manager

- `ipmi poller` - poller for IPMI checks
- `java poller` - poller for Java checks
- `lld manager` - manager process of low-level discovery tasks
- `lld worker` - worker process of low-level discovery tasks
- `odbc poller` - poller for ODBC checks
- `poller` - normal poller for passive checks
- `preprocessing manager` - manager of preprocessing tasks
- `preprocessing worker` - process for data preprocessing
- `proxy poller` - poller for passive proxies
- `report manager` - manager of scheduled report generation tasks
- `report writer` - process for generating scheduled reports
- `self-monitoring` - process for collecting internal server statistics
- `service manager` - process for managing services by receiving information about problems, problem tags, and problem recovery from history syncer, task manager, and alert manager
- `snmp trapper` - trapper for SNMP traps
- `task manager` - process for remote execution of tasks requested by other components (e.g., close problem, acknowledge problem, check item value now, remote command functionality)
- `timer` - timer for processing maintenances
- `trapper` - trapper for active checks, traps, proxy communication
- `trigger housekeeper` - process for removing problems generated by triggers that have been deleted
- `unreachable poller` - poller for unreachable devices
- `vmware collector` - VMware data collector responsible for data gathering from VMware services

The server log file can be used to observe these process types.

Various types of Zabbix server processes can be monitored using the **`zabbix[process,<type>,<mode>,<state>]`** internal **item**.

#### Supported platforms

Due to the security requirements and mission-critical nature of server operation, UNIX is the only operating system that can consistently deliver the necessary performance, fault tolerance and resilience. Zabbix operates on market leading versions.

Zabbix server is tested on the following platforms:

- Linux
- Solaris
- AIX
- HP-UX
- Mac OS X
- FreeBSD
- OpenBSD
- NetBSD
- SCO Open Server
- Tru64/OSF1

#### Note:

Zabbix may work on other Unix-like operating systems as well.

#### Locale

Note that the server requires a UTF-8 locale so that some textual items can be interpreted correctly. Most modern Unix-like systems have a UTF-8 locale as default, however, there are some systems where that may need to be set specifically.

## 1 High availability

#### Overview

High availability (HA) is typically required in critical infrastructures that can afford virtually no downtime. So for any service that may fail there must be a failover option in place to take over should the current service fail.

Zabbix offers a **native** high-availability solution that is easy to set up and does not require any previous HA expertise. Native Zabbix HA may be useful for an extra layer of protection against software/hardware failures of Zabbix server or to have less downtime due to maintenance.

In the Zabbix high availability mode multiple Zabbix servers are run as nodes in a cluster. While one Zabbix server in the cluster is active, others are on standby, ready to take over if necessary.



Switching to Zabbix HA is non-committal. You may switch back to standalone operation at any point.

See also: [Implementation details](#)

Enabling high availability

Starting Zabbix server as cluster node

Two parameters are required in the server [configuration](#) to start a Zabbix server as cluster node:

- **HANodeName** parameter must be specified for each Zabbix server that will be an HA cluster node.

This is a unique node identifier (e.g. `zabbix-node-01`) that the server will be referred to in agent and proxy configurations. If you do not specify `HANodeName`, then the server will be started in standalone mode.

- **NodeAddress** parameter must be specified for each node.

The `NodeAddress` parameter (`address:port`) will be used by Zabbix frontend to connect to the active server node. `NodeAddress` must match the IP or FQDN name of the respective Zabbix server.

Restart all Zabbix servers after making changes to the configuration files. They will now be started as cluster nodes. The new status of the servers can be seen in *Reports* → [System information](#) and also by running:

```
zabbix_server -R ha_status
```

This runtime command will log the current HA cluster status into the Zabbix server log (and to stdout):

```
Failover delay: 60 seconds
Cluster status:
# ID Name Address Status Last Access
1. ckzxxqg7u0001lsropenyzh3m zabbix-node-01 64.227.66.193:10051 standby 0s
2. ckzxyqo1k00013frpq539e1jp zabbix-node-02 64.227.74.25:10051 active 3s
```

Preparing frontend

Make sure that Zabbix server `address:port` is **not defined** in the frontend configuration (found in `conf/zabbix.conf.php` of the frontend files directory).

```
// Uncomment and set to desired values to override Zabbix hostname/IP and port.
// $ZBX_SERVER = '';
// $ZBX_SERVER_PORT = '';
```

Zabbix frontend will autodetect the active node by reading settings from the nodes table in Zabbix database. Node address of the active node will be used as the Zabbix server address.

Proxy configuration

HA cluster nodes (servers) must be listed in the configuration of either passive or active Zabbix proxy.

For a passive proxy, the node names must be listed in the `Server` [parameter](#) of the proxy, separated by a **comma**.

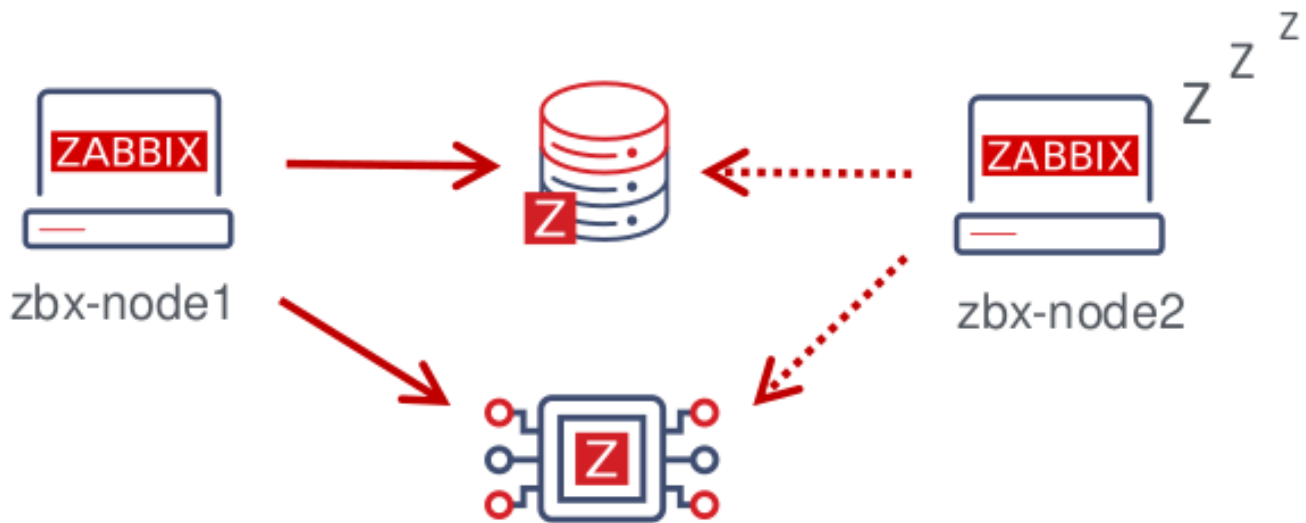
```
Server=zabbix-node-01,zabbix-node-02
```

For an active proxy, the node names must be listed in the `Server` [parameter](#) of the proxy, separated by a **semicolon**.

```
Server=zabbix-node-01;zabbix-node-02
```

## Agent configuration

HA cluster nodes (servers) must be listed in the configuration of Zabbix agent or Zabbix agent 2.



To enable passive checks, the node names must be listed in the Server **parameter**, separated by a **comma**.

```
Server=zabbix-node-01,zabbix-node-02
```

To enable active checks, the node names must be listed in the ServerActive **parameter**. Note that for active checks the nodes must be separated by a comma from any other servers, while the nodes themselves must be separated by a **semicolon**, e.g.:

```
ServerActive=zabbix-node-01;zabbix-node-02
```

### Failover to standby node

Zabbix will fail over to another node automatically if the active node stops. There must be at least one node in standby status for the failover to happen.

How fast will the failover be? All nodes update their last access time (and status, if it is changed) every 5 seconds. So:

- If the active node shuts down and manages to report its status as "stopped", another node will take over within **5 seconds**.
- If the active node shuts down/becomes unavailable without being able to update its status, standby nodes will wait for the **failover delay** + 5 seconds to take over

The failover delay is configurable, with the supported range between 10 seconds and 15 minutes (one minute by default). To change the failover delay, you may run:

```
zabbix_server -R ha_set_failover_delay=5m
```

### Managing HA cluster

The current status of the HA cluster can be managed using the dedicated **runtime control** options:

- **ha\_status** - log HA cluster status in the Zabbix server log (and to stdout)
- **ha\_remove\_node=target** - remove an HA node identified by its <target> - name or ID of the node (name/ID can be obtained from the output of running **ha\_status**), e.g.:

```
zabbix_server -R ha_remove_node=zabbix-node-02
```

Note that active/standby nodes cannot be removed.

- **ha\_set\_failover\_delay=delay** - set HA failover delay (between 10 seconds and 15 minutes; time suffixes are supported, e.g. 10s, 1m)

Node status can be monitored:

- in Reports → **System information**
- in the **System information** dashboard widget
- using the **ha\_status** runtime control option of the server (see above).

The `zabbix[cluster,discovery,nodes]` internal item can be used for node discovery, as it returns a JSON with the high-availability node information.

## Disabling high availability

To disable a high availability cluster:

- make backup copies of configuration files
- stop standby nodes
- remove the HANodeName parameter from the active primary server
- restart the primary server (it will start in standalone mode)

## Implementation details

The high availability (HA) cluster is an opt-in solution and it is supported for Zabbix server. The native HA solution is designed to be simple in use, it will work across sites and does not have specific requirements for the databases that Zabbix recognizes. Users are free to use the native Zabbix HA solution, or a third-party HA solution, depending on what best suits the high availability requirements in their environment.

The solution consists of multiple zabbix\_server instances or nodes. Every node:

- is configured separately
- uses the same database
- may have several modes: active, standby, unavailable, stopped

Only one node can be active (working) at a time. A standby node runs only one process - the HA manager. A standby node does no data collection, processing or other regular server activities; they do not listen on ports; they have minimum database connections.

Both active and standby nodes update their last access time every 5 seconds. Each standby node monitors the last access time of the active node. If the last access time of the active node is over 'failover delay' seconds, the standby node switches itself to be the active node and assigns 'unavailable' status to the previously active node.

The active node monitors its own database connectivity - if it is lost for more than failover delay-5 seconds, it must stop all processing and switch to standby mode. The active node also monitors the status of the standby nodes - if the last access time of a standby node is over 'failover delay' seconds, the standby node is assigned the 'unavailable' status.

The nodes are designed to be compatible across minor Zabbix versions.

## 2 Agent

### Overview

Zabbix agent is deployed on a monitoring target to actively monitor local resources and applications (hard drives, memory, processor statistics, etc.).

The agent gathers operational information locally and reports data to Zabbix server for further processing. In case of failures (such as a hard disk running full or a crashed service process), Zabbix server can actively alert the administrators of the particular machine that reported the failure.

Zabbix agents are extremely efficient because of use of native system calls for gathering statistical information.

### Passive and active checks

Zabbix agents can perform passive and active checks.

In a **passive check** the agent responds to a data request. Zabbix server (or proxy) asks for data, for example, CPU load, and Zabbix agent sends back the result.

**Active checks** require more complex processing. The agent must first retrieve a list of items from Zabbix server for independent processing. Then it will periodically send new values to the server.

Whether to perform passive or active checks is configured by selecting the respective monitoring **item type**. Zabbix agent processes items of type 'Zabbix agent' or 'Zabbix agent (active)'.

### Supported platforms

Zabbix agent is **supported** on the following platforms:

- Windows (all desktop and server versions since XP)
- Linux (also available in **distribution packages**)
- macOS
- IBM AIX
- FreeBSD
- OpenBSD

- Solaris

It is also possible to download legacy Zabbix agent binaries for [NetBSD](#) and [HP-UX](#), and those are compatible with current Zabbix server/proxy version.

#### Agent on UNIX-like systems

Zabbix agent on UNIX-like systems is run on the host being monitored.

#### Installation

See the [package installation](#) section for instructions on how to install Zabbix agent as package.

Alternatively see instructions for [manual installation](#) if you do not want to use packages.

#### Attention:

In general, 32bit Zabbix agents will work on 64bit systems, but may fail in some cases.

#### If installed as package

Zabbix agent runs as a daemon process. The agent can be started by executing:

```
systemctl start zabbix-agent
```

This will work on most of GNU/Linux systems. On other systems you may need to run:

```
/etc/init.d/zabbix-agent start
```

Similarly, for stopping/restarting/viewing status of Zabbix agent, use the following commands:

```
systemctl stop zabbix-agent
systemctl restart zabbix-agent
systemctl status zabbix-agent
```

#### Start up manually

If the above does not work you have to start it manually. Find the path to the `zabbix_agentd` binary and execute:

```
zabbix_agentd
```

#### Agent on Windows systems

Zabbix agent on Windows runs as a Windows service.

#### Preparation

Zabbix agent is distributed as a zip archive. After you download the archive you need to unpack it. Choose any folder to store Zabbix agent and the configuration file, e. g.

```
C:\zabbix
```

Copy `bin\zabbix_agentd.exe` and `conf\zabbix_agentd.conf` files to `c:\zabbix`.

Edit the `c:\zabbix\zabbix_agentd.conf` file to your needs, making sure to specify a correct "Hostname" parameter.

#### Installation

After this is done use the following command to install Zabbix agent as Windows service:

```
C:\> c:\zabbix\zabbix_agentd.exe -c c:\zabbix\zabbix_agentd.conf -i
```

Now you should be able to configure "Zabbix agent" service normally as any other Windows service.

See [more details](#) on installing and running Zabbix agent on Windows.

#### Other agent options

It is possible to run multiple instances of the agent on a host. A single instance can use the default configuration file or a configuration file specified in the command line. In case of multiple instances each agent instance must have its own configuration file (one of the instances can use the default configuration file).

The following command line parameters can be used with Zabbix agent:

| Parameter                     | Description |
|-------------------------------|-------------|
| <b>UNIX and Windows agent</b> |             |

| Parameter                             | Description  |
|---------------------------------------|--|
| -c --config <config-file>             | Path to the configuration file.<br>You may use this option to specify a configuration file that is not the default one.<br>On UNIX, default is /usr/local/etc/zabbix_agentd.conf or as set by <b>compile-time</b> variables <b>--sysconfdir</b> or <b>--prefix</b><br>On Windows, default is c:\zabbix_agentd.conf |
| -p --print                            | Print known items and exit.<br><b>Note:</b> To return <b>user parameter</b> results as well, you must specify the configuration file (if it is not in the default location).   |
| -t --test <item key>                  | Test specified item and exit.<br><b>Note:</b> To return <b>user parameter</b> results as well, you must specify the configuration file (if it is not in the default location).   |
| -h --help                             | Display help information   |
| -V --version                          | Display version number   |
| <b>UNIX agent only</b>                |  |
| -R --runtime-control <option>         | Perform administrative functions. See <b>runtime control</b> .   |
| <b>Windows agent only</b>             |  |
| -m --multiple-agents                  | Use multiple agent instances (with -i,-d,-s,-x functions).<br>To distinguish service names of instances, each service name will include the Hostname value from the specified configuration file.  |
| <b>Windows agent only (functions)</b> |  |
| -i --install                          | Install Zabbix Windows agent as service  |
| -d --uninstall                        | Uninstall Zabbix Windows agent service   |
| -s --start                            | Start Zabbix Windows agent service   |
| -x --stop                             | Stop Zabbix Windows agent service  |

Specific **examples** of using command line parameters:

- printing all built-in agent items with values
- testing a user parameter with "mysql.ping" key defined in the specified configuration file
- installing a "Zabbix Agent" service for Windows using the default path to configuration file c:\zabbix\_agentd.conf
- installing a "Zabbix Agent [Hostname]" service for Windows using the configuration file zabbix\_agentd.conf located in the same folder as agent executable and make the service name unique by extending it by Hostname value from the config file

```
zabbix_agentd --print
zabbix_agentd -t "mysql.ping" -c /etc/zabbix/zabbix_agentd.conf
zabbix_agentd.exe -i
zabbix_agentd.exe -i -m -c zabbix_agentd.conf
```

Runtime control

With runtime control options you may change the log level of agent processes.

| Option                               | Description   | Target   |
|--------------------------------------|---|--|
| log_level_increase[= <b>target</b> ] | Increase log level.<br>If target is not specified, all processes are affected.                            | Target can be specified as:<br><b>process type</b> - all processes of specified type (e.g., listener)<br>See all <b>agent process types</b> .<br><b>process type,N</b> - process type and number (e.g., listener,3)<br><b>pid</b> - process identifier (1 to 65535). For larger values specify target as 'process-type,N'. |
| log_level_decrease[= <b>target</b> ] | Decrease log level.<br>If target is not specified, all processes are affected.                            |  |
| userparameter_reload                 | Reload values of the <i>UserParameter</i> and <i>Include</i> options from the current configuration file. |  |

Examples:

- increasing log level of all processes

- increasing log level of the third listener process
- increasing log level of process with PID 1234
- decreasing log level of all active check processes

```
zabbix_agentd -R log_level_increase
zabbix_agentd -R log_level_increase=listener,3
zabbix_agentd -R log_level_increase=1234
zabbix_agentd -R log_level_decrease="active checks"
```

**Note:**

Runtime control is not supported on OpenBSD, NetBSD and Windows.

#### Agent process types

- `active checks` - process for performing active checks
- `collector` - process for data collection
- `listener` - process for listening to passive checks

The agent log file can be used to observe these process types.

#### Process user

Zabbix agent on UNIX is designed to run as a non-root user. It will run as whatever non-root user it is started as. So you can run agent as any non-root user without any issues.

If you will try to run it as 'root', it will switch to a hardcoded 'zabbix' user, which must be present on your system. You can only run agent as 'root' if you modify the 'AllowRoot' parameter in the agent configuration file accordingly.

#### Configuration file

For details on configuring Zabbix agent see the configuration file options for `zabbix_agentd` or `Windows agent`.

#### Locale

Note that the agent requires a UTF-8 locale so that some textual agent items can return the expected content. Most modern Unix-like systems have a UTF-8 locale as default, however, there are some systems where that may need to be set specifically.

#### Exit code

Before version 2.2 Zabbix agent returned 0 in case of successful exit and 255 in case of failure. Starting from version 2.2 and higher Zabbix agent returns 0 in case of successful exit and 1 in case of failure.

## 3 Agent 2

#### Overview

Zabbix agent 2 is a new generation of Zabbix agent and may be used in place of Zabbix agent. Zabbix agent 2 has been developed to:

- reduce the number of TCP connections
- provide improved concurrency of checks
- be easily extendible with plugins. A plugin should be able to:
  - provide trivial checks consisting of only a few simple lines of code
  - provide complex checks consisting of long-running scripts and standalone data gathering with periodic sending back of the data
- be a drop-in replacement for Zabbix agent (in that it supports all the previous functionality)

Agent 2 is written in Go programming language (with some C code of Zabbix agent reused). A configured Go environment with a currently supported [Go version](#) is required for building Zabbix agent 2.

Agent 2 does not have built-in daemonization support on Linux; it can be run as a `Windows service`.

Passive checks work similarly to Zabbix agent. Active checks support scheduled/flexible intervals and check concurrency within one active server.



**Note:**

By default, Zabbix agent 2 will schedule the first data collection for active checks at a conditionally random time within the item's update interval to prevent spikes in resource usage. To perform active checks that do not have *Scheduling update intervals* immediately after the agent restart, set `ForceActiveChecksOnStart` parameter (global-level) or `Plugins.<Plugin name>.System.ForceActiveChecksOnStart` (affects only specific plugin checks) in the *configuration file*. Plugin-level parameter, if set, will override the global parameter. Forcing active checks on start is supported since Zabbix 6.0.2.

**Check concurrency**

Checks from different plugins can be executed concurrently. The number of concurrent checks within one plugin is limited by the plugin capacity setting. Each plugin may have a hardcoded capacity setting (100 being default) that can be lowered using the `Plugins.<PluginName>.System.Capacity=N` setting in the *Plugins* configuration *parameter*. Former name of this parameter `Plugins.<PluginName>.Capacity` is still supported, but has been deprecated in Zabbix 6.0.

See also: [Plugin development guidelines](#).

**Supported platforms**

Zabbix agent 2 is supported on the following platforms:

- Windows (all desktop and server versions *since Windows 10/Server 2016*) - available as a [pre-compiled binary](#) or in [Zabbix sources](#)
- Linux - available in [distribution packages](#) or [Zabbix sources](#)

**Attention:**

Since Zabbix 6.0.35, Zabbix agent 2 packages are no longer available for [RHEL 6](#) due to Go 1.22 (and newer) being incompatible with GCC 4.4.7 provided by RHEL 6, which results in compilation errors. Note, however, that *Zabbix agent packages* are still supported.

**Installation**

To install Zabbix agent 2, the following options are available:

**Windows:**

- from a pre-compiled binary - download the binary and follow the instructions on the *Windows agent installation from MSI* page
- from sources - see *Building Zabbix agent 2 on Windows*

**Linux:**

- from distribution packages - follow the instructions on the [Zabbix packages](#) page, available by choosing your distribution and the Agent 2 component
- from sources - see *Installation from sources*; note that you must configure the sources by specifying the `--enable-agent2` configuration option

**Note:**

Zabbix agent 2 monitoring capabilities can be extended with plugins. While built-in plugins are available out-of-the-box, loadable plugins must be installed separately. For more information, see [Plugins](#).

**Options**

The following command line parameters can be used with Zabbix agent 2:

| Parameter                                    | Description   |
|--|---|
| <code>-c --config &lt;config-file&gt;</code> | Path to the configuration file.<br>You may use this option to specify a configuration file that is not the default one.<br>On UNIX, default is <code>/usr/local/etc/zabbix_agent2.conf</code> or as set by <i>compile-time</i> variables <code>--sysconfdir</code> or <code>--prefix</code> |
| <code>-f --foreground</code>                 | Run Zabbix agent in foreground (default: true).   |
| <code>-p --print</code>                      | Print known items and exit.<br><i>Note:</i> To return <i>user parameter</i> results as well, you must specify the configuration file (if it is not in the default location).  |
| <code>-t --test &lt;item key&gt;</code>      | Test specified item and exit.<br><i>Note:</i> To return <i>user parameter</i> results as well, you must specify the configuration file (if it is not in the default location).  |

| Parameter                        | Description   |
|----------------------------------|---|
| -h --help                        | Print help information and exit.  |
| -v --verbose                     | Print debugging information. Use this option with -p and -t options.    |
| -V --version                     | Print agent version and license information.                            |
| -R --runtime-control<br><option> | Perform administrative functions. See <a href="#">runtime control</a> . |

Specific **examples** of using command line parameters:

- print all built-in agent items with values
- test a user parameter with "mysql.ping" key defined in the specified configuration file

```
zabbix_agent2 --print
```

```
zabbix_agent2 -t "mysql.ping" -c /etc/zabbix/zabbix_agentd.conf
```

Runtime control

Runtime control provides some options for remote control.

| Option               | Description   |
|----------------------|---|
| log_level_increase   | Increase log level.   |
| log_level_decrease   | Decrease log level.   |
| metrics              | List available metrics.   |
| version              | Display agent version.  |
| userparameter_reload | Reload values of the <i>UserParameter</i> and <i>Include</i> options from the current configuration file. |
| help                 | Display help information on runtime control.  |

Examples:

- increasing log level for agent 2
- print runtime control options

```
zabbix_agent2 -R log_level_increase
```

```
zabbix_agent2 -R help
```

Configuration file

The configuration parameters of agent 2 are mostly compatible with Zabbix agent with some exceptions.

| New parameters  | Description   |
|---|---|
| <i>ControlSocket</i>  | The runtime control socket path. Agent 2 uses a control socket for <a href="#">runtime commands</a> .   |
| <i>EnablePersistentBuffer,</i><br><i>PersistentBufferFile,</i><br><i>PersistentBufferPeriod</i> | These parameters are used to configure persistent storage on agent 2 for active items.  |
| <i>ForceActiveChecksOnStart</i>   | Determines whether the agent should perform active checks immediately after restart or spread evenly over time. Supported since Zabbix 6.0.2.   |
| <i>Plugins</i>  | Plugins may have their own parameters, in the format <code>Plugins.&lt;Plugin name&gt;.&lt;Parameter&gt;=&lt;value&gt;</code> . A common plugin parameter is <i>System.Capacity</i> , setting the limit of checks that can be executed at the same time.          |
| <i>StatusPort</i>   | The port agent 2 will be listening on for HTTP status request and display of a list of configured plugins and some internal parameters  |
| <b>Dropped parameters</b>   | <b>Description</b>  |
| <i>AllowRoot, User</i>  | Not supported because daemonization is not supported.   |
| <i>LoadModule,</i><br><i>LoadModulePath</i>   | Loadable modules are not supported.   |
| <i>StartAgents</i>  | This parameter was used in Zabbix agent to increase passive check concurrency or disable them. In Agent 2, the concurrency is configured at a plugin level and can be limited by a capacity setting. Whereas disabling passive checks is not currently supported. |
| <i>HostInterface,</i><br><i>HostInterfaceItem</i>   | Not yet supported.  |

For more details see the configuration file options for [zabbix\\_agent2](#).

## Exit codes

Starting from version 4.4.8 Zabbix agent 2 can also be compiled with older OpenSSL versions (1.0.1, 1.0.2).

In this case Zabbix provides mutexes for locking in OpenSSL. If a mutex lock or unlock fails then an error message is printed to the standard error stream (STDERR) and Agent 2 exits with return code 2 or 3, respectively.

## 4 Proxy

### Overview

Zabbix proxy is a process that may collect monitoring data from one or more monitored devices and send the information to the Zabbix server, essentially working on behalf of the server. All collected data is buffered locally and then transferred to the Zabbix server the proxy belongs to.

Deploying a proxy is optional, but may be very beneficial to distribute the load of a single Zabbix server. If only proxies collect data, processing on the server becomes less CPU and disk I/O hungry.

A Zabbix proxy is the ideal solution for centralized monitoring of remote locations, branches and networks with no local administrators.

Zabbix proxy requires a separate database.

#### Attention:

Note that databases supported with Zabbix proxy are SQLite, MySQL and PostgreSQL. Using Oracle is at your own risk and may contain some limitations as, for example, in **return values** of low-level discovery rules.

See also: [Using proxies in a distributed environment](#)

### Running proxy

If installed as package

Zabbix proxy runs as a daemon process. The proxy can be started by executing:

```
systemctl start zabbix-proxy
```

This will work on most of GNU/Linux systems. On other systems you may need to run:

```
/etc/init.d/zabbix-proxy start
```

Similarly, for stopping/restarting/viewing status of Zabbix proxy, use the following commands:

```
systemctl stop zabbix-proxy
systemctl restart zabbix-proxy
systemctl status zabbix-proxy
```

Start up manually

If the above does not work you have to start it manually. Find the path to the zabbix\_proxy binary and execute:

```
zabbix_proxy
```

You can use the following command line parameters with Zabbix proxy:

|  |                                  |
|--|----------------------------------|
| <code>-c --config &lt;file&gt;</code>            | path to the configuration file   |
| <code>-f --foreground</code>                     | run Zabbix proxy in foreground   |
| <code>-R --runtime-control &lt;option&gt;</code> | perform administrative functions |
| <code>-h --help</code>                           | give this help                   |
| <code>-V --version</code>                        | display version number           |

Examples of running Zabbix proxy with command line parameters:

```
zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf
zabbix_proxy --help
zabbix_proxy -V
```

Runtime control

Runtime control options:

| Option   | Description   | Target  |
|--|---|---|
| <code>config_cache_reload</code>                 | Reload configuration cache. Ignored if cache is being currently loaded.<br>Active Zabbix proxy will connect to the Zabbix server and request configuration data.                        |   |
| <code>diagnfo[=&lt;section&gt;]</code>           | Gather diagnostic information in the proxy log file.  | <b>historycache</b> - history cache statistics<br><b>preprocessing</b> - preprocessing manager statistics<br><b>locks</b> - list of mutexes (is empty on <i>BSD</i> systems)  |
| <code>snmp_cache_reload</code>                   | Reload SNMP cache, clear the SNMP properties (engine time, engine boots, engine id, credentials) for all hosts.   |   |
| <code>housekeeper_execute</code>                 | Start the housekeeping procedure. Ignored if the housekeeping procedure is currently in progress.   |   |
| <code>log_level_increase[=&lt;target&gt;]</code> | Increase log level, affects all processes if target is not specified.<br>Not supported on <i>BSD</i> systems.   | <b>process type</b> - All processes of specified type (e.g., poller)<br>See all <b>proxy process types</b> .<br><b>process type,N</b> - Process type and number (e.g., poller,3)<br><b>pid</b> - Process identifier (1 to 65535). For larger values specify target as 'process type,N'.   |
| <code>log_level_decrease[=&lt;target&gt;]</code> | Decrease log level, affects all processes if target is not specified.<br>Not supported on <i>BSD</i> systems.   |   |
| <code>prof_enable[=&lt;target&gt;]</code>        | Enable profiling.<br>Affects all processes if target is not specified.<br>Enabled profiling provides details of all rwlocks/mutexes by function name.<br>Supported since Zabbix 6.0.13. | <b>process type</b> - All processes of specified type (e.g., history syncer)<br>See all <b>proxy process types</b> .<br><b>process type,N</b> - Process type and number (e.g., history syncer,1)<br><b>pid</b> - Process identifier (1 to 65535). For larger values specify target as 'process type,N'.<br><b>scope</b> - rwlock, mutex, processing can be used with the process type and number (e.g., history syncer,1,processing) or all processes of type (e.g., history syncer,rwlock) |
| <code>prof_disable[=&lt;target&gt;]</code>       | Disable profiling.<br>Affects all processes if target is not specified.<br>Supported since Zabbix 6.0.13.   | <b>process type</b> - All processes of specified type (e.g., history syncer)<br>See all <b>proxy process types</b> .<br><b>process type,N</b> - Process type and number (e.g., history syncer,1)<br><b>pid</b> - Process identifier (1 to 65535). For larger values specify target as 'process type,N'.   |

Example of using runtime control to reload the proxy configuration cache:

```
zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf -R config_cache_reload
```

Examples of using runtime control to gather diagnostic information:

Gather all available diagnostic information in the proxy log file:

```
zabbix_proxy -R diagnfo
```

Gather history cache statistics in the proxy log file:

```
zabbix_proxy -R diagnfo=historycache
```

Example of using runtime control to reload the SNMP cache:

```
zabbix_proxy -R snmp_cache_reload
```

Example of using runtime control to trigger execution of housekeeper

```
zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf -R housekeeper_execute
```

Examples of using runtime control to change log level:

Increase log level of all processes:

```
zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf -R log_level_increase
```

Increase log level of second poller process:

```
zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf -R log_level_increase=poller,2
```

Increase log level of process with PID 1234:

```
zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf -R log_level_increase=1234
```

Decrease log level of all http poller processes:

```
zabbix_proxy -c /usr/local/etc/zabbix_proxy.conf -R log_level_decrease="http poller"
```

#### Process user

Zabbix proxy is designed to run as a non-root user. It will run as whatever non-root user it is started as. So you can run proxy as any non-root user without any issues.

If you will try to run it as 'root', it will switch to a hardcoded 'zabbix' user, which must be present on your system. You can only run proxy as 'root' if you modify the 'AllowRoot' parameter in the proxy configuration file accordingly.

#### Configuration file

See the [configuration file](#) options for details on configuring zabbix\_proxy.

#### Proxy process types

- `availability manager` - process for host availability updates
- `configuration syncer` - process for managing in-memory cache of configuration data
- `data sender` - proxy data sender
- `discoverer` - process for discovery of devices
- `heartbeat sender` - proxy heartbeat sender
- `history poller` - process for handling calculated, aggregated and internal checks requiring a database connection
- `history syncer` - history DB writer
- `housekeeper` - process for removal of old historical data
- `http poller` - web monitoring poller
- `icmp pinger` - poller for icmping checks
- `ipmi manager` - IPMI poller manager
- `ipmi poller` - poller for IPMI checks
- `java poller` - poller for Java checks
- `odbc poller` - poller for ODBC checks
- `poller` - normal poller for passive checks
- `preprocessing manager` - manager of preprocessing tasks
- `preprocessing worker` - process for data preprocessing
- `self-monitoring` - process for collecting internal server statistics
- `snmp trapper` - trapper for SNMP traps
- `task manager` - process for remote execution of tasks requested by other components (e.g. close problem, acknowledge problem, check item value now, remote command functionality)
- `trapper` - trapper for active checks, traps, proxy communication
- `unreachable poller` - poller for unreachable devices
- `vmware collector` - VMware data collector responsible for data gathering from VMware services

The proxy log file can be used to observe these process types.

Various types of Zabbix proxy processes can be monitored using the **zabbix[process,<type>,<mode>,<state>]** internal [item](#).

#### Supported platforms

Zabbix proxy runs on the same list of [supported platforms](#) as Zabbix server.

#### Locale

Note that the proxy requires a UTF-8 locale so that some textual items can be interpreted correctly. Most modern Unix-like systems have a UTF-8 locale as default, however, there are some systems where that may need to be set specifically.

## 5 Java gateway

### Overview

Native support for monitoring JMX applications exists in the form of a Zabbix daemon called "Zabbix Java gateway", available since Zabbix 2.0. Zabbix Java gateway is a daemon written in Java. To find out the value of a particular JMX counter on a host, Zabbix server queries Zabbix Java gateway, which uses the [JMX management API](#) to query the application of interest remotely. The application does not need any additional software installed, it just has to be started with `-Dcom.sun.management.jmxremote` option on the command line.

Java gateway accepts incoming connection from Zabbix server or proxy and can only be used as a "passive proxy". As opposed to Zabbix proxy, it may also be used from Zabbix proxy (Zabbix proxies cannot be chained). Access to each Java gateway is configured directly in Zabbix server or proxy configuration file, thus only one Java gateway may be configured per Zabbix server or Zabbix proxy. If a host will have items of type **JMX agent** and items of other type, only the **JMX agent** items will be passed to Java gateway for retrieval.

When an item has to be updated over Java gateway, Zabbix server or proxy will connect to the Java gateway and request the value, which Java gateway in turn retrieves and passes back to the server or proxy. As such, Java gateway does not cache any values.

Zabbix server or proxy has a specific type of processes that connect to Java gateway, controlled by the option **StartJavaPollers**. Internally, Java gateway starts multiple threads, controlled by the **START\_POLLERS** option. On the server side, if a connection takes more than **Timeout** seconds, it will be terminated, but Java gateway might still be busy retrieving value from the JMX counter. To solve this, there is the **TIMEOUT** option in Java gateway that allows to set timeout for JMX network operations.

Zabbix server or proxy will try to pool requests to a single JMX target together as much as possible (affected by item intervals) and send them to the Java gateway in a single connection for better performance.

It is suggested to have **StartJavaPollers** less than or equal to **START\_POLLERS**, otherwise there might be situations when no threads are available in the Java gateway to service incoming requests; in such a case Java gateway uses `ThreadPoolExecutor.CallerRunsPolicy`, meaning that the main thread will service the incoming request and temporarily will not accept any new requests.

If you are trying to monitor Wildfly-based Java applications with Zabbix Java gateway, please install the latest `jboss-client.jar` available on the [Wildfly download page](#).

#### Getting Java gateway

You can install Java gateway either from the sources or packages downloaded from [Zabbix website](#).

Using the links below you can access information how to get and run Zabbix Java gateway, how to configure Zabbix server (or Zabbix proxy) to use Zabbix Java gateway for JMX monitoring, and how to configure Zabbix items in Zabbix frontend that correspond to particular JMX counters.

| Installation from             | Instructions                 | Instructions          |
|-------------------------------|------------------------------|-----------------------|
| <i>Sources</i>                | <a href="#">Installation</a> | <a href="#">Setup</a> |
| <i>RHEL packages</i>          | <a href="#">Installation</a> | <a href="#">Setup</a> |
| <i>Debian/Ubuntu packages</i> | <a href="#">Installation</a> | <a href="#">Setup</a> |

## 1 Setup from sources

### Overview

If **installed** from sources, the following information will help you in setting up Zabbix **Java gateway**.

#### Overview of files

If you obtained Java gateway from sources, you should have ended up with a collection of shell scripts, JAR and configuration files under `$PREFIX/sbin/zabbix_java`. The role of these files is summarized below.

`bin/zabbix-java-gateway-$VERSION.jar`

Java gateway JAR file itself.

`lib/logback-core-1.5.16.jar`

`lib/logback-classic-1.5.16.jar`

`lib/slf4j-api-2.0.16.jar`

`lib/android-json-4.3_r3.1.jar`

Dependencies of Java gateway: [Logback](#), [SLF4J](#), and [Android JSON](#) library.

`lib/logback.xml`

`lib/logback-console.xml`

Configuration files for Logback.

shutdown.sh

startup.sh

Convenience scripts for starting and stopping Java gateway.

settings.sh

Configuration file that is sourced by startup and shutdown scripts above.

Configuring and running Java gateway

By default, Java gateway listens on port 10052. If you plan on running Java gateway on a different port, you can specify that in settings.sh script. See the description of [Java gateway configuration file](#) for how to specify this and other options.

**Warning:**

Port 10052 is not [IANA registered](#).

Once you are comfortable with the settings, you can start Java gateway by running the startup script:

```
./startup.sh
```

Likewise, once you no longer need Java gateway, run the shutdown script to stop it:

```
./shutdown.sh
```

Note that unlike server or proxy, Java gateway is lightweight and does not need a database.

Configuring server for use with Java gateway

With Java gateway up and running, you have to tell Zabbix server where to find Zabbix Java gateway. This is done by specifying JavaGateway and JavaGatewayPort parameters in the [server configuration file](#). If the host on which JMX application is running is monitored by Zabbix proxy, then you specify the connection parameters in the [proxy configuration file](#) instead.

```
JavaGateway=192.168.3.14
```

```
JavaGatewayPort=10052
```

By default, server does not start any processes related to JMX monitoring. If you wish to use it, however, you have to specify the number of pre-forked instances of Java pollers. You do this in the same way you specify regular pollers and trappers.

```
StartJavaPollers=5
```

Do not forget to restart server or proxy, once you are done with configuring them.

Debugging Java gateway

In case there are any problems with Java gateway or an error message that you see about an item in the frontend is not descriptive enough, you might wish to take a look at Java gateway log file.

By default, Java gateway logs its activities into /tmp/zabbix\_java.log file with log level "info". Sometimes that information is not enough and there is a need for information at log level "debug". In order to increase logging level, modify file lib/logback.xml and change the level attribute of <root> tag to "debug":

```
<root level="debug">
  <appender-ref ref="FILE" />
</root>
```

Note that unlike Zabbix server or Zabbix proxy, there is no need to restart Zabbix Java gateway after changing logback.xml file - changes in logback.xml will be picked up automatically. When you are done with debugging, you can return the logging level to "info".

If you wish to log to a different file or a completely different medium like database, adjust logback.xml file to meet your needs. See [Logback Manual](#) for more details.

Sometimes for debugging purposes it is useful to start Java gateway as a console application rather than a daemon. To do that, comment out PID\_FILE variable in settings.sh. If PID\_FILE is omitted, startup.sh script starts Java gateway as a console application and makes Logback use lib/logback-console.xml file instead, which not only logs to console, but has logging level "debug" enabled as well.

Finally, note that since Java gateway uses SLF4J for logging, you can replace Logback with the framework of your choice by placing an appropriate JAR file in lib directory. See [SLF4J Manual](#) for more details.

JMX monitoring

See [JMX monitoring](#) page for more details.

## 2 Setup from RHEL packages

### Overview

If **installed** from RHEL packages, the following information will help you in setting up Zabbix **Java gateway**.

### Configuring and running Java gateway

Configuration parameters of Zabbix Java gateway may be tuned in the file:

```
/etc/zabbix/zabbix_java_gateway.conf
```

For more details, see Zabbix Java gateway configuration **parameters**.

To start Zabbix Java gateway:

```
systemctl restart zabbix-java-gateway
```

To automatically start Zabbix Java gateway on boot:

RHEL 7 and later:

```
systemctl enable zabbix-java-gateway
```

RHEL prior to 7:

```
chkconfig --level 12345 zabbix-java-gateway on
```

### Configuring server for use with Java gateway

With Java gateway up and running, you have to tell Zabbix server where to find Zabbix Java gateway. This is done by specifying `JavaGateway` and `JavaGatewayPort` parameters in the **server configuration file**. If the host on which JMX application is running is monitored by Zabbix proxy, then you specify the connection parameters in the **proxy configuration file** instead.

```
JavaGateway=192.168.3.14
```

```
JavaGatewayPort=10052
```

By default, server does not start any processes related to JMX monitoring. If you wish to use it, however, you have to specify the number of pre-forked instances of Java pollers. You do this in the same way you specify regular pollers and trappers.

```
StartJavaPollers=5
```

Do not forget to restart server or proxy, once you are done with configuring them.

### Debugging Java gateway

Zabbix Java gateway log file is:

```
/var/log/zabbix/zabbix_java_gateway.log
```

If you like to increase the logging, edit the file:

```
/etc/zabbix/zabbix_java_gateway_logback.xml
```

and change `level="info"` to `"debug"` or even `"trace"` (for deep troubleshooting):

```
<configuration scan="true" scanPeriod="15 seconds">
[...]  
    <root level="info">  
        <appender-ref ref="FILE" />  
    </root>  
  
</configuration>
```

### JMX monitoring

See **JMX monitoring** page for more details.

## 3 Setup from Debian/Ubuntu packages

### Overview

If **installed** from Debian/Ubuntu packages, the following information will help you in setting up Zabbix **Java gateway**.

### Configuring and running Java gateway

Java gateway configuration may be tuned in the file:



/etc/zabbix/zabbix\_java\_gateway.conf

For more details, see Zabbix Java gateway configuration [parameters](#).

To start Zabbix Java gateway:

```
systemctl restart zabbix-java-gateway
```

To automatically start Zabbix Java gateway on boot:

```
systemctl enable zabbix-java-gateway
```

Configuring server for use with Java gateway

With Java gateway up and running, you have to tell Zabbix server where to find Zabbix Java gateway. This is done by specifying `JavaGateway` and `JavaGatewayPort` parameters in the [server configuration file](#). If the host on which JMX application is running is monitored by Zabbix proxy, then you specify the connection parameters in the [proxy configuration file](#) instead.

```
JavaGateway=192.168.3.14
```

```
JavaGatewayPort=10052
```

By default, server does not start any processes related to JMX monitoring. If you wish to use it, however, you have to specify the number of pre-forked instances of Java pollers. You do this in the same way you specify regular pollers and trappers.

```
StartJavaPollers=5
```

Do not forget to restart server or proxy, once you are done with configuring them.

Debugging Java gateway

Zabbix Java gateway log file is:

```
/var/log/zabbix/zabbix_java_gateway.log
```

If you like to increase the logging, edit the file:

```
/etc/zabbix/zabbix_java_gateway_logback.xml
```

and change `level="info"` to `"debug"` or even `"trace"` (for deep troubleshooting):

```
<configuration scan="true" scanPeriod="15 seconds">
```

```
[...]
```

```
  <root level="info">
```

```
    <appender-ref ref="FILE" />
```

```
  </root>
```

```
</configuration>
```

JMX monitoring

See [JMX monitoring](#) page for more details.

## 6 Sender

### Overview

Zabbix sender is a command line utility that may be used to send performance data to Zabbix server for processing.

The utility is usually used in long running user scripts for periodical sending of availability and performance data.

For sending results directly to Zabbix server or proxy, a [trapper item](#) type must be configured.

See also [zabbix\\_utils](#) - a Python library that has built-in functionality to act like Zabbix sender.

Running Zabbix sender

An example of running Zabbix UNIX sender:

```
cd bin
```

```
./zabbix_sender -z zabbix -s "Linux DB3" -k db.connections -o 43
```

where:

- `z` - Zabbix server host (IP address can be used as well)
- `s` - technical name of monitored host (as registered in Zabbix frontend)

- k - item key
- o - value to send

#### Attention:

Options that contain whitespaces, must be quoted using double quotes.

Zabbix sender can be used to send multiple values from an input file. See the [Zabbix sender manpage](#) for more information.

If a configuration file is specified, Zabbix sender uses all addresses defined in the agent `ServerActive` configuration parameter for sending data. If sending to one address fails, the sender tries sending to the other addresses. If sending of batch data fails to one address, the following batches are not sent to this address.

Zabbix sender accepts strings in UTF-8 encoding (for both UNIX-like systems and Windows) without byte order mark (BOM) first in the file.

Zabbix sender on Windows can be run similarly:

```
zabbix_sender.exe [options]
```

Since Zabbix 1.8.4, `zabbix_sender` realtime sending scenarios have been improved to gather multiple values passed to it in close succession and send them to the server in a single connection. A value that is not further apart from the previous value than 0.2 seconds can be put in the same stack, but maximum polling time still is 1 second.

#### Note:

Zabbix sender will terminate if invalid (not following *parameter=value* notation) parameter entry is present in the specified configuration file.

Running Zabbix sender with low-level discovery

An example of running Zabbix sender for sending a JSON-formatted value for low-level discovery:

```
./zabbix_sender -z 192.168.1.113 -s "Zabbix server" -k trapper.discovery.item -o '[{"#FSNAME}":"/",{"#FSNAME}":"/"}]
```

For this to work, the low-level discovery rule must have a Zabbix trapper item type (in this example, with `trapper.discovery.item` key).

## 7 Get

Overview

Zabbix get is a command line utility which can be used to communicate with Zabbix agent and retrieve required information from the agent.

The utility is usually used for the troubleshooting of Zabbix agents.

See also [zabbix\\_utils](#) - a Python library that has built-in functionality to act like Zabbix get.

Running Zabbix get

An example of running Zabbix get under UNIX to get the processor load value from the agent:

```
cd bin
./zabbix_get -s 127.0.0.1 -p 10050 -k system.cpu.load[all,avg1]
```

Another example of running Zabbix get for capturing a string from a website:

```
cd bin
./zabbix_get -s 192.168.1.1 -p 10050 -k "web.page.regex[www.example.com,,,\"USA: ([a-zA-Z0-9.-]+)\",,\\1]"
```

Note that the item key here contains a space so quotes are used to mark the item key to the shell. The quotes are not part of the item key; they will be trimmed by the shell and will not be passed to Zabbix agent.

Zabbix get accepts the following command line parameters:

|   |   |
|---|---|
| <code>-s --host &lt;host name or IP&gt;</code>      | Specify host name or IP address of a host                         |
| <code>-p --port &lt;port number&gt;</code>          | Specify port number of agent running on the host (default: 10050) |
| <code>-I --source-address &lt;IP address&gt;</code> | Specify source IP address   |
| <code>-t --timeout &lt;seconds&gt;</code>           | Specify timeout. Valid range: 1-30 seconds (default: 30 seconds)  |
| <code>-k --key &lt;item key&gt;</code>              | Specify key of item to retrieve value for                         |

|                           |                           |
|---------------------------|---------------------------|
| <code>-h --help</code>    | Display this help message |
| <code>-V --version</code> | Display version number    |

See also [Zabbix get manpage](#) for more information.

Zabbix get on Windows can be run similarly:

```
zabbix_get.exe [options]
```

## 8 JS

### Overview

`zabbix_js` is a command line utility that can be used for embedded script testing.

This utility will execute a user script with a string parameter and print the result. Scripts are executed using the embedded Zabbix scripting engine.

In case of compilation or execution errors `zabbix_js` will print the error in `stderr` and exit with code 1.

### Usage

```
zabbix_js -s script-file -p input-param [-l log-level] [-t timeout]
zabbix_js -s script-file -i input-file [-l log-level] [-t timeout]
zabbix_js -h
zabbix_js -V
```

`zabbix_js` accepts the following command line parameters:

|                                       |  |
|---------------------------------------|--|
| <code>-s, --script script-file</code> | Specify the file name of the script to execute. If '-' is specified as f |
| <code>-i, --input input-file</code>   | Specify the file name of the input parameter. If '-' is specified as f   |
| <code>-p, --param input-param</code>  | Specify the input parameter.   |
| <code>-l, --loglevel log-level</code> | Specify the log level.   |
| <code>-t, --timeout timeout</code>    | Specify the timeout in seconds. Valid range: 1-60 seconds (default: 10   |
| <code>-h, --help</code>               | Display help information.  |
| <code>-V, --version</code>            | Display the version number.  |

Example:

```
zabbix_js -s script-file.js -p example
```

## 9 Web service

### Overview

Zabbix web service is a process that is used for communication with external web services. Currently, Zabbix web service is used for generating and sending [scheduled reports](#) with plans to add additional functionality in the future.

Zabbix server connects to the web service via HTTP(S). Zabbix web service requires Google Chrome to be installed on the same host; on some distributions the service may also work with Chromium (see [known issues](#)).

### Installation

The official `zabbix-web-service` package is available in the [Zabbix repository](#).

To compile Zabbix web service [from sources](#), specify the `--enable-webservice` configure option.

To configure Zabbix web service, update the `zabbix_web_service.conf` configuration file parameters.

#### Attention:

It is strongly recommended to set up encryption between Zabbix server and Zabbix web service [using certificates](#). By default, data transmitted between Zabbix server and Zabbix web service is not encrypted, which can lead to unauthorized access.

## 4 Installation

Please use the sidebar to access content in the Installation section.

### 1 Getting Zabbix

#### Overview

There are four ways of getting Zabbix:

- Install it from the **packages**
- Download the latest source archive and **compile it yourself**
- Install it from the **containers**
- Download the **virtual appliance**

To download the latest distribution packages, pre-compiled sources or the virtual appliance, go to the [Zabbix download page](#), where direct links to latest versions are provided.

#### Getting Zabbix source code

There are several ways of getting Zabbix source code:

- You can [download](#) the released stable versions from the official Zabbix website
- You can [download](#) nightly builds from the official Zabbix website developer page
- You can get the latest development version from the Git source code repository system:
  - The primary location of the full repository is at <https://git.zabbix.com/scm/zbx/zabbix.git>
  - Master and supported releases are also mirrored to Github at <https://github.com/zabbix/zabbix>

A Git client must be installed to clone the repository. The official commandline Git client package is commonly called **git** in distributions. To install, for example, on Debian/Ubuntu, run:

```
sudo apt-get update
sudo apt-get install git
```

To grab all Zabbix source, change to the directory you want to place the code in and execute:

```
git clone https://git.zabbix.com/scm/zbx/zabbix.git
```

### 2 Requirements

#### Hardware

##### Memory

Zabbix requires both physical and disk memory. The amount of required disk memory obviously depends on the number of hosts and parameters that are being monitored. If you're planning to keep a long history of monitored parameters, you should be thinking of at least a couple of gigabytes to have enough space to store the history in the database. Each Zabbix daemon process requires several connections to a database server. The amount of memory allocated for the connection depends on the configuration of the database engine.

##### Note:

The more physical memory you have, the faster the database (and therefore Zabbix) works.

##### CPU

Zabbix and especially Zabbix database may require significant CPU resources depending on number of monitored parameters and chosen database engine.

##### Other hardware

A serial communication port and a serial GSM modem are required for using SMS notification support in Zabbix. USB-to-serial converter will also work.

Examples of hardware configuration

The table provides examples of hardware configuration, assuming a **Linux/BSD/Unix** platform.

These are size and hardware configuration examples to start with. Each Zabbix installation is unique. Make sure to benchmark the performance of your Zabbix system in a staging or development environment, so that you can fully understand your requirements before deploying the Zabbix installation to its production environment.

| Installation size | Monitored metrics <sup>1</sup> | CPU/vCPU cores | Memory (GiB) | Database   | Amazon EC2 <sup>2</sup> |
|-------------------|--------------------------------|----------------|--------------|--|-------------------------|
| Small             | 1 000                          | 2              | 8            | MySQL Server, Percona Server, MariaDB Server, PostgreSQL         | m6i.large/m6g.large     |
| Medium            | 10 000                         | 4              | 16           | MySQL Server, Percona Server, MariaDB Server, PostgreSQL         | m6i.xlarge/m6g.xlarge   |
| Large             | 100 000                        | 16             | 64           | MySQL Server, Percona Server, MariaDB Server, PostgreSQL, Oracle | m6i.4xlarge/m6g.4xlarge |
| Very large        | 1 000 000                      | 32             | 96           | MySQL Server, Percona Server, MariaDB Server, PostgreSQL, Oracle | m6i.8xlarge/m6g.8xlarge |

<sup>1</sup> 1 metric = 1 item + 1 trigger + 1 graph  
<sup>2</sup> Example with Amazon general purpose EC2 instances, using ARM64 or x86\_64 architecture, a proper instance type like Compute/Memory/Storage optimised should be selected during Zabbix installation evaluation and testing before installing in its production environment.

**Note:**

Actual configuration depends on the number of active items and refresh rates very much (see [database size](#) section of this page for details). It is highly recommended to run the database on a separate server for large installations.

## Supported platforms

Due to security requirements and the mission-critical nature of the monitoring server, UNIX is the only operating system that can consistently deliver the necessary performance, fault tolerance, and resilience. Zabbix operates on market-leading versions.

Zabbix components are available and tested for the following platforms:

| Platform | Server | Agent | Agent2 |
|----------|--------|-------|--------|
| Linux    | x      | x     | x      |
| IBM AIX  | x      | x     | -      |
| FreeBSD  | x      | x     | -      |
| NetBSD   | x      | x     | -      |
| OpenBSD  | x      | x     | -      |
| HP-UX    | x      | x     | -      |
| Mac OS X | x      | x     | -      |
| Solaris  | x      | x     | -      |
| Windows  | -      | x     | x      |

**Note:**

Zabbix server/agent may work on other Unix-like operating systems as well. Zabbix agent is supported on all Windows desktop and server versions since XP.

To prevent critical security vulnerabilities in Zabbix agent 2, it is compiled only with [supported Go releases](#). As of Go 1.21, the [minimum required Windows versions](#) are raised; therefore, since Zabbix 6.0.27, the minimum Windows version for Zabbix agent 2 is Windows 10/Server 2016.

**Attention:**

Zabbix disables core dumps if compiled with encryption and does not start if the system does not allow disabling of core dumps.

**Required software**

Zabbix is built around modern web servers, leading database engines, and PHP scripting language.

**Third-party external surrounding software**

If stated as mandatory, the required software/library is strictly necessary. Optional ones are needed for supporting some specific function.

| Software                           | Mandatory status | Supported versions     | Comments   |
|------------------------------------|------------------|------------------------|--|
| <i>MySQL/Percona</i>               | One of           | 8.0.30-9.0.X           | <p>Required if MySQL (or Percona) is used as Zabbix backend database. InnoDB engine is required.</p> <p>Added support for MySQL versions:</p> <ul style="list-style-type: none"> <li>- 8.1 since Zabbix 6.0.21;</li> <li>- 8.2 since Zabbix 6.0.26;</li> <li>- 8.3 since Zabbix 6.0.27;</li> <li>- 8.4 since Zabbix 6.0.32;</li> <li>- 9.0 since Zabbix 6.0.33.</li> </ul> <p>We recommend using the <a href="#">C API (libmysqlclient)</a> library for building server/proxy.</p>   |
| <i>MariaDB</i>                     |                  | 10.5.00-11.5.X         | <p>For MySQL versions 8.0.0-8.0.28, see also: <a href="#">Possible deadlocks</a>. InnoDB engine is required.</p> <p>The recommended version is 11.4.</p> <p>We recommend using the <a href="#">MariaDB Connector/C</a> library for building server/proxy.</p> <p>Added support for MariaDB versions:</p> <ul style="list-style-type: none"> <li>- 10.7.X since Zabbix 6.0.6;</li> <li>- 10.8.X since Zabbix 6.0.7;</li> <li>- 10.9.X and 10.10.X since Zabbix 6.0.13;</li> <li>- 10.11.X since Zabbix 6.0.15;</li> <li>- 11.0.X since Zabbix 6.0.21;</li> <li>- 11.1.X since Zabbix 6.0.23;</li> <li>- 11.2.X since Zabbix 6.0.27;</li> <li>- 11.3.X since Zabbix 6.0.29;</li> <li>- 11.4.X since Zabbix 6.0.32;</li> <li>- 11.5.X since Zabbix 6.0.34.</li> </ul> |
| <i>Oracle</i><br><i>PostgreSQL</i> |                  | 19c - 21c<br>13.0-17.X | <p>See also: <a href="#">Possible deadlocks</a>.</p> <p>Required if Oracle is used as Zabbix backend database.</p> <p>Required if PostgreSQL is used as Zabbix backend database. Depending on the installation size, it might be required to increase PostgreSQL <i>work_mem</i> configuration property (4MB being the default value), so that the amount of memory used by the database for particular operation is sufficient and query execution does not take too much time.</p> <p>Added support for PostgreSQL versions:</p> <ul style="list-style-type: none"> <li>- 15.X since Zabbix 6.0.10;</li> <li>- 16.X since Zabbix 6.0.23;</li> <li>- 17.X since Zabbix 6.0.36.</li> </ul>   |

| Software                          | Mandatory status | Supported versions | Comments  |
|-----------------------------------|------------------|--------------------|---|
| <i>TimescaleDB</i> for PostgreSQL |                  | 2.1.0-2.18.X       | <p>Required if TimescaleDB is used as a PostgreSQL database extension. Make sure to install TimescaleDB Community Edition, which supports compression.</p> <p>Note that PostgreSQL 15 is supported since TimescaleDB 2.10. You may also refer to the <a href="#">Timescale documentation</a> for details regarding PostgreSQL and TimescaleDB version compatibility.</p> <p>Added support for TimescaleDB versions:</p> <ul style="list-style-type: none"> <li>- 2.6 since Zabbix 6.0.7;</li> <li>- 2.7 since Zabbix 6.0.8;</li> <li>- 2.8 since Zabbix 6.0.10;</li> <li>- 2.9 since Zabbix 6.0.13;</li> <li>- 2.10 since Zabbix 6.0.15;</li> <li>- 2.11 since Zabbix 6.0.19;</li> <li>- 2.12 since Zabbix 6.0.24;</li> <li>- 2.13 since Zabbix 6.0.25;</li> <li>- 2.14 since Zabbix 6.0.28;</li> <li>- 2.15 since Zabbix 6.0.32;</li> <li>- 2.16 since Zabbix 6.0.34;</li> <li>- 2.17 since Zabbix 6.0.36;</li> <li>- 2.18 since Zabbix 6.0.39.</li> </ul> |
| <i>SQLite</i>                     | Optional         | 3.3.5-3.34.X       | SQLite is only supported with Zabbix proxies. Required if SQLite is used as Zabbix proxy database.  |
| <i>smartmontools</i>              |                  | 7.1 or later       | Required for Zabbix agent 2.  |
| <i>who</i>                        |                  |                    | Required for the user count plugin.   |
| <i>dpkg</i>                       |                  |                    | Required for the system.sw.packages plugin.   |
| <i>pkgtool</i>                    |                  |                    | Required for the system.sw.packages plugin.   |
| <i>rpm</i>                        |                  |                    | Required for the system.sw.packages plugin.   |
| <i>pacman</i>                     |                  |                    | Required for the system.sw.packages plugin.   |

#### Note:

Although Zabbix can work with databases available in the operating systems, for the best experience, we recommend using databases installed from the official database developer repositories.

## Frontend

The minimum supported screen width for Zabbix frontend is 1200px.

If stated as mandatory, the required software/library is strictly necessary. Optional ones are needed for supporting some specific function.

| Software                      | Mandatory status | Version                       | Comments   |
|-------------------------------|------------------|-------------------------------|--|
| <i>Apache</i><br><i>Nginx</i> | One of           | 2.4 or later<br>1.20 or later |  |
| <i>PHP</i>                    | Yes              | 7.2.5 or later,<br>8.0-8.3    | <p>Recommended to use PHP 7.4 or later.</p> <p>Added support for PHP versions:</p> <ul style="list-style-type: none"> <li>- 8.0 and 8.1 since Zabbix 6.0.6;</li> <li>- 8.2 since Zabbix 6.0.14;</li> <li>- 8.3 since Zabbix 6.0.26.</li> </ul>                                       |
| PHP extensions:<br><i>gd</i>  | Yes              | 2.0.28 or later               | <p>PHP GD extension must support PNG images (<i>--with-png-dir</i>), JPEG (<i>--with-jpeg-dir</i>) images and FreeType 2 (<i>--with-freetype-dir</i>). Version 2.3.0 or later might be required to avoid possible <b>text overlapping in graphs</b> for some frontend languages.</p> |
| <i>bcmath</i><br><i>ctype</i> |                  |                               | <p>php-bcmath (<i>--enable-bcmath</i>)</p> <p>php-ctype (<i>--enable-ctype</i>)</p>  |

| Software         | Mandatory status | Version         | Comments  |
|------------------|------------------|-----------------|---|
| <i>libXML</i>    | No               | 2.6.15 or later | php-xml, if provided as a separate package by the distributor.                |
| <i>xmlreader</i> |                  |                 | php-xmlreader, if provided as a separate package by the distributor.          |
| <i>xmlwriter</i> |                  |                 | php-xmlwriter, if provided as a separate package by the distributor.          |
| <i>session</i>   |                  |                 | php-session, if provided as a separate package by the distributor.            |
| <i>sockets</i>   |                  |                 | php-net-socket ( <i>--enable-sockets</i> ). Required for user script support. |
| <i>mbstring</i>  |                  |                 | php-mbstring ( <i>--enable-mbstring</i> )                                     |
| <i>gettext</i>   |                  |                 | php-gettext ( <i>--with-gettext</i> ). Required for translations to work.     |
| <i>ldap</i>      |                  |                 | php-ldap. Required only if LDAP authentication is used in the frontend.       |
| <i>openssl</i>   |                  |                 | php-openssl. Required only if SAML authentication is used in the frontend.    |
| <i>mysqli</i>    |                  |                 | Required if MySQL is used as Zabbix backend database.                         |
| <i>oci8</i>      |                  |                 | Required if Oracle is used as Zabbix backend database.                        |
| <i>pgsql</i>     |                  |                 | Required if PostgreSQL is used as Zabbix backend database.                    |

Third-party frontend libraries that are supplied with Zabbix:

| Library  | Mandatory status | Minimum version | Comments   |
|--|------------------|-----------------|--|
| <a href="#">jQuery JavaScript Library</a><br><a href="#">jQuery UI</a> | Yes              | 3.6.0           | JavaScript library that simplifies the process of cross-browser development.               |
| <a href="#">SAML PHP Toolkit</a>                                       |                  | 1.12.1          | A set of user interface interactions, effects, widgets, and themes built on top of jQuery. |
| <a href="#">Symfony Yaml Component</a>                                 |                  | 3.4.1           | A PHP toolkit that adds SAML 2.0 authentication support to be able to sign in to Zabbix.   |
|  |                  | 5.1.0           | Adds support to export and import Zabbix configuration elements in the YAML format.        |

**Note:**

Zabbix may work on previous versions of Apache, MySQL, Oracle, and PostgreSQL as well.

**Attention:**

For other fonts than the default DejaVu, PHP function [imagerotate](#) might be required. If it is missing, these fonts might be rendered incorrectly when a graph is displayed. This function is only available if PHP is compiled with bundled GD, which is not the case in Debian and other distributions.

Third-party libraries used for writing and debugging Zabbix frontend code:

| Library                  | Mandatory status | Minimum version | Description  |
|--------------------------|------------------|-----------------|--|
| <a href="#">Composer</a> | No               | 2.4.1           | An application-level package manager for PHP that provides a standard format for managing dependencies of PHP software and required libraries. |
| <a href="#">PHPUnit</a>  |                  | 8.5.29          | A PHP unit testing framework for testing Zabbix frontend.  |
| <a href="#">SASS</a>     |                  | 3.4.22          | A preprocessor scripting language that is interpreted and compiled into Cascading Style Sheets (CSS).  |

Web browser on client side

Cookies and JavaScript must be enabled.

The latest stable versions of Google Chrome, Mozilla Firefox, Microsoft Edge, Apple Safari, and Opera are supported.



**Warning:**

The same-origin policy for IFrames is implemented, which means that Zabbix cannot be placed in frames on a different domain.

Still, pages placed into a Zabbix frame will have access to Zabbix frontend (through JavaScript) if the page that is placed in the frame and Zabbix frontend are on the same domain. A page like `http://secure-zabbix.com/cms/page.html`, if placed into dashboards on `http://secure-zabbix.com/zabbix/`, will have full JS access to Zabbix.

**Server/proxy**

If stated as mandatory, the required software/library is strictly necessary. Optional ones are needed for supporting some specific function.

| Requirement                           | Mandatory status | Description  |
|---------------------------------------|------------------|--|
| <i>libpcre/libpcre2</i>               | One of           | PCRE/PCRE2 library is required for <a href="#">Perl Compatible Regular Expression</a> (PCRE) support.<br>The naming may differ depending on the GNU/Linux distribution, for example 'libpcre3' or 'libpcre1'. PCRE v8.x and PCRE2 v10.x (from Zabbix 6.0.0) are supported.   |
| <i>libevent</i>                       | Yes              | Required for inter-process communication. Version 1.4 or higher.   |
| <i>libpthread</i>                     |                  | Required for mutex and read-write lock support (could be part of libc).  |
| <i>libresolv</i>                      |                  | Required for DNS resolution (could be part of libc).   |
| <i>libiconv</i>                       |                  | Required for text encoding/format conversion (could be part of libc). Mandatory for Zabbix server on Linux.  |
| <i>libz</i>                           | One of           | Required for compression support.  |
| <i>libm</i>                           |                  | Math library. Required by Zabbix server only.  |
| <i>libmysqlclient</i>                 |                  | Required if MySQL is used.   |
| <i>libmariadb</i>                     |                  | Required if MariaDB is used.   |
| <i>libclntsh</i>                      | No               | Required if Oracle is used; <i>libclntsh</i> version must match or be higher than the version of the Oracle database used.   |
| <i>libpq5</i>                         |                  | Required if PostgreSQL is used; <i>libpq5</i> version must match or be higher than the version of the PostgreSQL database used.  |
| <i>libsqlite3</i>                     |                  | Required if Sqlite is used. Required for Zabbix proxy only.  |
| <i>libOpenIPMI</i>                    |                  | Required for IPMI support. Required for Zabbix server only.  |
| <i>libssh2</i> or <i>libssh</i>       | No               | Required for <b>SSH checks</b> . Version 1.0 or higher (libssh2); 0.6.0 or higher (libssh). libssh is supported since Zabbix 4.4.6.  |
| <i>libcurl</i>                        |                  | Required for web monitoring, VMware monitoring, SMTP authentication, <code>web.page.*</code> Zabbix agent <b>items</b> , HTTP agent items and Elasticsearch (if used). Version 7.28.0 or higher is recommended.<br>Libcurl version requirements:<br>- SMTP authentication: version 7.20.0 or higher<br>- Elasticsearch: version 7.28.0 or higher |
| <i>libxml2</i>                        |                  | Required for VMware monitoring and XML XPath preprocessing.  |
| <i>net-snmp</i>                       |                  | Required for SNMP support. Version 5.3.0 or higher.<br>Support of strong encryption protocols (AES192/AES192C, AES256/AES256C) is available starting with net-snmp library 5.8; on RHEL 8+ based systems it is recommended to use net-snmp 5.8.15 or later.  |
| <i>libunixodbc</i>                    | No               | Required for database monitoring.  |
| <i>libgnutls</i> or <i>libopenssl</i> |                  | Required when using <b>encryption</b> .<br>Minimum versions: <i>libgnutls</i> - 3.1.18, <i>libopenssl</i> - 1.0.1  |
| <i>libldap</i>                        |                  | Required for LDAP support.   |
| <i>fping</i>                          |                  | Required for <b>ICMP ping items</b> .  |

**Agent**

| Requirement                           | Mandatory status | Description  |
|---------------------------------------|------------------|--|
| <i>libpcre/libpcre2</i>               | One of           | PCRE/PCRE2 library is required for <a href="#">Perl Compatible Regular Expression</a> (PCRE) support.<br>The naming may differ depending on the GNU/Linux distribution, for example 'libpcre3' or 'libpcre1'. PCRE v8.x and PCRE2 v10.x (from Zabbix 6.0.0) are supported.<br>Required for log monitoring. Also required on Windows. |
| <i>libpthread</i>                     | Yes              | Required for mutex and read-write lock support (could be part of libc). Not required on Windows.   |
| <i>libresolv</i>                      |                  | Required for DNS resolution (could be part of libc). Not required on Windows.  |
| <i>libiconv</i>                       |                  | Required for text encoding/format conversion to UTF-8 in log items, file content, file regex and regmatch items (could be part of libc). Not required on Windows.  |
| <i>libgnutls</i> or <i>libopenssl</i> | No               | Required if using <b>encryption</b> .<br>Minimum versions: <i>libgnutls</i> - 3.1.18, <i>libopenssl</i> - 1.0.1<br>On Microsoft Windows OpenSSL 1.1.1 or later is required.  |
| <i>libldap</i>                        |                  | Required if LDAP is used. Not supported on Windows.  |
| <i>libcurl</i>                        |                  | Required for <code>web.page.*</code> Zabbix agent <b>items</b> . Not supported on Windows.<br>Version 7.28.0 or higher is recommended.   |
| <i>libmodbus</i>                      |                  | Only required if Modbus monitoring is used.<br>Version 3.0 or higher.  |

**Note:**

Starting from version 5.0.3, Zabbix agent will not work on AIX platforms below versions 6.1 TL07 / AIX 7.1 TL01.

## Agent 2

| Requirement             | Mandatory status | Description  |
|-------------------------|------------------|--|
| <i>libpcre/libpcre2</i> | One of           | PCRE/PCRE2 library is required for <a href="#">Perl Compatible Regular Expression</a> (PCRE) support.<br>The naming may differ depending on the GNU/Linux distribution, for example 'libpcre3' or 'libpcre1'. PCRE v8.x and PCRE2 v10.x (from Zabbix 6.0.0) are supported.<br>Required for log monitoring. Also required on Windows. |
| <i>libopenssl</i>       | No               | Required when using encryption.<br>OpenSSL 1.0.1 or later is required on UNIX platforms.<br>The OpenSSL library must have PSK support enabled. LibreSSL is not supported.<br>On Microsoft Windows systems OpenSSL 1.1.1 or later is required.  |

## Go libraries

| Requirement   | Mandatory status | Minimum version | Description   |
|---|------------------|-----------------|---|
| <a href="https://github.com/zabbix/zabbix-agent2/blob/master/README.md#go-libraries">git.zabbix.com/ap/plugin</a> | Yes              | 1.X.X           | Zabbix own support library. Mostly for plugins.                                 |
| <a href="https://github.com/BurntSushi/locker">github.com/BurntSushi/locker</a>                                   |                  | 0.0.0           | Named read/write locks, access sync.  |
| <a href="https://github.com/chromedp/cdproto">github.com/chromedp/cdproto</a>                                     |                  | 0.0.0           | Generated commands, types, and events for the Chrome DevTools Protocol domains. |
| <a href="https://github.com/chromedp/chromedp">github.com/chromedp/chromedp</a>                                   |                  | 0.6.0           | Chrome DevTools Protocol support (report generation).                           |
| <a href="https://github.com/dustin/gomemcached">github.com/dustin/gomemcached</a>                                 |                  | 0.0.0           | A memcached binary protocol toolkit for go.                                     |
| <a href="https://github.com/eclipse/paho.mqtt.golang">github.com/eclipse/paho.mqtt.golang</a>                     |                  | 1.2.0           | A library to handle MQTT connections.   |
| <a href="https://github.com/fsnotify/fsnotify">github.com/fsnotify/fsnotify</a>                                   |                  | 1.4.9           | Cross-platform file system notifications for Go.                                |
| <a href="https://github.com/go-ldap/ldap">github.com/go-ldap/ldap</a>   |                  | 3.0.3           | Basic LDAP v3 functionality for the Go programming language.                    |
| <a href="https://github.com/go-ole/go-ole">github.com/go-ole/go-ole</a>   |                  | 1.2.4           | Win32 ole implementation for Go.  |
| <a href="https://github.com/godbus/dbus">github.com/godbus/dbus</a>   |                  | 4.1.0           | Native Go bindings for D-Bus.   |
| <a href="https://github.com/go-sql-driver/mysql">github.com/go-sql-driver/mysql</a>                               |                  | 1.5.0           | MySQL driver.   |

| Requirement   | Mandatory status                       | Minimum version | Description  |
|---|--|-----------------|--|
| <a href="https://github.com/godror/godror">github.com/godror/godror</a>                     |  | 0.20.1          | Oracle DB driver.  |
| <a href="https://github.com/matttn/go-sqlite3">github.com/matttn/go-sqlite3</a>             |  | 2.0.3           | Sqlite3 driver.  |
| <a href="https://github.com/mediocregopher/radix/v3">github.com/mediocregopher/radix/v3</a> |  | 3.5.0           | Redis client.  |
| <a href="https://github.com/memcachier/mc/v3">github.com/memcachier/mc/v3</a>               |  | 3.0.1           | Binary Memcached client.   |
| <a href="https://github.com/miekg/dns">github.com/miekg/dns</a>                             |  | 1.1.43          | DNS library.   |
| <a href="https://github.com/omeid/go-yarn">github.com/omeid/go-yarn</a>                     |  | 0.0.1           | Embeddable filesystem mapped key-string store.   |
| <a href="https://github.com/goburrow/modbus">github.com/goburrow/modbus</a>                 |  | 0.1.0           | Fault-tolerant implementation of Modbus.   |
| <a href="https://golang.org/x/sys">golang.org/x/sys</a>                                     |  | 0.0.0           | Go packages for low-level interactions with the operating system. Also used in plugin support lib. Used in MongoDB and PostgreSQL plugins. |
| <a href="https://github.com/Microsoft/go-winio">github.com/Microsoft/go-winio</a>           | On Windows. Yes, indirect <sup>1</sup> | 0.6.0           | Windows named pipe implementation. Also used in plugin support lib. Used in MongoDB and PostgreSQL plugins.                                |
| <a href="https://github.com/goburrow/serial">github.com/goburrow/serial</a>                 | Yes, indirect <sup>1</sup>             | 0.1.0           | Serial library for Modbus.   |
| <a href="https://golang.org/x/xerrors">golang.org/x/xerrors</a>                             |  | 0.0.0           | Functions to manipulate errors.  |
| <a href="https://gopkg.in/asn1-ber.v1">gopkg.in/asn1-ber.v1</a>                             |  | 1.0.0           | Encoding/decoding library for ASN1 BER.  |
| <a href="https://github.com/go-stack/stack">github.com/go-stack/stack</a>                   | No, indirect <sup>1</sup>              | 1.8.0           |  |
| <a href="https://github.com/golang/snappy">github.com/golang/snappy</a>                     |  | 0.0.1           |  |
| <a href="https://github.com/klauspost/compress">github.com/klauspost/compress</a>           |  | 1.13.6          |  |
| <a href="https://github.com/xdg-go/pbkdf2">github.com/xdg-go/pbkdf2</a>                     |  | 1.0.0           |  |
| <a href="https://github.com/xdg-go/scram">github.com/xdg-go/scram</a>                       |  | 1.0.2           |  |
| <a href="https://github.com/xdg-go/stringprep">github.com/xdg-go/stringprep</a>             |  | 1.0.2           |  |
| <a href="https://github.com/youmark/pkcs8">github.com/youmark/pkcs8</a>                     |  | 0.0.0           |  |

<sup>1</sup> "Indirect" means that it is used in one of the libraries that the agent uses. It's required since Zabbix uses the library that uses the package.

See also dependencies for loadable plugins:

- [PostgreSQL](#)
- [MongoDB](#)

#### Java gateway

If you obtained Zabbix from the source repository or an archive, then the necessary dependencies are already included in the source tree.

If you obtained Zabbix from your distribution's package, then the necessary dependencies are already provided by the packaging system.

In both cases above, the software is ready to be used and no additional downloads are necessary.

If, however, you wish to provide your versions of these dependencies (for instance, if you are preparing a package for some Linux distribution), below is the list of library versions that Java gateway is known to work with. Zabbix may work with other versions of these libraries, too.

The following table lists JAR files that are currently bundled with Java gateway in the original code:

| Library                         | Mandatory status | Comments   |
|---------------------------------|------------------|--|
| <a href="#">android-json</a>    | Yes              | Version 4.3r1 or higher.<br>JSON (JavaScript Object Notation) is a lightweight data-interchange format. This is the org.json compatible Android implementation extracted from the Android SDK. |
| <a href="#">logback-classic</a> |                  | Version 1.5.16 or higher.  |

| Library                      | Mandatory status | Comments                  |
|------------------------------|------------------|---------------------------|
| <a href="#">logback-core</a> |                  | Version 1.5.16 or higher. |
| <a href="#">slf4j-api</a>    |                  | Version 2.0.16 or higher. |

Java gateway can be built using either Oracle Java or open source OpenJDK (version 1.6 or newer). Packages provided by Zabbix are compiled using OpenJDK. The following table lists OpenJDK packages used for building Zabbix packages by distribution:

| Distribution       | OpenJDK package  |
|--------------------|--|
| Debian 12          | default-jdk-headless (amd64, arm64: 2:1.17-74)   |
| Debian 11          | default-jdk-headless (amd64: 2:1.11-72)  |
| Debian 10          | default-jdk-headless (amd64, i386: 2:1.11-71)  |
| OpenSUSE Leap 15   | java-17-openjdk-devel (amd64: 17.0.5.0-150400.3.9.3; arm64: 17.0.8.0-150400.3.27.1)                        |
| Oracle Linux 9     | java-11-openjdk-devel (amd64: 11.0.19.0.7-4.0.1; arm64: 11.0.20.0.8-2.0.1)                                 |
| Oracle Linux 8     | java-1.8.0-openjdk-devel (amd64: 1.8.0.372.b07-4.0.1);<br>java-11-openjdk-devel (arm64: 11.0.20.0.8-3.0.1) |
| Oracle Linux 7     | java-1.8.0-openjdk-devel (amd64: 1.8.0.282.b08-1)  |
| Raspberry Pi OS 12 | default-jdk-headless (arm64, armhf: 2:1.17-74)   |
| Raspberry Pi OS 11 | default-jdk-headless (arm64: 2:1.11-72; armhf: 2:1.11-72+b4)   |
| Raspberry Pi OS 10 | default-jdk (armhf: 2:1.11-71+b2)  |
| RHEL 9             | java-11-openjdk-devel (amd64: 11.0.19.0.7-4; arm64: 11.0.20.0.8-3)   |
| RHEL 8             | java-1.8.0-openjdk-devel (amd64: 1.8.0.372.b07-4; arm64: 1.8.0.382.b05-2)                                  |
| RHEL 7             | java-1.8.0-openjdk-devel (amd64: 1.8.0.282.b08-1)  |
| SLES 15            | java-17-openjdk-devel (amd64: 17.0.5.0-150400.3.9.3; arm64: 17.0.8.0-150400.3.27.1)                        |
| SLES 12            | java-1_8_0-openjdk-devel (amd64: 1.8.0.252-27.45.6)  |
| Ubuntu 24.04       | default-jdk-headless (amd64, arm64: 2:1.21-75+exp1)  |
| Ubuntu 22.04       | default-jdk-headless (amd64, arm64: 2:1.11-72build2)   |
| Ubuntu 20.04       | default-jdk-headless (amd64, arm64: 2:1.11-72)   |
| Ubuntu 18.04       | default-jdk (amd64: 2:1.11-68ubuntu1~18.04.1; i386: 2:1.10-63ubuntu1~02)                                   |

#### Default port numbers

The following list of open ports per component is applicable for default configuration:

| Zabbix component    | Port number | Protocol | Type of connection |
|---------------------|-------------|----------|--------------------|
| Zabbix agent        | 10050       | TCP      | on demand          |
| Zabbix agent 2      | 10050       | TCP      | on demand          |
| Zabbix server       | 10051       | TCP      | on demand          |
| Zabbix proxy        | 10051       | TCP      | on demand          |
| Zabbix Java gateway | 10052       | TCP      | on demand          |
| Zabbix web service  | 10053       | TCP      | on demand          |
| Zabbix frontend     | 80          | HTTP     | on demand          |
|                     | 443         | HTTPS    | on demand          |
| Zabbix trapper      | 10051       | TCP      | on demand          |

#### Note:

The port numbers should be open in firewall to enable Zabbix communications. Outgoing TCP connections usually do not require explicit firewall settings.

#### Database size

Zabbix configuration data require a fixed amount of disk space and do not grow much.

Zabbix database size mainly depends on these variables, which define the amount of stored historical data:

- Number of processed values per second

This is the average number of new values Zabbix server receives every second. For example, if you have 3000 items for monitoring with a refresh rate of 60 seconds, the number of values per second is calculated as  $3000/60 = 50$ . It means that 50 new values are added to Zabbix database every second.

- Housekeeper settings for history

Zabbix keeps values for a fixed period of time, normally several weeks or months. Each new value requires a certain amount of disk space for data and index.

So, if you would like to keep 30 days of history and you receive 50 values per second, the total number of values will be around  $(30 \times 24 \times 3600) \times 50 = 129.600.000$ , or about 130M of values.

Depending on the database engine used, type of received values (floats, integers, strings, log files, etc), the disk space for keeping a single value may vary from 40 bytes to hundreds of bytes. Normally it is around 90 bytes per value for numeric items<sup>2</sup>.

In this case, it means that 130M of values will require  $130M \times 90 \text{ bytes} = 10.9GB$  of disk space.

**Note:**

The size of text/log item values is impossible to predict exactly, but you may expect around 500 bytes per value.

- Housekeeper setting for trends

Zabbix keeps a 1-hour max/min/avg/count set of values for each item in the table **trends**. The data is used for trending and long period graphs. The one hour period can not be customized.

Zabbix database, depending on the database type, requires about 90 bytes per each total.

Suppose you would like to keep trend data for 5 years. Values for 3000 items will require  $3000 \times 24 \times 365 \times 90 = 2.2GB$  per year, or **11GB** for 5 years.

- Housekeeper settings for events

Each Zabbix event requires approximately 250 bytes of disk space<sup>1</sup>.

It is hard to estimate the number of events generated by Zabbix daily. In the worst-case scenario, you may assume that Zabbix generates one event per second. For each recovered event, an `event_recovery` record is created. Normally, most of the events will be recovered. So, you can assume one `event_recovery` record per event. That means additional 80 bytes per event.

Optionally, events can have tags, each tag record requiring approximately 100 bytes of disk space<sup>1</sup>. The number of tags per event (#tags) depends on configuration.

So, each will need an additional  $\#tags \times 100$  bytes of disk space.

It means that if you want to keep 3 years of events, this would require  $3 \times 365 \times 24 \times 3600 \times (250 + 80 + \#tags \times 100) = \sim 30GB + \#tags \times 100B$  disk space<sup>2</sup>.

**Note:**

<sup>1</sup> More when having non-ASCII event names, tags and values.

<sup>2</sup> The size approximations are based on MySQL and might be different for other databases.

The table contains formulas that can be used to calculate the disk space required for Zabbix system:

| Parameter                   | Formula for required disk space (in bytes)   |
|-----------------------------|--|
| <i>Zabbix configuration</i> | Fixed size. Normally 10MB or less.   |
| <i>History</i>              | $\text{days} \times (\text{items} / \text{refresh rate}) \times 24 \times 3600 \times \text{bytes}$<br>items : number of items<br>days : number of days to keep history<br>refresh rate : average refresh rate of items<br>bytes : number of bytes required to keep single value, depends on database engine, normally ~90 bytes.                                      |
| <i>Trends</i>               | $\text{days} \times (\text{items} / 3600) \times 24 \times 3600 \times \text{bytes}$<br>items : number of items<br>days : number of days to keep history<br>bytes : number of bytes required to keep single trend, depends on the database engine, normally ~90 bytes.   |
| <i>Events</i>               | $\text{days} \times \text{events} \times 24 \times 3600 \times \text{bytes}$<br>events : number of event per second. One (1) event per second in worst-case scenario.<br>days : number of days to keep history<br>bytes : number of bytes required to keep single trend, depends on the database engine, normally ~330 + average number of tags per event * 100 bytes. |

So, the total required disk space can be calculated as:

### Configuration + History + Trends + Events

The disk space will NOT be used immediately after Zabbix installation. Database size will grow then it will stop growing at some point, which depends on housekeeper settings.

### Time synchronization

It is very important to have precise system time on the server with Zabbix running. [ntpd](#) is the most popular daemon that synchronizes the host's time with the time of other machines. It's strongly recommended to maintain synchronized system time on all systems Zabbix components are running on.

## 1 Plugins

Please use the sidebar to access content in the Plugins section.

### 1 PostgreSQL plugin dependencies

#### Overview

The required libraries for the PostgreSQL loadable plugin are listed in this page.

Go libraries

| Requirement   | Mandatory status      | Minimum version | Description  |
|---|-----------------------|-----------------|--|
| <a href="https://git.zabbix.com/ap/plugin/support">git.zabbix.com/ap/plugin/support</a> | Yes                   | 1.X.X           | Zabbix own support library. Mostly for plugins.    |
| <a href="https://github.com/jackc/pgx/v4">github.com/jackc/pgx/v4</a>                   |                       | 4.17.2          | PostgreSQL driver.                                 |
| <a href="https://github.com/omeid/go-yarn">github.com/omeid/go-yarn</a>                 |                       | 0.0.1           | Embeddable filesystem mapped key-string store.     |
| <a href="https://github.com/jackc/chunkedio">github.com/jackc/chunkedio</a>             | Indirect <sup>1</sup> | 2.0.1           |  |
| <a href="https://github.com/jackc/pgconn">github.com/jackc/pgconn</a>                   |                       | 1.13.0          |  |
| <a href="https://github.com/jackc/pgio">github.com/jackc/pgio</a>                       |                       | 1.0.0           |  |
| <a href="https://github.com/jackc/pgpassfile">github.com/jackc/pgpassfile</a>           |                       | 1.0.0           |  |
| <a href="https://github.com/jackc/pgproto3">github.com/jackc/pgproto3</a>               |                       | 2.3.1           |  |
| <a href="https://github.com/jackc/pgservicefile">github.com/jackc/pgservicefile</a>     |                       | 0.0.0           |  |
| <a href="https://github.com/jackc/pgtype">github.com/jackc/pgtype</a>                   |                       | 1.12.0          |  |
| <a href="https://github.com/jackc/puddle">github.com/jackc/puddle</a>                   |                       | 1.3.0           |  |
| <a href="https://github.com/Microsoft/go-winio">github.com/Microsoft/go-winio</a>       |                       | 0.6.0           | Required package for PostgreSQL plugin on Windows. |
| <a href="https://golang.org/x/crypto">golang.org/x/crypto</a>                           |                       | 0.0.0           |  |
| <a href="https://golang.org/x/sys">golang.org/x/sys</a>                                 |                       | 0.0.0           |  |
| <a href="https://golang.org/x/text">golang.org/x/text</a>                               |                       | 0.3.7           |  |

<sup>1</sup> "Indirect" means that it is used in one of the libraries that the agent uses. It's required since Zabbix uses the library that uses the package.

### 2 MongoDB plugin dependencies

#### Overview

The required libraries for the MongoDB loadable plugin are listed in this page.

Go libraries

| Requirement   | Mandatory status      | Minimum version | Description   |
|---|-----------------------|-----------------|---|
| <a href="https://git.zabbix.com/ap/plugin/support">git.zabbix.com/ap/plugin/support</a> | Yes                   | 1.X.X           | Zabbix own support library. Mostly for plugins.       |
| <a href="https://go.mongodb.org/mongo-driver">go.mongodb.org/mongo-driver</a>           |                       | 1.7.6           | Named read/write locks, access sync.                  |
| <a href="https://github.com/go-stack/stack">github.com/go-stack/stack</a>               | Indirect <sup>1</sup> | 1.8.0           | Required package for MongoDB plugin mongo-driver lib. |

| Requirement   | Mandatory status | Minimum version | Description   |
|---|------------------|-----------------|---|
| <a href="https://github.com/golang/snappy">github.com/golang/snappy</a>           |                  | 0.0.1           | Required package for MongoDB plugin mongo-driver lib. |
| <a href="https://github.com/klauspost/compress">github.com/klauspost/compress</a> |                  | 1.13.6          | Required package for MongoDB plugin mongo-driver lib. |
| <a href="https://github.com/Microsoft/go-winio">github.com/Microsoft/go-winio</a> |                  | 0.6.0           | Required package for MongoDB plugin mongo-driver lib. |
| <a href="https://github.com/pkg/errors">github.com/pkg/errors</a>                 |                  | 0.9.1           | Required package for MongoDB plugin mongo-driver lib. |
| <a href="https://github.com/xdg-go/pbkdf2">github.com/xdg-go/pbkdf2</a>           |                  | 1.0.0           | Required package for MongoDB plugin mongo-driver lib. |
| <a href="https://github.com/xdg-go/scram">github.com/xdg-go/scram</a>             |                  | 1.0.2           | Required package for MongoDB plugin mongo-driver lib. |
| <a href="https://github.com/xdg-go/stringprep">github.com/xdg-go/stringprep</a>   |                  | 1.0.2           | Required package for MongoDB plugin mongo-driver lib. |
| <a href="https://github.com/youmark/pkcs8">github.com/youmark/pkcs8</a>           |                  | 0.0.0           | Required package for MongoDB plugin mongo-driver lib. |
| <a href="https://golang.org/x/crypto">golang.org/x/crypto</a>                     |                  | 0.0.0           | Required package for MongoDB plugin mongo-driver lib. |
| <a href="https://golang.org/x/sync">golang.org/x/sync</a>                         |                  | 0.0.0           | Required package for MongoDB plugin mongo-driver lib. |
| <a href="https://golang.org/x/sys">golang.org/x/sys</a>                           |                  | 0.0.0           | Required package for MongoDB plugin mongo-driver lib. |
| <a href="https://golang.org/x/text">golang.org/x/text</a>                         |                  | 0.3.7           | Required package for MongoDB plugin mongo-driver lib. |

<sup>1</sup> "Indirect" means that it is used in one of the libraries that the agent uses. It's required since Zabbix uses the library that uses the package.

## 2 Best practices for secure Zabbix setup

### Overview

This section contains best practices that should be observed in order to set up Zabbix in a secure way.

The practices contained here are not required for the functioning of Zabbix. They are recommended for better security of the system.

### Access control

#### Principle of least privilege

The principle of least privilege should be used at all times for Zabbix. This principle means that user accounts (in Zabbix frontend) or process user (for Zabbix server/proxy or agent) have only those privileges that are essential to perform intended functions. In other words, user accounts at all times should run with as few privileges as possible.

#### Attention:

Giving extra permissions to 'zabbix' user will allow it to access configuration files and execute operations that can compromise the overall security of the infrastructure.

When implementing the least privilege principle for user accounts, Zabbix **frontend user types** should be taken into account. It is important to understand that while a "Admin" user type has less privileges than "Super Admin" user type, it has administrative permissions that allow managing configuration and execute custom scripts.

#### Note:

Some information is available even for non-privileged users. For example, while *Administration* → *Scripts* is not available for non-Super Admins, scripts themselves are available for retrieval by using Zabbix API. Limiting script permissions and not adding sensitive information (like access credentials, etc) should be used to avoid exposure of sensitive information available in global scripts.

### Secure user for Zabbix agent

In the default configuration, Zabbix server and Zabbix agent processes share one 'zabbix' user. If you wish to make sure that the agent cannot access sensitive details in server configuration (e.g. database login information), the agent should be run as a different user:

1. Create a secure user
2. Specify this user in the agent **configuration file** ('User' parameter)
3. Restart the agent with administrator privileges. Privileges will be dropped to the specified user.

Revoke write access to SSL configuration file in Windows

Zabbix Windows agent compiled with OpenSSL will try to reach the SSL configuration file in c:\openssl-64bit. The "openssl-64bit" directory on disk C: can be created by non-privileged users.

So for security hardening, it is required to create this directory manually and revoke write access from non-admin users.

Please note that the directory names will be different on 32-bit and 64-bit versions of Windows.

## Cryptography

### Setting up SSL for Zabbix frontend

On RHEL-based systems, install the `mod_ssl` package:

```
dnf install mod_ssl
```

Create a directory for SSL keys:

```
mkdir -p /etc/httpd/ssl/private
chmod 700 /etc/httpd/ssl/private
```

Create the SSL certificate:

```
openssl req -x509 -nodes -days 365 -newkey rsa:2048 -keyout /etc/httpd/ssl/private/apache-selfsigned.key -
```

Fill out the prompts appropriately. The most important line is the one that requests the `Common Name`. You need to enter the domain name that you want to be associated with your server. You can enter the public IP address instead if you do not have a domain name.

```
Country Name (2 letter code) [XX]:
State or Province Name (full name) []:
Locality Name (eg, city) [Default City]:
Organization Name (eg, company) [Default Company Ltd]:
Organizational Unit Name (eg, section) []:
Common Name (eg, your name or your server's hostname) []:example.com
Email Address []:
```

Edit the Apache SSL configuration file (`/etc/httpd/conf.d/ssl.conf`):

```
DocumentRoot "/usr/share/zabbix"
ServerName example.com:443
SSLCertificateFile /etc/httpd/ssl/apache-selfsigned.crt
SSLCertificateKeyFile /etc/httpd/ssl/private/apache-selfsigned.key
```

Restart the Apache service to apply the changes:

```
systemctl restart httpd.service
```

## Web server hardening

### Enabling Zabbix on root directory of URL

On RHEL-based systems, add a virtual host to Apache configuration (`/etc/httpd/conf/httpd.conf`) and set permanent redirect for document root to Zabbix SSL URL. Note that `example.com` should be replaced with the actual name of the server.

#### Add lines:

```
<VirtualHost *:*>
    ServerName example.com
    Redirect permanent / https://example.com
</VirtualHost>
```

Restart the Apache service to apply the changes:

```
systemctl restart httpd.service
```

### Enabling HTTP Strict Transport Security (HSTS) on the web server

To protect Zabbix frontend against protocol downgrade attacks, we recommend enabling [HSTS](#) policy on the web server.

To enable HSTS policy for your Zabbix frontend in Apache configuration, follow these steps:

1. Locate your virtual host's configuration file:

- `/etc/httpd/conf/httpd.conf` on RHEL-based systems
- `/etc/apache2/sites-available/000-default.conf` on Debian/Ubuntu



2. Add the following directive to your virtual host's configuration file:

```
<VirtualHost *:*>
    Header set Strict-Transport-Security "max-age=31536000"
</VirtualHost>
```

3. Restart the Apache service to apply the changes:

```
#### On RHEL-based systems:
systemctl restart httpd.service

#### On Debian/Ubuntu
systemctl restart apache2.service
```

#### Enforcing Secure and SameSite session cookies in Zabbix

When configuring Zabbix, it is essential to enforce secure and SameSite attributes for session cookies to enhance security and prevent cross-site request forgery (CSRF) attacks. However, enforcing SameSite=Strict may cause issues in certain scenarios, such as:

- Dashboard URL widgets displaying "user not logged in" when embedding same-domain iframes.
- Users accessing the dashboard via HTTP instead of HTTPS may face login issues.
- Inability to share URLs to specific Zabbix menu sections or hosts.

To mitigate these issues, users should have a way to adjust the SameSite policy.

##### 1. Secure cookies

Setting the secure flag ensures that cookies are only transmitted over HTTPS, preventing exposure over unencrypted connections.

To enable secure cookies in Zabbix, add or modify the following setting in the web server configuration:

For Apache:

```
Header always edit Set-Cookie ^(.*)$ $1;Secure
```

For Nginx:

```
proxy_cookie_path / "/; Secure";
```

Ensure that your Zabbix frontend is accessed via HTTPS; otherwise, cookies with the Secure flag will not be sent.

##### 2. Configuring the SameSite attribute

Web server settings can also enforce the SameSite attribute:

For Apache:

```
<IfModule mod_headers.c>
    Header onsuccess edit Set-Cookie (.*?) "$1; SameSite=Strict"
</IfModule>
```

For Nginx (version 1.19.3+):

```
proxy_cookie_flags ~ samesite=Strict; # Replace ~ with 'zbx_session' for specificity
```

#### Enabling Content Security Policy (CSP) on the web server

To protect Zabbix frontend against Cross Site Scripting (XSS), data injection, and similar attacks, we recommend enabling Content Security Policy on the web server. To do so, configure the web server to return the [HTTP header](#).

#### Attention:

The following CSP header configuration is only for the default Zabbix frontend installation and for cases when all content originates from the site's domain (excluding subdomains). A different CSP header configuration may be required if you are, for example, configuring the [URL](#) widget to display content from the site's subdomains or external domains, switching from *OpenStreetMap* to another map engine, or adding external CSS or widgets.

To enable CSP for your Zabbix frontend in Apache configuration, follow these steps:

##### 1. Locate your virtual host's configuration file:

- `/etc/httpd/conf/httpd.conf` on RHEL-based systems
- `/etc/apache2/sites-available/000-default.conf` on Debian/Ubuntu

2. Add the following directive to your virtual host's configuration file:

```
<VirtualHost *:*>
    Header set Content-Security-Policy: "default-src 'self' *.openstreetmap.org; script-src 'self' 'unsafe-inline'"
</VirtualHost>
```

3. Restart the Apache service to apply the changes:

```
#### On RHEL-based systems:
systemctl restart httpd.service

#### On Debian/Ubuntu
systemctl restart apache2.service
```

Disabling web server information exposure

It is recommended to disable all web server signatures as part of the web server hardening process. The web server is exposing software signature by default:

▼ **Response Headers** [view source](#)

```
Cache-Control: no-store, no-cache, must-revalidate
Connection: Keep-Alive
Content-Encoding: gzip
Content-Length: 1160
Content-Type: text/html; charset=UTF-8
Keep-Alive: timeout=5, max=100
Pragma: no-cache
Server: Apache/2.4.18 (Ubuntu)
```

The signature can be disabled by adding two lines to the Apache (used as an example) configuration file:

```
ServerSignature Off
ServerTokens Prod
```

PHP signature (X-Powered-By HTTP header) can be disabled by changing the php.ini configuration file (signature is disabled by default):

```
expose_php = Off
```

Web server restart is required for configuration file changes to be applied.

Additional security level can be achieved by using the mod\_security (package libapache2-mod-security2) with Apache. mod\_security allows to remove server signature instead of only removing version from server signature. Signature can be altered to any value by changing "SecServerSignature" to any desired value after installing mod\_security.

Please refer to documentation of your web server to find help on how to remove/change software signatures.

Disabling default web server error pages

It is recommended to disable default error pages to avoid information exposure. Web server is using built-in error pages by default:

# Not Found

The requested URL /custom-text was not found on this server.

---

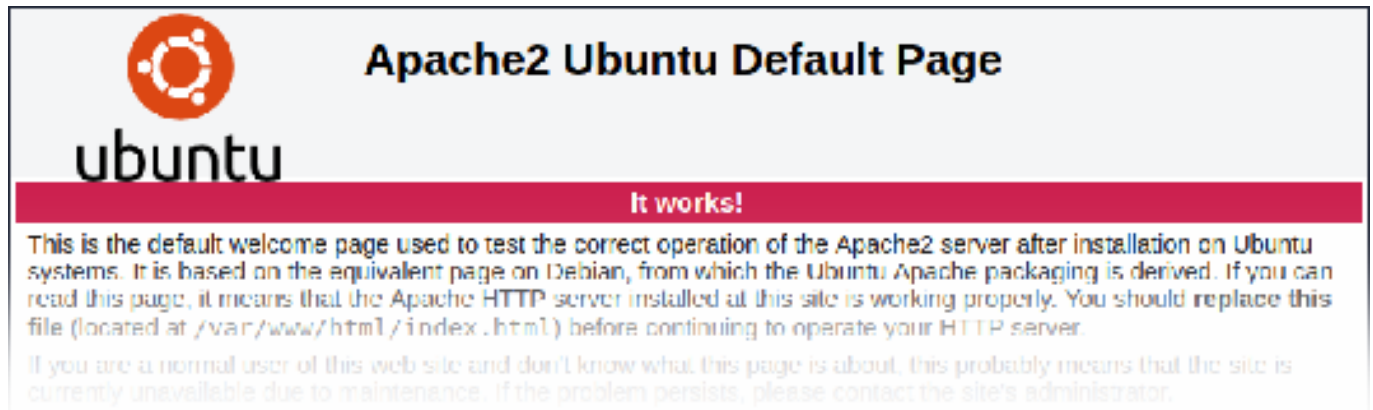
Apache/2.4.18 (Ubuntu) Server at localhost Port 80

Default error pages should be replaced/removed as part of the web server hardening process. The "ErrorDocument" directive can be used to define a custom error page/text for Apache web server (used as an example).

Please refer to documentation of your web server to find help on how to replace/remove default error pages.

#### Removing web server test page

It is recommended to remove the web server test page to avoid information exposure. By default, web server webroot contains a test page called index.html (Apache2 on Ubuntu is used as an example):



The test page should be removed or should be made unavailable as part of the web server hardening process.

#### Set X-Frame-Options HTTP response header

By default, Zabbix is configured with X-Frame-Options HTTP header\* set to SAMEORIGIN. This means that content can only be loaded in a frame that has the same origin as the page itself.

Zabbix frontend elements that pull content from external URLs (namely, the URL **dashboard widget**) display retrieved content in a sandbox with all sandboxing restrictions enabled.

These settings enhance the security of the Zabbix frontend and provide protection against XSS and clickjacking attacks. *Super admin* users can **modify** the *Use iframe sandboxing* and *Use X-Frame-Options HTTP header* parameters as needed. Please carefully weigh the risks and benefits before changing default settings. Turning iframe sandboxing or X-Frame-Options HTTP header off completely is not recommended.

#### Hiding the file with list of common passwords

To increase the complexity of password brute force attacks, it is suggested to limit access to the file `ui/data/top_passwords.txt` by modifying web server configuration. This file contains a list of the most common and context-specific passwords, and is used to prevent users from setting such passwords if *Avoid easy-to-guess passwords* parameter is enabled in the **password policy**.

For example, on NGINX file access can be limited by using the location directive:

```
location = /data/top_passwords.txt {
    deny all;
    return 404;
}
```

On Apache - by using `.htaccess` file:

```
<Files "top_passwords.txt">
    Order Allow,Deny
    Deny from all
</Files>
```

#### UTF-8 encoding

UTF-8 is the only encoding supported by Zabbix. It is known to work without any security flaws. Users should be aware that there are known security issues if using some of the other encodings.

#### Windows installer paths

When using Windows installers, it is recommended to use default paths provided by the installer as using custom paths without proper permissions could compromise the security of the installation.

#### Zabbix Security Advisories and CVE database

See [Zabbix Security Advisories and CVE database](#).

### 3 Installation from sources

You can get the very latest version of Zabbix by compiling it from the sources.

A step-by-step tutorial for installing Zabbix from the sources is provided here.

#### 1 Installing Zabbix daemons

##### 1 Download the source archive

Go to the [Zabbix download page](#) and download the source archive. Once downloaded, extract the sources, by running:

```
tar -zxvf zabbix-6.0.0.tar.gz
```

#### Note:

Enter the correct Zabbix version in the command. It must match the name of the downloaded archive.

##### 2 Create user account

For all of the Zabbix daemon processes, an unprivileged user is required. If a Zabbix daemon is started from an unprivileged user account, it will run as that user.

However, if a daemon is started from a 'root' account, it will switch to a 'zabbix' user account, which must be present. To create such a user account (in its own group, "zabbix"),

on a RedHat-based system, run:

```
groupadd --system zabbix
useradd --system -g zabbix -d /usr/lib/zabbix -s /sbin/nologin -c "Zabbix Monitoring System" zabbix
```

on a Debian-based system, run:

```
addgroup --system --quiet zabbix
adduser --quiet --system --disabled-login --ingroup zabbix --home /var/lib/zabbix --no-create-home zabbix
```

#### Attention:

Zabbix processes do not need a home directory, which is why we do not recommend creating it. However, if you are using some functionality that requires it (e. g. store MySQL credentials in \$HOME/.my.cnf) you are free to create it using the following commands.

On RedHat-based systems, run:

```
mkdir -m u=rwx,g=rwx,o= -p /usr/lib/zabbix
chown zabbix:zabbix /usr/lib/zabbix
```

On Debian-based systems, run:

```
mkdir -m u=rwx,g=rwx,o= -p /var/lib/zabbix
chown zabbix:zabbix /var/lib/zabbix
```

A separate user account is not required for Zabbix frontend installation.

If Zabbix **server** and **agent** are run on the same machine it is recommended to use a different user for running the server than for running the agent. Otherwise, if both are run as the same user, the agent can access the server configuration file and any Admin level user in Zabbix can quite easily retrieve, for example, the database password.

#### Attention:

Running Zabbix as root, bin, or any other account with special rights is a security risk.

##### 3 Create Zabbix database

For Zabbix **server** and **proxy** daemons, as well as Zabbix frontend, a database is required. It is not needed to run Zabbix **agent**.

SQL **scripts are provided** for creating database schema and inserting the dataset. Zabbix proxy database needs only the schema while Zabbix server database requires also the dataset on top of the schema.

Having created a Zabbix database, proceed to the following steps of compiling Zabbix.

##### 4 Configure the sources

C99 with GNU extensions is required for building Zabbix server, Zabbix proxy or Zabbix agent. This version can be explicitly specified by setting `CFLAGS="-std=gnu99"`:

```
export CFLAGS="-std=gnu99"
```

**Note:**

If installing from [Zabbix Git repository](#), it is required to run first:

```
./bootstrap.sh
```

When configuring the sources for a Zabbix server or proxy, you must specify the database type to be used. Only one database type can be compiled with a server or proxy process at a time.

To see all of the supported configuration options, inside the extracted Zabbix source directory run:

```
./configure --help
```

To configure the sources for a Zabbix server and agent, you may run something like:

```
./configure --enable-server --enable-agent --with-mysql --enable-ipv6 --with-net-snmp --with-libcurl --with-
```

To configure the sources for a Zabbix server (with PostgreSQL etc.), you may run:

```
./configure --enable-server --with-postgresql --with-net-snmp
```

To configure the sources for a Zabbix proxy (with SQLite etc.), you may run:

```
./configure --prefix=/usr --enable-proxy --with-net-snmp --with-sqlite3 --with-ssh2
```

To configure the sources for a Zabbix agent, you may run:

```
./configure --enable-agent
```

or, for Zabbix agent 2:

```
./configure --enable-agent2
```

**Note:**

A configured Go environment with a currently supported [Go version](#) is required for building Zabbix agent 2. See [go.dev](#) for installation instructions.

Notes on compilation options:

- Command-line utilities `zabbix_get` and `zabbix_sender` are compiled if `--enable-agent` option is used.
- `--with-libcurl` and `--with-libxml2` configuration options are required for virtual machine monitoring; `--with-libcurl` is also required for SMTP authentication and `web.page.*` Zabbix agent [items](#). Note that cURL 7.20.0 or higher is [required](#) with the `--with-libcurl` configuration option.
- Zabbix always compiles with the PCRE library (since version 3.4.0); installing it is not optional. `--with-libpcre=[DIR]` only allows pointing to a specific base install directory, instead of searching through a number of common places for the libpcre files.
- You may use the `--enable-static` flag to statically link libraries. If you plan to distribute compiled binaries among different servers, you must use this flag to make these binaries work without required libraries. Note that `--enable-static` does not work in [Solaris](#).
- Using `--enable-static` option is not recommended when building server. In order to build the server statically, you must have a static version of every external library needed. There is no strict check for that in configure script.
- Add optional path to the MySQL configuration file `--with-mysql=/<path_to_the_file>/mysql_config` to select the desired MySQL client library when there is a need to use one that is not located in the default location. It is useful when there are several versions of MySQL installed or MariaDB installed alongside MySQL on the same system.
- Use `--with-oracle` flag to specify location of the OCI API.

**Attention:**

If `./configure` fails due to missing libraries or some other circumstance, please see the `config.log` file for more details on the error. For example, if `libssl` is missing, the immediate error message may be misleading:

```
checking for main in -lmysqlclient... no
configure: error: Not found mysqlclient library
```

While `config.log` has a more detailed description:

```
/usr/bin/ld: cannot find -lssl
/usr/bin/ld: cannot find -lcrypto
```

See also:

- [Compiling Zabbix with encryption support](#) for encryption support
- [Known issues](#) with compiling Zabbix agent on HP-UX

## 5 Make and install everything

### Note:

If installing from [Zabbix Git repository](#), it is required to run first:

```
$ make dbschema
```

`make install`

This step should be run as a user with sufficient permissions (commonly 'root', or by using `sudo`).

Running `make install` will by default install the daemon binaries (`zabbix_server`, `zabbix_agentd`, `zabbix_proxy`) in `/usr/local/sbin` and the client binaries (`zabbix_get`, `zabbix_sender`) in `/usr/local/bin`.

### Note:

To specify a different location than `/usr/local`, use a `--prefix` key in the previous step of configuring sources, for example `--prefix=/home/zabbix`. In this case daemon binaries will be installed under `<prefix>/sbin`, while utilities under `<prefix>/bin`. Man pages will be installed under `<prefix>/share`.

## 6 Review and edit configuration files

- edit the Zabbix agent configuration file **`/usr/local/etc/zabbix_agentd.conf`**

You need to configure this file for every host with `zabbix_agentd` installed.

You must specify the Zabbix server **IP address** in the file. Connections from other hosts will be denied.

- edit the Zabbix server configuration file **`/usr/local/etc/zabbix_server.conf`**

You must specify the database name, user and password (if using any).

The rest of the parameters will suit you with their defaults if you have a small installation (up to ten monitored hosts). You should change the default parameters if you want to maximize the performance of Zabbix server (or proxy) though.

- if you have installed a Zabbix proxy, edit the proxy configuration file **`/usr/local/etc/zabbix_proxy.conf`**

You must specify the server IP address and proxy hostname (must be known to the server), as well as the database name, user and password (if using any).

### Note:

With SQLite the full path to database file must be specified; DB user and password are not required.

## 7 Start up the daemons

Run `zabbix_server` on the server side.

`zabbix_server`

### Note:

Make sure that your system allows allocation of 36MB (or a bit more) of shared memory, otherwise the server may not start and you will see "Cannot allocate shared memory for <type of cache>." in the server log file. This may happen on FreeBSD, Solaris 8.

Run `zabbix_agentd` on all the monitored machines.

`zabbix_agentd`

### Note:

Make sure that your system allows allocation of 2MB of shared memory, otherwise the agent may not start and you will see "Cannot allocate shared memory for collector." in the agent log file. This may happen on Solaris 8.

If you have installed Zabbix proxy, run `zabbix_proxy`.

`zabbix_proxy`

## 2 Installing Zabbix web interface

### Copying PHP files

Zabbix frontend is written in PHP, so to run it a PHP supported webserver is needed. Installation is done by simply copying the PHP files from the ui directory to the webserver HTML documents directory.

Common locations of HTML documents directories for Apache web servers include:

- /usr/local/apache2/htdocs (default directory when installing Apache from source)
- /srv/www/htdocs (OpenSUSE, SLES)
- /var/www/html (Debian, Ubuntu, Fedora, RHEL)

It is suggested to use a subdirectory instead of the HTML root. To create a subdirectory and copy Zabbix frontend files into it, execute the following commands, replacing the actual directory:

```
mkdir <htdocs>/zabbix
cd ui
cp -a . <htdocs>/zabbix
```

If planning to use any other language than English, see [Installation of additional frontend languages](#) for instructions.

### Installing frontend

Please see [Web interface installation](#) page for information about Zabbix frontend installation wizard.

## 3 Installing Java gateway

It is required to install Java gateway only if you want to monitor JMX applications. Java gateway is lightweight and does not require a database.

To install from sources, first [download](#) and extract the source archive.

To compile Java gateway, run the `./configure` script with `--enable-java` option. It is advisable that you specify the `--prefix` option to request installation path other than the default `/usr/local`, because installing Java gateway will create a whole directory tree, not just a single executable.

```
./configure --enable-java --prefix=$PREFIX
```

To compile and package Java gateway into a JAR file, run `make`. Note that for this step you will need `javac` and `jar` executables in your path.

```
make
```

Now you have a `zabbix-java-gateway-$VERSION.jar` file in `src/zabbix_java/bin`. If you are comfortable with running Java gateway from `src/zabbix_java` in the distribution directory, then you can proceed to instructions for configuring and running [Java gateway](#). Otherwise, make sure you have enough privileges and run `make install`.

```
make install
```

Proceed to [setup](#) for more details on configuring and running Java gateway.

## 4 Installing Zabbix web service

Installing Zabbix web service is only required if you want to use [scheduled reports](#).

To install from sources, first [download](#) and extract the source archive.

To compile Zabbix web service, run the `./configure` script with `--enable-webservice` option.

### Note:

A configured [Go](#) version 1.13+ environment is required for building Zabbix web service.

Run `zabbix_web_service` on the machine, where the web service is installed:

```
zabbix_web_service
```

Proceed to [setup](#) for more details on configuring Scheduled reports generation.

## 1 Building Zabbix agent on Windows

### Overview

This section demonstrates how to build Zabbix Windows agent binaries from sources with or without TLS.

## Compiling OpenSSL

The following steps will help you to compile OpenSSL from sources on MS Windows 10 (64-bit).

1. For compiling OpenSSL you will need on Windows machine:
  1. C compiler (e.g. VS 2017 RC),
  2. NASM (<https://www.nasm.us/>),
  3. Perl (e.g. Strawberry Perl from <http://strawberryperl.com/>),
  4. Perl module Text::Template (cpan Text::Template).
2. Get OpenSSL sources from <https://www.openssl.org/>. OpenSSL 1.1.1 is used here.
3. Unpack OpenSSL sources, for example, in E:\openssl-1.1.1.
4. Open a commandline window e.g. the x64 Native Tools Command Prompt for VS 2017 RC.
5. Go to the OpenSSL source directory, e.g. E:\openssl-1.1.1.
  1. Verify that NASM can be found: `e:\openssl-1.1.1> nasm --version` NASM version 2.13.01 compiled on May 1 2017
6. Configure OpenSSL, for example: `e:\openssl-1.1.1> perl E:\openssl-1.1.1\Configure VC-WIN64A no-shared no-capieng no-srp no-gost no-dgram no-dtls1-method no-dtls1_2-method --api=1.1.0 --prefix=C:\OpenSSL --openssldir=C:\OpenSSL-Win64-111-static`
  - Note the option 'no-shared': if 'no-shared' is used then the OpenSSL static libraries libcrypto.lib and libssl.lib will be 'self-sufficient' and resulting Zabbix binaries will include OpenSSL in themselves, no need for external OpenSSL DLLs. Advantage: Zabbix binaries can be copied to other Windows machines without OpenSSL libraries. Disadvantage: when a new OpenSSL bugfix version is released, Zabbix agent needs to be recompiled and reinstalled.
  - If 'no-shared' is not used, then the static libraries libcrypto.lib and libssl.lib will be using OpenSSL DLLs at runtime. Advantage: when a new OpenSSL bugfix version is released, probably you can upgrade only OpenSSL DLLs, without recompiling Zabbix agent. Disadvantage: copying Zabbix agent to another machine requires copying OpenSSL DLLs, too.
7. Compile OpenSSL, run tests, install: `e:\openssl-1.1.1> nmake` `e:\openssl-1.1.1> nmake test` ... All tests successful. Files=152, Tests=1152, 501 wallclock secs ( 0.67 usr + 0.61 sys = 1.28 CPU) Result: PASS `e:\openssl-1.1.1> nmake install_sw` 'install\_sw' installs only software components (i.e. libraries, header files, but no documentation). If you want everything, use "nmake install".

## Compiling PCRE

1. Download the PCRE or PCRE2 (supported since Zabbix 6.0) library (<https://pcre.org/>).
2. Extract to directory E:\pcre2-10.39.
3. Install CMake from <https://cmake.org/download/>, during install select: and ensure that cmake\bin is on your path (tested version 3.9.4).
4. Create a new, empty build directory, preferably a subdirectory of the source dir. For example, E:\pcre2-10.39\build.
5. Open a commandline window e.g. the x64 Native Tools Command Prompt for VS 2017 and from that shell environment run cmake-gui. Do not try to start CMake from the Windows Start menu, as this can lead to errors.
6. Enter E:\pcre2-10.39 and E:\pcre2-10.39\build for the source and build directories, respectively.
7. Hit the "Configure" button.
8. When specifying the generator for this project select "NMake Makefiles".
9. Create a new, empty install directory. For example, E:\pcre2-10.39-install.
10. The GUI will then list several configuration options. Make sure the following options are selected:
  - **PCRE\_SUPPORT\_UNICODE\_PROPERTIES ON**
  - **PCRE\_SUPPORT\_UTF ON**
  - **CMAKE\_INSTALL\_PREFIX E:\pcre2-10.39-install**
11. Hit "Configure" again. The adjacent "Generate" button should now be active.
12. Hit "Generate".
13. In the event that errors occur, it is recommended that you delete the CMake cache before attempting to repeat the CMake build process. In the CMake GUI, the cache can be deleted by selecting "File > Delete Cache".
14. The build directory should now contain a usable build system - *Makefile*.
15. Open a commandline window e.g. the x64 Native Tools Command Prompt for VS 2017 and navigate to the *Makefile* mentioned above.
16. Run NMake command: `E:\pcre2-10.39\build> nmake install`

## Compiling Zabbix

The following steps will help you to compile Zabbix from sources on MS Windows 10 (64-bit). When compiling Zabbix with/without TLS support the only significant difference is in step 4.

1. On a Linux machine check out the source from git: 

```
$ git clone https://git.zabbix.com/scm/zbx/zabbix.git
$ cd zabbix      $ ./bootstrap.sh      $ ./configure --enable-agent --enable-ipv6 --prefix=`pwd`
$ make dbschema  $ make dist
```
2. Copy and unpack the archive, e.g. zabbix-4.4.0.tar.gz, on a Windows machine.



- Let's assume that sources are in e:\zabbix-4.4.0. Open a commandline window e.g. the x64 Native Tools Command Prompt for VS 2017 RC. Go to E:\zabbix-4.4.0\build\win32\project.
- Compile zabbix\_get, zabbix\_sender and zabbix\_agent.
  - without TLS: E:\zabbix-4.4.0\build\win32\project> nmake /K PCREINCDIR=E:\pcre2-10.39-install\include PCRELIBDIR=E:\pcre2-10.39-install\lib
  - with TLS: E:\zabbix-4.4.0\build\win32\project> nmake /K -f Makefile\_get TLS=openssl TLSINCDIR=C:\OpenSSL-Win64-111-static\include PCRELIBDIR=E:\pcre2-10.39-install\lib E:\zabbix-4.4.0\build\win32\project> nmake /K -f Makefile\_sender TLS=openssl TLSINCDIR="C:\OpenSSL-Win64-111-static\include" PCRELIBDIR=E:\pcre2-10.39-install\lib E:\zabbix-4.4.0\build\win32\project> nmake /K -f Makefile\_agent TLS=openssl TLSINCDIR=C:\OpenSSL-Win64-111-static\include PCRELIBDIR=E:\pcre2-10.39-install\lib
- New binaries are located in e:\zabbix-4.4.0\bin\win64. Since OpenSSL was compiled with 'no-shared' option, Zabbix binaries contain OpenSSL within themselves and can be copied to other machines that do not have OpenSSL.

#### Compiling Zabbix with LibreSSL

The process is similar to compiling with OpenSSL, but you need to make small changes in files located in the build\win32\project directory:

- In Makefile\_tls delete /DHAVE\_OPENSSL\_WITH\_PSK, i.e. find:

```
CFLAGS = $(CFLAGS) /DHAVE_OPENSSL /DHAVE_OPENSSL_WITH_PSK
```

and replace it with

```
CFLAGS = $(CFLAGS) /DHAVE_OPENSSL
```

- In Makefile\_common.inc add /NODEFAULTLIB:LIBCMT i.e. find:

```
/MANIFESTUAC:"level='asInvoker' uiAccess='false'" /DYNAMICBASE:NO /PDB:${TARGETDIR}\$(TARGETNAME).pdb
```

and replace it with

```
/MANIFESTUAC:"level='asInvoker' uiAccess='false'" /DYNAMICBASE:NO /PDB:${TARGETDIR}\$(TARGETNAME).pdb /NODEFAULTLIB:LIBCMT
```

## 2 Building Zabbix agent 2 on Windows

### Overview

This section demonstrates how to build Zabbix agent 2 (Windows) from sources.

#### Installing MinGW Compiler

- Download MinGW-w64 with SJLJ (set jump/long jump) Exception Handling and Windows threads (for example x86\_64-8.1.0-release-win32-sjlj-rt\_v6-rev0.7z)
- Extract and move to c:\mingw
- Setup environmental variable

```
@echo off
set PATH=%PATH%;c:\mingw\bin
cmd
```

When compiling use Windows prompt instead of MSYS terminal provided by MinGW

#### Compiling PCRE development libraries

The following instructions will compile and install 64-bit PCRE libraries in c:\dev\pcre and 32-bit libraries in c:\dev\pcre32:

- Download the PCRE or PCRE2 (supported since Zabbix 6.0) library (<https://pcre.org/>) and extract
- Open cmd and navigate to the extracted sources

#### Build 64bit PCRE

- Delete old configuration/cache if exists:

```
del CMakeCache.txt
rmdir /q /s CMakeFiles
```

- Run cmake (CMake can be installed from <https://cmake.org/download/>):

```
cmake -G "MinGW Makefiles" -DCMAKE_C_COMPILER=gcc -DCMAKE_C_FLAGS="-O2 -g" -DCMAKE_CXX_FLAGS="-O2 -g" -DCMAKE_BUILD_TYPE=Release
```

3. Next, run:

```
mingw32-make clean
mingw32-make install
```

Build 32bit PCRE

1. Run:

```
mingw32-make clean
```

2. Delete *CMakeCache.txt*:

```
del CMakeCache.txt
rmdir /q /s CMakeFiles
```

3. Run cmake:

```
cmake -G "MinGW Makefiles" -DCMAKE_C_COMPILER=gcc -DCMAKE_C_FLAGS="-m32 -O2 -g" -DCMAKE_CXX_FLAGS="-m32 -O2 -g"
```

4. Next, run:

```
mingw32-make install
```

Installing OpenSSL development libraries

1. Download 32 and 64 bit builds from <https://curl.se/windows/>
2. Extract files into *c:\dev\openssl32* and *c:\dev\openssl* directories accordingly.
3. After that remove extracted \*.dll.a (dll call wrapper libraries) as MinGW prioritizes them before static libraries.

Compiling Zabbix agent 2

32 bit

Open MinGW environment (Windows command prompt) and navigate to *build/mingw* directory in the Zabbix source tree.

Run:

```
mingw32-make clean
mingw32-make ARCH=x86 PCRE=c:\dev\pcre32 OPENSSL=c:\dev\openssl32
```

64 bit

Open MinGW environment (Windows command prompt) and navigate to *build/mingw* directory in the Zabbix source tree.

Run:

```
mingw32-make clean
mingw32-make PCRE=c:\dev\pcre OPENSSL=c:\dev\openssl
```

**Note:**

Both 32- and 64- bit versions can be built on a 64-bit platform, but only a 32-bit version can be built on a 32-bit platform. When working on the 32-bit platform, follow the same steps as for 64-bit version on 64-bit platform.

### 3 Building Zabbix agent on macOS

#### Overview

This section demonstrates how to build Zabbix macOS agent binaries from sources with or without TLS.

#### Prerequisites

You will need command line developer tools (Xcode is not required), Automake, pkg-config and PCRE (v8.x) or PCRE2 (v10.x). If you want to build agent binaries with TLS, you will also need OpenSSL or GnuTLS.

To install Automake and pkg-config, you will need a Homebrew package manager from <https://brew.sh/>. To install it, open terminal and run the following command:

```
/usr/bin/ruby -e "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install)"
```

Then install Automake and pkg-config:

```
brew install automake
brew install pkg-config
```

Preparing PCRE, OpenSSL and GnuTLS libraries depends on the way how they are going to be linked to the agent.

If you intend to run agent binaries on a macOS machine that already has these libraries, you can use precompiled libraries that are provided by Homebrew. These are typically macOS machines that use Homebrew for building Zabbix agent binaries or for other purposes.

If agent binaries will be used on macOS machines that don't have the shared version of libraries, you should compile static libraries from sources and link Zabbix agent with them.

Building agent binaries with shared libraries

Install PCRE2 (replace *pcre2* with *pcre* in the commands below, if needed):

```
brew install pcre2
```

When building with TLS, install OpenSSL and/or GnuTLS:

```
brew install openssl
brew install gnutls
```

Download Zabbix source:

```
git clone https://git.zabbix.com/scm/zbx/zabbix.git
```

Build agent without TLS:

```
cd zabbix
./bootstrap.sh
./configure --sysconfdir=/usr/local/etc/zabbix --enable-agent --enable-ipv6
make
make install
```

Build agent with OpenSSL:

```
cd zabbix
./bootstrap.sh
./configure --sysconfdir=/usr/local/etc/zabbix --enable-agent --enable-ipv6 --with-openssl=/usr/local/opt/openssl
make
make install
```

Build agent with GnuTLS:

```
cd zabbix-source/
./bootstrap.sh
./configure --sysconfdir=/usr/local/etc/zabbix --enable-agent --enable-ipv6 --with-gnutls=/usr/local/opt/gnutls
make
make install
```

Building agent binaries with static libraries without TLS

Let's assume that PCRE static libraries will be installed in `$HOME/static-libs`. We will use PCRE2 10.39.

```
PCRE_PREFIX="$HOME/static-libs/pcre2-10.39"
```

Download and build PCRE with Unicode properties support:

```
mkdir static-libs-source
cd static-libs-source
curl --remote-name https://github.com/PhilipHazel/pcre2/releases/download/pcre2-10.39/pcre2-10.39.tar.gz
tar xf pcre2-10.39.tar.gz
cd pcre2-10.39
./configure --prefix="$PCRE_PREFIX" --disable-shared --enable-static --enable-unicode-properties
make
make check
make install
```

Download Zabbix source and build agent:

```
git clone https://git.zabbix.com/scm/zbx/zabbix.git
cd zabbix
./bootstrap.sh
./configure --sysconfdir=/usr/local/etc/zabbix --enable-agent --enable-ipv6 --with-libpcre2="$PCRE_PREFIX"
make
make install
```

## Building agent binaries with static libraries with OpenSSL

When building OpenSSL, it's recommended to run `make test` after successful building. Even if building was successful, tests sometimes fail. If this is the case, problems should be researched and resolved before continuing.

Let's assume that PCRE and OpenSSL static libraries will be installed in `$HOME/static-libs`. We will use PCRE2 10.39 and OpenSSL 1.1.1a.

```
PCRE_PREFIX="$HOME/static-libs/pcre2-10.39"
OPENSSL_PREFIX="$HOME/static-libs/openssl-1.1.1a"
```

Let's build static libraries in `static-libs-source`:

```
mkdir static-libs-source
cd static-libs-source
```

Download and build PCRE with Unicode properties support:

```
curl --remote-name https://github.com/PhilipHazel/pcre2/releases/download/pcre2-10.39/pcre2-10.39.tar.gz
tar xf pcre2-10.39.tar.gz
cd pcre2-10.39
./configure --prefix="$PCRE_PREFIX" --disable-shared --enable-static --enable-unicode-properties
make
make check
make install
cd ..
```

Download and build OpenSSL:

```
curl --remote-name https://www.openssl.org/source/openssl-1.1.1a.tar.gz
tar xf openssl-1.1.1a.tar.gz
cd openssl-1.1.1a
./Configure --prefix="$OPENSSL_PREFIX" --openssldir="$OPENSSL_PREFIX" --api=1.1.0 no-shared no-capieng no-
make
make test
make install_sw
cd ..
```

Download Zabbix source and build agent:

```
git clone https://git.zabbix.com/scm/zbx/zabbix.git
cd zabbix
./bootstrap.sh
./configure --sysconfdir=/usr/local/etc/zabbix --enable-agent --enable-ipv6 --with-libpcre2="$PCRE_PREFIX"
make
make install
```

## Building agent binaries with static libraries with GnuTLS

GnuTLS depends on the Nettle crypto backend and GMP arithmetic library. Instead of using full GMP library, this guide will use mini-gmp which is included in Nettle.

When building GnuTLS and Nettle, it's recommended to run `make check` after successful building. Even if building was successful, tests sometimes fail. If this is the case, problems should be researched and resolved before continuing.

Let's assume that PCRE, Nettle and GnuTLS static libraries will be installed in `$HOME/static-libs`. We will use PCRE2 10.39, Nettle 3.4.1 and GnuTLS 3.6.5.

```
PCRE_PREFIX="$HOME/static-libs/pcre2-10.39"
NETTLE_PREFIX="$HOME/static-libs/nettle-3.4.1"
GNUTLS_PREFIX="$HOME/static-libs/gnutls-3.6.5"
```

Let's build static libraries in `static-libs-source`:

```
mkdir static-libs-source
cd static-libs-source
```

Download and build Nettle:

```
curl --remote-name https://ftp.gnu.org/gnu/nettle/nettle-3.4.1.tar.gz
tar xf nettle-3.4.1.tar.gz
cd nettle-3.4.1
./configure --prefix="$NETTLE_PREFIX" --enable-static --disable-shared --disable-documentation --disable-a-
```

```
make
make check
make install
cd ..
```

Download and build GnuTLS:

```
curl --remote-name https://www.gnupg.org/ftp/gcrypt/gnutls/v3.6/gnutls-3.6.5.tar.xz
tar xf gnutls-3.6.5.tar.xz
cd gnutls-3.6.5
PKG_CONFIG_PATH="$NETTLE_PREFIX/lib/pkgconfig" ./configure --prefix="$GNUTLS_PREFIX" --enable-static --dis
make
make check
make install
cd ..
```

Download Zabbix source and build agent:

```
git clone https://git.zabbix.com/scm/zbx/zabbix.git
cd zabbix
./bootstrap.sh
CFLAGS="-Wno-unused-command-line-argument -framework Foundation -framework Security" \
> LIBS="-lgnutls -lhogweed -lnettle" \
> LDFLAGS="-L$GNUTLS_PREFIX/lib -L$NETTLE_PREFIX/lib" \
> ./configure --sysconfdir=/usr/local/etc/zabbix --enable-agent --enable-ipv6 --with-libpcre2="$PCRE_PREFI
make
make install
```

## 4 Installation from packages

Zabbix SIA provides official RPM and DEB packages for:

- [Red Hat Enterprise Linux](#)
- [Debian/Ubuntu/Raspbian](#)
- [SUSE Linux Enterprise Server](#)

Package files for yum/dnf, apt, and zypper repositories for various OS distributions are available in the [Zabbix official repository](#).

Note that though some OS distributions (in particular, Debian-based distributions) provide their own Zabbix packages, these packages are not supported by Zabbix. Zabbix packages provided by third parties can be out of date and may lack the latest features and bug fixes. It is recommended to use only the packages from the [Zabbix official repository](#). If you have previously used unofficial Zabbix packages, see notes about [upgrading Zabbix packages from OS repositories](#).

### 1 Red Hat Enterprise Linux

#### Overview

Official Zabbix 6.0 LTS packages for Red Hat Enterprise Linux and Oracle Linux are available on [Zabbix website](#).

#### Attention:

Zabbix packages for Red Hat Enterprise Linux systems are intended only for RHEL systems. Alternative environments, such as [Red Hat Universal Base Image](#), may lack the necessary dependencies and repository access requirements for successful installation. To address such issues, verify compatibility with the target environment and ensure access to required repositories and dependencies before proceeding with Zabbix installation from packages. For more information, see [Known issues](#).

Packages are available with either MySQL/PostgreSQL database and Apache/Nginx web server support.

*Zabbix agent* packages and utilities *Zabbix get* and *Zabbix sender* are available on Zabbix Official Repository for [RHEL 9](#), [RHEL 8](#), [RHEL 7](#), [RHEL 6](#), and [RHEL 5](#).

**Attention:**

Since Zabbix 6.0.35, Zabbix agent 2 packages are no longer available for [RHEL 6](#) due to Go 1.22 (and newer) being incompatible with GCC 4.4.7 provided by RHEL 6, which results in compilation errors. Note, however, that **Zabbix agent packages** are still supported.

Zabbix Official Repository provides *fping*, *iksemel* and *libssh2* packages as well. These packages are located in the [non-supported](#) directory.

**Attention:**

The EPEL repository for EL9 also provides Zabbix packages. If both the official Zabbix repository and EPEL repositories are installed, then the Zabbix packages in EPEL **must be** excluded by adding the following clause to the EPEL repo configuration file under `/etc/yum.repos.d/`:

```
[epel]
```

```
...
```

```
excludepkgs=zabbix*
```

See also: [Accidental installation of EPEL Zabbix packages](#)

## Notes on installation

See [installation instructions](#) per platform in the download page for:

- installing the repository
- installing server/agent/frontend
- creating initial database, importing initial data
- configuring database for Zabbix server
- configuring PHP for Zabbix frontend
- starting server/agent processes
- configuring Zabbix frontend

If you want to run Zabbix agent as root, see [Running agent as root](#).

Zabbix web service process, which is used for [scheduled report generation](#), requires Google Chrome browser. The browser is not included into packages and has to be installed manually.

## Importing data with Timescale DB

With TimescaleDB, in addition to the import command for PostgreSQL, also run:

```
cat /usr/share/zabbix-sql-scripts/postgresql/timescaledb.sql | sudo -u zabbix psql zabbix
```

**Warning:**

TimescaleDB is supported with Zabbix server only.

## PHP 7.2

Zabbix frontend requires PHP version **7.2 or newer**.

## SELinux configuration

Zabbix uses socket-based inter-process communication. On systems where SELinux is enabled, it may be required to add SELinux rules to allow Zabbix create/use UNIX domain sockets in the SocketDir directory. Currently socket files are used by server (alerter, preprocessing, IPMI) and proxy (IPMI). Socket files are persistent, meaning they are present while the process is running.

Having SELinux status enabled in enforcing mode, you need to execute the following commands to enable communication between Zabbix frontend and server:

RHEL 7 and later:

```
setsebool -P httpd_can_connect_zabbix on
```

If the database is accessible over network (including 'localhost' in case of PostgreSQL), you need to allow Zabbix frontend to connect to the database too:

```
setsebool -P httpd_can_network_connect_db on
```

RHEL prior to 7:

```
setsebool -P httpd_can_network_connect on
```

```
setsebool -P zabbix_can_network on
```

After the frontend and SELinux configuration is done, restart the Apache web server:

```
systemctl restart httpd
```

In addition, Zabbix provides the zabbix-selinux-policy package as part of source RPM packages for [RHEL 8](#) and [RHEL 7](#). This package provides a basic default policy for SELinux and makes zabbix components work out-of-the-box by allowing Zabbix to create and use sockets and enabling httpd connection to PostgreSQL (used by frontend).

The source *zabbix\_policy.te* file contains the following rules:

```
module zabbix_policy 1.2;

require {
    type zabbix_t;
    type zabbix_port_t;
    type zabbix_var_run_t;
    type postgresql_port_t;
    type httpd_t;
    class tcp_socket name_connect;
    class sock_file { create unlink };
    class unix_stream_socket connectto;
}

#===== zabbix_t =====
allow zabbix_t self:unix_stream_socket connectto;
allow zabbix_t zabbix_port_t:tcp_socket name_connect;
allow zabbix_t zabbix_var_run_t:sock_file create;
allow zabbix_t zabbix_var_run_t:sock_file unlink;
allow httpd_t zabbix_port_t:tcp_socket name_connect;

#===== httpd_t =====
allow httpd_t postgresql_port_t:tcp_socket name_connect;
```

This package has been created to prevent users from turning off SELinux because of the configuration complexity. It contains the default policy that is sufficient to speed up Zabbix deployment and configuration. For maximum security level, it is recommended to set custom SELinux settings.

#### Proxy installation

Once the required repository is added, you can install Zabbix proxy by running:

```
dnf install zabbix-proxy-mysql zabbix-sql-scripts
```

Substitute 'mysql' in the commands with 'pgsql' to use PostgreSQL, or with 'sqlite3' to use SQLite3 (proxy only).

The package 'zabbix-sql-scripts' contains database schemas for all supported database management systems for both Zabbix server and Zabbix proxy and will be used for data import.

#### Creating database

**Create** a separate database for Zabbix proxy.

Zabbix server and Zabbix proxy cannot use the same database. If they are installed on the same host, the proxy database must have a different name.

#### Importing data

Import initial schema:

```
cat /usr/share/zabbix-sql-scripts/mysql/proxy.sql | mysql -uzabbix -p zabbix
```

For proxy with PostgreSQL (or SQLite):

```
cat /usr/share/zabbix-sql-scripts/postgresql/proxy.sql | sudo -u zabbix psql zabbix
cat /usr/share/zabbix-sql-scripts/sqlite3/proxy.sql | sqlite3 zabbix.db
```

#### Configure database for Zabbix proxy

Edit Zabbix proxy configuration file (/etc/zabbix/zabbix\_proxy.conf):

```
DBHost=localhost
DBName=zabbix
DBUser=zabbix
```

DBPassword=<password>

In DBName for Zabbix proxy use a separate database from Zabbix server.

In DBPassword use Zabbix database password for MySQL; PostgreSQL user password for PostgreSQL.

Use DBHost= with PostgreSQL. You might want to keep the default setting DBHost=localhost (or an IP address), but this would make PostgreSQL use a network socket for connecting to Zabbix. See [SELinux configuration](#) for instructions.

Starting Zabbix proxy process

To start a Zabbix proxy process and make it start at system boot:

```
systemctl start zabbix-proxy
systemctl enable zabbix-proxy
```

Frontend configuration

A Zabbix proxy does not have a frontend; it communicates with Zabbix server only.

Java gateway installation

It is required to install [Java gateway](#) only if you want to monitor JMX applications. Java gateway is lightweight and does not require a database.

Once the required repository is added, you can install Zabbix Java gateway by running:

```
dnf install zabbix-java-gateway
```

Proceed to [setup](#) for more details on configuring and running Java gateway.

Installing debuginfo packages

**Note:**

Debuginfo packages are currently available for RHE versions 7, 6 and 5.

To enable debuginfo repository, edit `/etc/yum.repos.d/zabbix.repo` file. Change `enabled=0` to `enabled=1` for zabbix-debuginfo repository.

```
[zabbix-debuginfo]
name=Zabbix Official Repository debuginfo - $basearch
baseurl=http://repo.zabbix.com/zabbix/5.5/rhel/7/$basearch/debuginfo/
enabled=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-ZABBIX-A14FE591
gpgcheck=1
```

This will allow you to install the zabbix-debuginfo package.

```
dnf install zabbix-debuginfo
```

This single package contains debug information for all binary Zabbix components.

## 2 Debian/Ubuntu/Raspbian

Overview

Official Zabbix 6.0 LTS packages for Debian, Ubuntu, and Raspberry Pi OS (Raspbian) are available on [Zabbix website](#).

Packages are available with either MySQL/PostgreSQL database and Apache/Nginx web server support.

Notes on installation

See the [installation instructions](#) per platform in the download page for:

- installing the repository
- installing server/agent/frontend
- creating initial database, importing initial data
- configuring database for Zabbix server
- configuring PHP for Zabbix frontend
- starting server/agent processes
- configuring Zabbix frontend



If you want to run Zabbix agent as root, see [running agent as root](#).

Zabbix web service process, which is used for [scheduled report generation](#), requires Google Chrome browser. The browser is not included into packages and has to be installed manually.

Importing data with Timescale DB

With TimescaleDB, in addition to the import command for PostgreSQL, also run:

```
cat /usr/share/zabbix-sql-scripts/postgresql/timescaledb.sql | sudo -u zabbix psql zabbix
```

**Warning:**

TimescaleDB is supported with Zabbix server only.

PHP 7.2

Zabbix frontend requires PHP version **7.2 or newer** starting with Zabbix 5.0.

See [instructions](#) for installing Zabbix frontend on distributions with PHP versions below 7.2.

SELinux configuration

See [SELinux configuration](#) for RHEL.

After the frontend and SELinux configuration is done, restart the Apache web server:

```
systemctl restart apache2
```

Proxy installation

Once the required repository is added, you can install Zabbix proxy by running:

```
apt install zabbix-proxy-mysql zabbix-sql-scripts
```

Substitute 'mysql' in the command with 'pgsql' to use PostgreSQL, or with 'sqlite3' to use SQLite3.

The package 'zabbix-sql-scripts' contains database schemas for all supported database management systems for both Zabbix server and Zabbix proxy and will be used for data import.

Creating database

[Create](#) a separate database for Zabbix proxy.

Zabbix server and Zabbix proxy cannot use the same database. If they are installed on the same host, the proxy database must have a different name.

Importing data

Import initial schema:

```
cat /usr/share/zabbix-sql-scripts/mysql/proxy.sql | mysql -uzabbix -p zabbix
```

For proxy with PostgreSQL (or SQLite):

```
cat /usr/share/zabbix-sql-scripts/postgresql/proxy.sql | sudo -u zabbix psql zabbix
cat /usr/share/zabbix-sql-scripts/sqlite3/proxy.sql | sqlite3 zabbix.db
```

Configure database for Zabbix proxy

Edit Zabbix proxy configuration file (/etc/zabbix/zabbix\_proxy.conf):

```
DBHost=localhost
DBName=zabbix
DBUser=zabbix
DBPassword=<password>
```

In DBName for Zabbix proxy use a separate database from Zabbix server.

In DBPassword use Zabbix database password for MySQL; PostgreSQL user password for PostgreSQL.

Use DBHost= with PostgreSQL. You might want to keep the default setting DBHost=localhost (or an IP address), but this would make PostgreSQL use a network socket for connecting to Zabbix. Refer to the [respective section](#) for RHEL for instructions.

Starting Zabbix proxy process

To start a Zabbix proxy process and make it start at system boot:

```
systemctl restart zabbix-proxy
systemctl enable zabbix-proxy
```

## Frontend configuration

A Zabbix proxy does not have a frontend; it communicates with Zabbix server only.

## Java gateway installation

It is required to install **Java gateway** only if you want to monitor JMX applications. Java gateway is lightweight and does not require a database.

Once the required repository is added, you can install Zabbix Java gateway by running:

```
apt install zabbix-java-gateway
```

Proceed to **setup** for more details on configuring and running Java gateway.

## 3 SUSE Linux Enterprise Server

### Overview

Official Zabbix 6.0 LTS packages for SUSE Linux Enterprise Server are available on [Zabbix website](#).

*Zabbix agent* packages and utilities *Zabbix get* and *Zabbix sender* are available on Zabbix Official Repository for [SLES 15 \(SP4 and newer\)](#) and [SLES 12 \(SP4 and newer\)](#).

#### Note:

Using SLES 15 with SP3 or older is not recommended and may contain limitations. Also, please note that the *Verify CA encryption mode* does not work on SLES 12 (all minor OS versions) with MySQL due to older MySQL libraries.

### Adding Zabbix repository

Install the repository configuration package. This package contains yum (software package manager) configuration files.

SLES 15:

```
rpm -Uvh --nosignature https://repo.zabbix.com/zabbix/6.0/sles/15/x86_64/zabbix-release-latest.sles15.noarch.rpm  
zypper --gpg-auto-import-keys refresh 'Zabbix Official Repository'
```

SLES 12:

```
rpm -Uvh --nosignature https://repo.zabbix.com/zabbix/6.0/sles/12/x86_64/zabbix-release-latest.sles12.noarch.rpm  
zypper --gpg-auto-import-keys refresh 'Zabbix Official Repository'
```

Please note that Zabbix web service process, which is used for **scheduled report generation**, requires Google Chrome browser. The browser is not included into packages and has to be installed manually.

### Server/frontend/agent installation

To install Zabbix server/frontend/agent with MySQL support:

```
zypper install zabbix-server-mysql zabbix-web-mysql zabbix-apache-conf zabbix-agent
```

Substitute 'apache' in the command with 'nginx' if using the package for Nginx web server. See also: [Nginx setup for Zabbix on SLES 12/15](#).

Substitute 'zabbix-agent' with 'zabbix-agent2' in these commands if using Zabbix agent 2 (only SLES 15).

To install Zabbix proxy with MySQL support:

```
zypper install zabbix-proxy-mysql zabbix-sql-scripts
```

Substitute 'mysql' in the commands with 'pgsql' to use PostgreSQL.

The package 'zabbix-sql-scripts' contains database schemas for all supported database management systems for both Zabbix server and Zabbix proxy and will be used for data import.

### Creating database

For Zabbix **server** and **proxy** daemons a database is required. It is not needed to run Zabbix **agent**.

#### Warning:

Separate databases are needed for Zabbix server and Zabbix proxy; they cannot use the same database. Therefore, if they are installed on the same host, their databases must be created with different names!

Create the database using the provided instructions for **MySQL** or **PostgreSQL**.

## Importing data

Now import initial schema and data for the **server** with MySQL:

```
zcat /usr/share/packages/zabbix-sql-scripts/mysql/create.sql.gz | mysql -uzabbix -p zabbix
```

You will be prompted to enter your newly created database password.

With PostgreSQL:

```
zcat /usr/share/packages/zabbix-sql-scripts/postgresql/create.sql.gz | sudo -u zabbix psql zabbix
```

With TimescaleDB, in addition to the previous command, also run:

```
zcat /usr/share/packages/zabbix-sql-scripts/postgresql/timescaledb.sql.gz | sudo -u <username> psql zabbix
```

### Warning:

TimescaleDB is supported with Zabbix server only.

For proxy, import initial schema:

```
zcat /usr/share/packages/zabbix-sql-scripts/mysql/schema.sql.gz | mysql -uzabbix -p zabbix
```

For proxy with PostgreSQL:

```
zcat /usr/share/packages/zabbix-sql-scripts/postgresql/schema.sql.gz | sudo -u zabbix psql zabbix
```

Configure database for Zabbix server/proxy

Edit Zabbix server configuration file (/etc/zabbix/zabbix\_server.conf) and, if required, Zabbix proxy configuration file (/etc/zabbix/zabbix\_proxy.conf) for their respective databases. For example:

```
DBHost=localhost
DBName=zabbix
DBUser=zabbix
DBPassword=<password>
```

In DBPassword use Zabbix database password for MySQL; PostgreSQL user password for PostgreSQL.

Use DBHost= with PostgreSQL. You might want to keep the default setting DBHost=localhost (or an IP address), but this would make PostgreSQL use a network socket for connecting to Zabbix.

## Zabbix frontend configuration

Depending on the web server used (Apache/Nginx) edit the corresponding configuration file for Zabbix frontend:

- For Apache the configuration file is located in /etc/apache2/conf.d/zabbix.conf. Some PHP settings are already configured. But it's necessary to uncomment the "date.timezone" setting and [set the right timezone](#) for you.

```
php_value max_execution_time 300
php_value memory_limit 128M
php_value post_max_size 16M
php_value upload_max_filesize 2M
php_value max_input_time 300
php_value max_input_vars 10000
php_value always_populate_raw_post_data -1
# php_value date.timezone Europe/Riga
```

- The zabbix-nginx-conf package installs a separate Nginx server for Zabbix frontend. Its configuration file is located in /etc/nginx/conf.d/zabbix.conf. For Zabbix frontend to work, it's necessary to uncomment and set listen and/or server\_name directives.

```
# listen 80;
# server_name example.com;
```

- Zabbix uses its own dedicated php-fpm connection pool with Nginx:

Its configuration file is located in /etc/php7/fpm/php-fpm.d/zabbix.conf. Some PHP settings are already configured. But it's necessary to set the right [date.timezone](#) setting for you.

```
php_value[max_execution_time] = 300
php_value[memory_limit] = 128M
php_value[post_max_size] = 16M
php_value[upload_max_filesize] = 2M
php_value[max_input_time] = 300
```

```
php_value[max_input_vars] = 10000
; php_value[date.timezone] = Europe/Riga
```

Now you are ready to proceed with **frontend installation steps** which will allow you to access your newly installed Zabbix.

Note that a Zabbix proxy does not have a frontend; it communicates with Zabbix server only.

Starting Zabbix server/agent process

Start Zabbix server and agent processes and make it start at system boot.

With Apache web server:

```
systemctl restart zabbix-server zabbix-agent apache2 php-fpm
systemctl enable zabbix-server zabbix-agent apache2 php-fpm
```

Substitute 'apache2' with 'nginx' for Nginx web server.

Installing debuginfo packages

To enable debuginfo repository edit `/etc/zypp/repos.d/zabbix.repo` file. Change `enabled=0` to `enabled=1` for zabbix-debuginfo repository.

```
[zabbix-debuginfo]
name=Zabbix Official Repository debuginfo
type=rpm-md
baseurl=http://repo.zabbix.com/zabbix/6.0/sles/15/x86_64/debuginfo/
gpgcheck=1
gpgkey=http://repo.zabbix.com/zabbix/6.0/sles/15/x86_64/debuginfo/repodata/repomd.xml.key
enabled=0
update=1
```

This will allow you to install zabbix-**<component>**-debuginfo packages.

## 4 Windows agent installation from MSI

Overview

Zabbix Windows agent can be installed from Windows MSI installer packages (32-bit or 64-bit) available for [download](#).

The minimum requirement for a Zabbix agent 2 MSI installation is Windows 10 32-bit/Server 2016.

The Zabbix get and sender utilities can also be installed, either together with Zabbix agent/agent 2 or separately.

A 32-bit package cannot be installed on a 64-bit Windows.

All packages come with TLS support, however, configuring TLS is optional.

Both UI and command-line based installation is supported.

### Note:

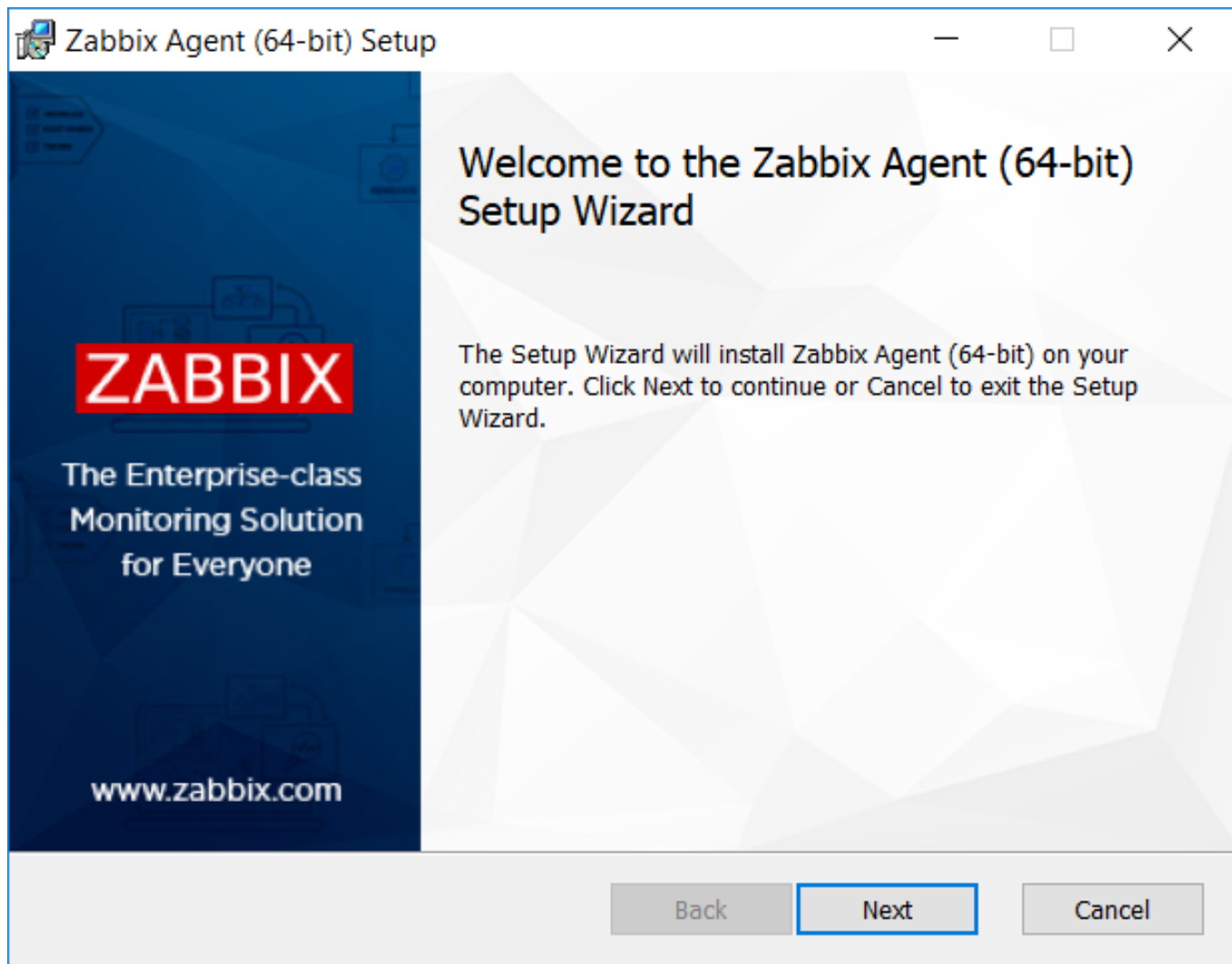
Although Zabbix installation from MSI installer packages is fully supported, it is recommended to install at least *Microsoft .NET Framework 2* for proper error handling. See [Microsoft Download .NET Framework](#).

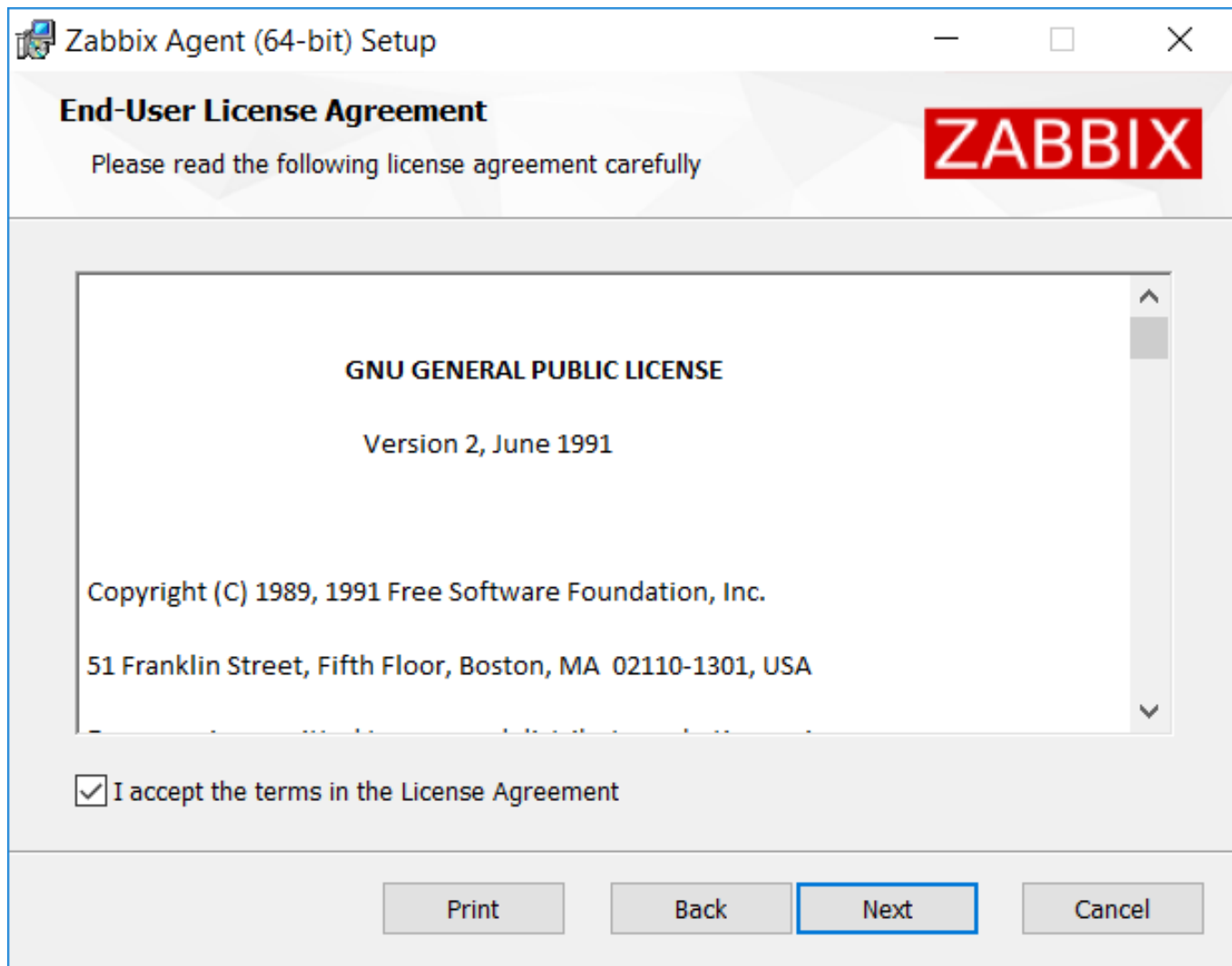
### Attention:

It is recommended to use default paths provided by the installer as using custom paths without proper permissions could compromise the security of the installation.

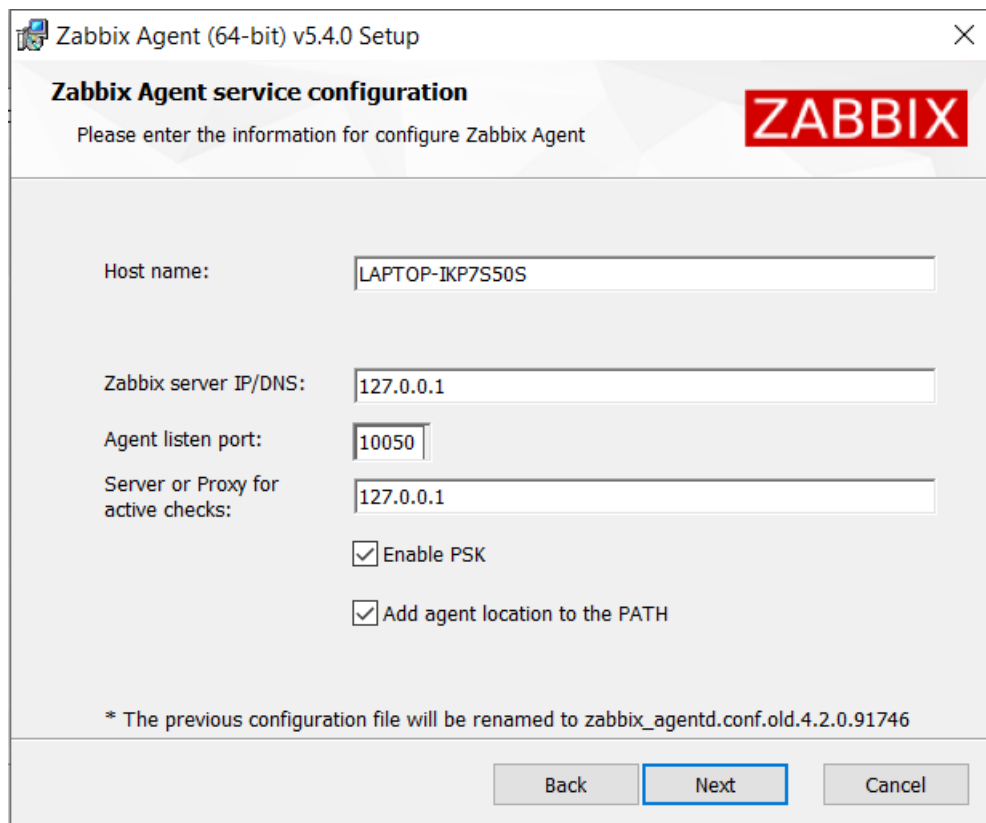
Installation steps

To install, double-click the downloaded MSI file.



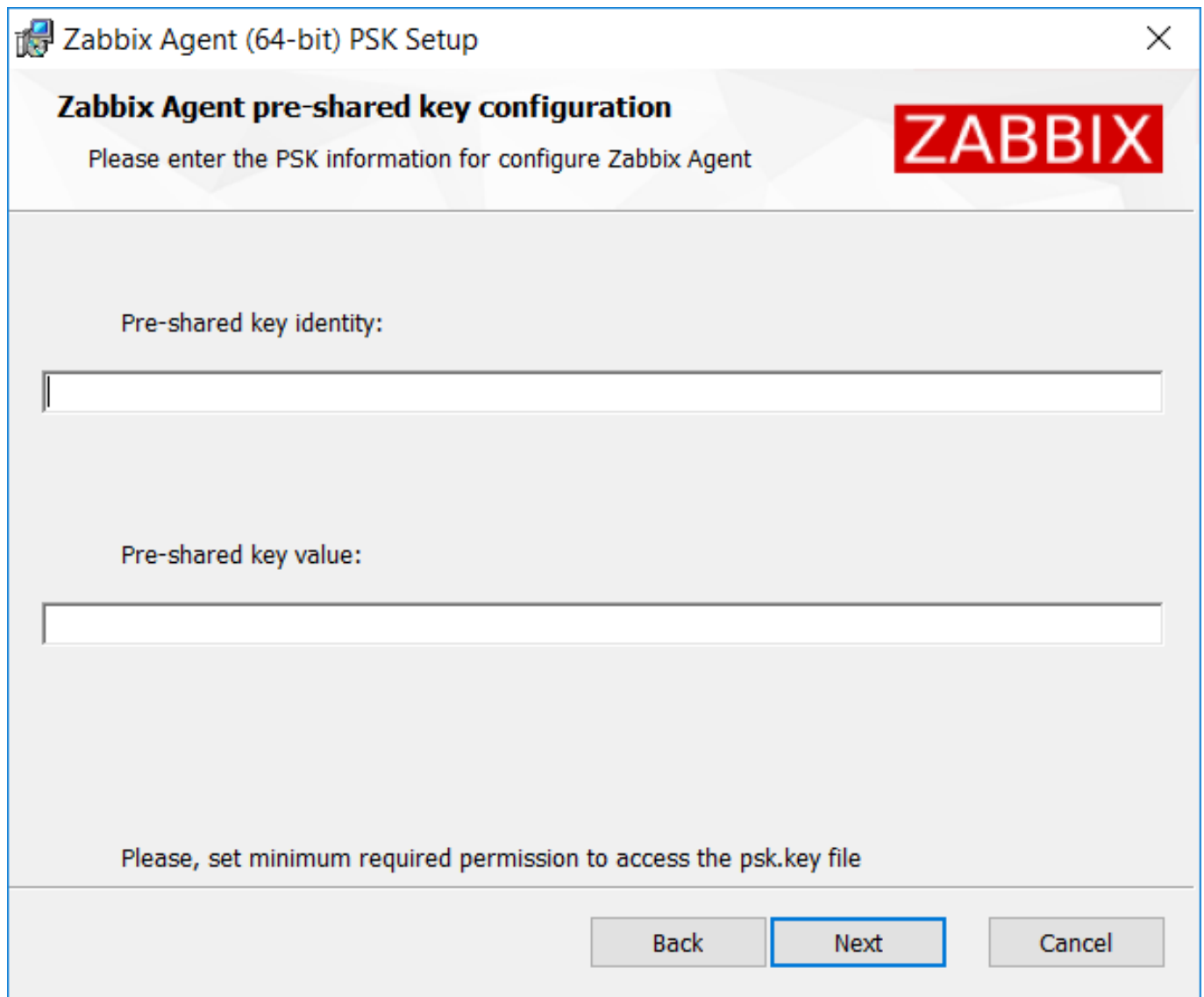


Accept the license to proceed to the next step.



Specify the following parameters.

| Parameter                                | Description  |
|--|--|
| <i>Host name</i>                         | Specify host name.   |
| <i>Zabbix server IP/DNS</i>              | Specify IP/DNS of Zabbix server.                               |
| <i>Agent listen port</i>                 | Specify agent listen port (10050 by default).                  |
| <i>Server or Proxy for active checks</i> | Specify IP/DNS of Zabbix server/proxy for active agent checks. |
| <i>Enable PSK</i>                        | Mark the checkbox to enable TLS support via pre-shared keys.   |
| <i>Add agent location to the PATH</i>    | Add agent location to the PATH variable.                       |



**Zabbix Agent (64-bit) PSK Setup**

**Zabbix Agent pre-shared key configuration**

Please enter the PSK information for configure Zabbix Agent

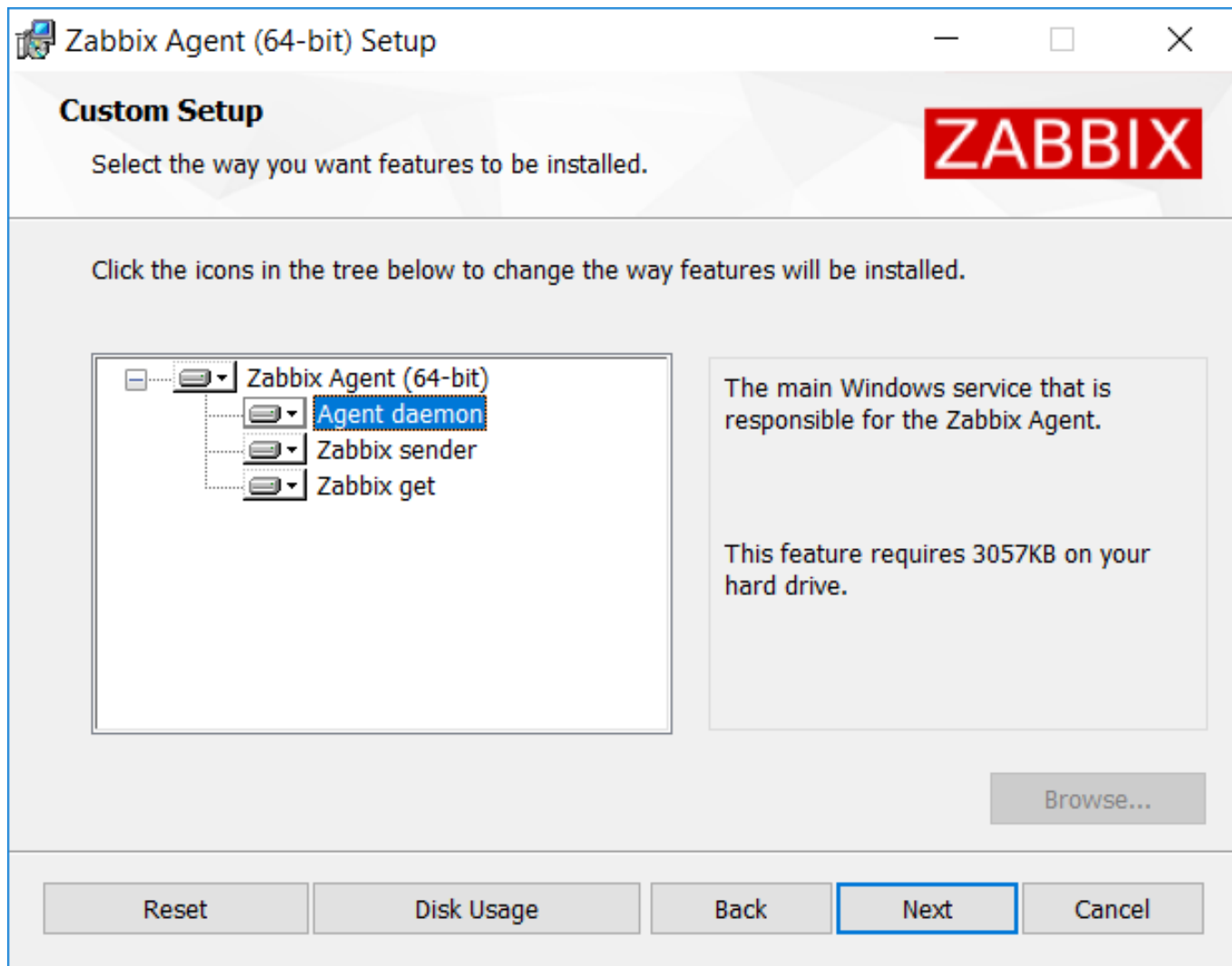
Pre-shared key identity:

Pre-shared key value:

Please, set minimum required permission to access the psk.key file

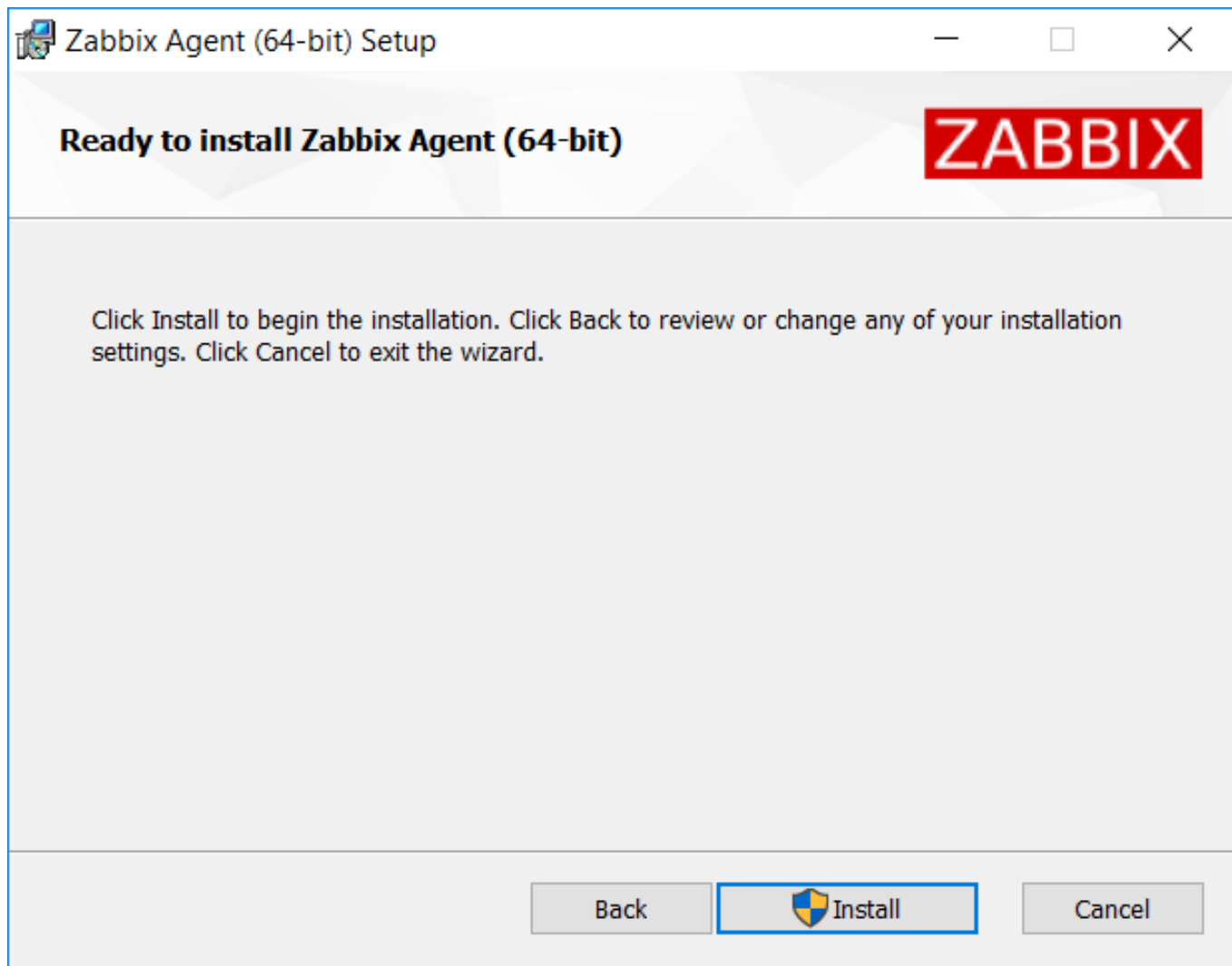
Back Next Cancel

Enter pre-shared key identity and value. This step is only available if you checked *Enable PSK* in the previous step.

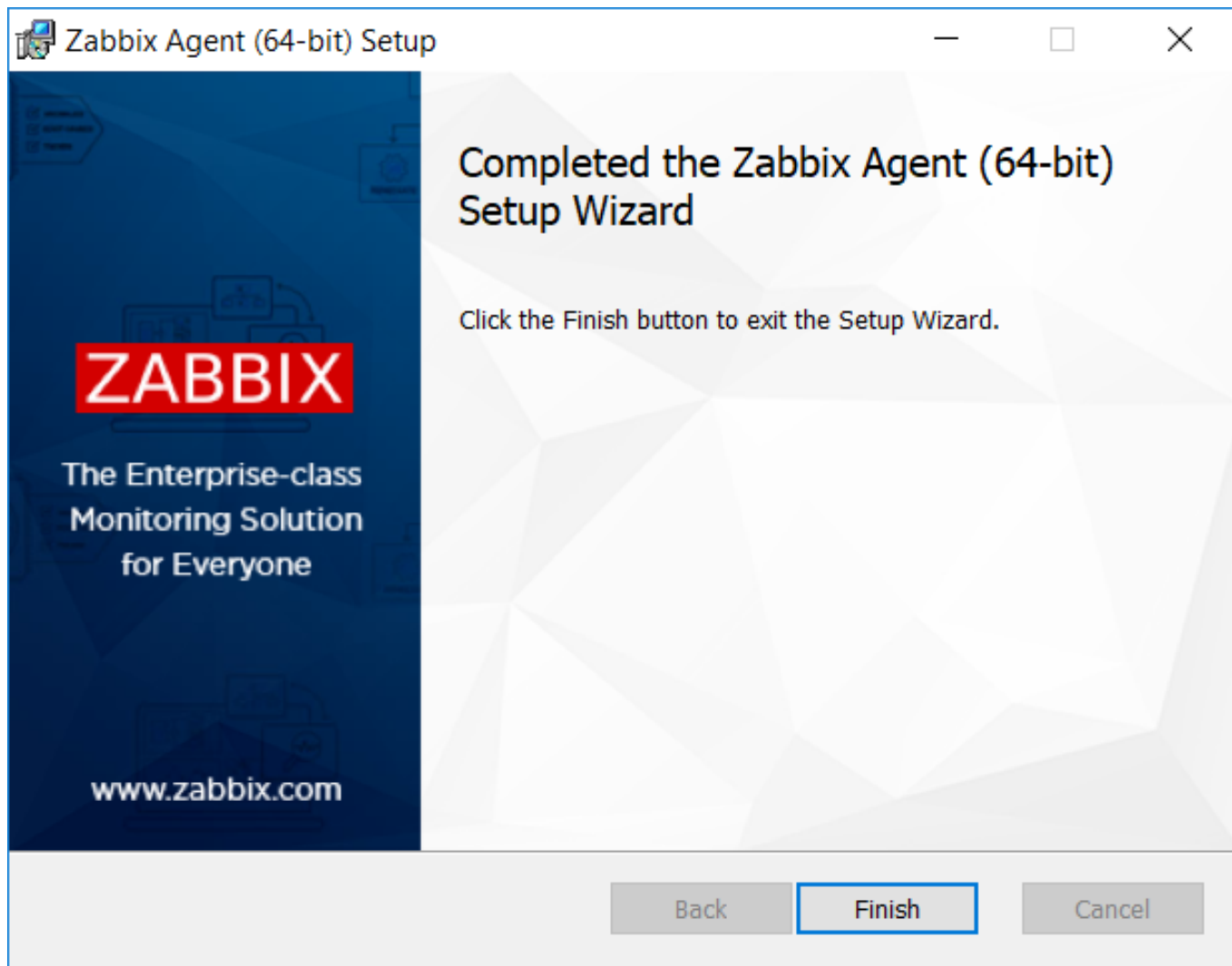


Select Zabbix components to install - **Zabbix agent daemon**, **Zabbix sender**, **Zabbix get**.





Zabbix components along with the configuration file will be installed in a *Zabbix Agent* folder in Program Files. `zabbix_agentd.exe` will be set up as Windows service with automatic startup.



Command-line based installation

Supported parameters

The following set of parameters is supported by created MSIs:

| Number | Parameter            | Description |
|--------|----------------------|-------------|
| 1      | LOGTYPE              |             |
| 2      | LOGFILE              |             |
| 3      | SERVER               |             |
| 4      | LISTENPORT           |             |
| 5      | SERVERACTIVE         |             |
| 6      | HOSTNAME             |             |
| 7      | TIMEOUT              |             |
| 8      | TLSCONNECT           |             |
| 9      | TLSACCEPT            |             |
| 10     | TLSPSKIDENTITY       |             |
| 11     | TLSPSKFILE           |             |
| 12     | TLSPSKVALUE          |             |
| 13     | TLSCAFILE            |             |
| 14     | TLSCRLFILE           |             |
| 15     | TLSSERVERCERTISSUER  |             |
| 16     | TLSSERVERCERTSUBJECT |             |
| 17     | TLSCERTFILE          |             |
| 18     | TLSKEYFILE           |             |
| 19     | LISTENIP             |             |
| 20     | HOSTINTERFACE        |             |
| 21     | HOSTMETADATA         |             |
| 22     | HOSTMETADATAITEM     |             |

| Number | Parameter              | Description  |
|--------|------------------------|--|
| 23     | STATUSPORT             | Zabbix agent 2 only.   |
| 24     | ENABLEPERSISTENTBUFFER | Zabbix agent 2 only.   |
| 25     | PERSISTENTBUFFERPERIOD | Zabbix agent 2 only.   |
| 26     | PERSISTENTBUFFERFILE   | Zabbix agent 2 only.   |
| 27     | INSTALLFOLDER          |  |
| 28     | ENABLEPATH             |  |
| 29     | SKIP                   | SKIP=fw - do not install firewall exception rule   |
| 30     | INCLUDE                | Sequence of includes separated by ;  |
| 31     | ALLOWDENYKEY           | Sequence of "AllowKey" and "DenyKey" <b>parameters</b> separated by ;.<br>Use \; to escape the delimiter.<br>Example: ALLOWDENYKEY="AllowKey=system.run[type<br>c:\windows\system32\drivers\etc\hosts] ;DenyKey=system.run[*]" |
| 32     | ADDDEFAULT             | A comma-delimited list of programs to install in their default configuration.<br>Possible values: AgentProgram, GetProgram, SenderProgram, ALL<br>E.g., ADDDEFAULT=AgentProgram,GetProgram                                     |
| 33     | ADDLOCAL               | A comma-delimited list of programs to install locally.<br>Possible values: AgentProgram, GetProgram, SenderProgram, ALL<br>E.g., ADDLOCAL=AgentProgram,SenderProgram   |
| 34     | CONF                   | Specify path to custom configuration file, e.g.,<br>CONF=c:\full\path\to\user.conf   |

To install you may run, for example:

```
SET INSTALLFOLDER=C:\Program Files\za
```

```
msiexec /l*v log.txt /i zabbix_agent-6.0.0-x86.msi /qn^
LOGTYPE=file^
LOGFILE="%INSTALLFOLDER%\za.log"^
SERVER=192.168.6.76^
LISTENPORT=12345^
SERVERACTIVE=:1^
HOSTNAME=myHost^
TLSCONNECT=psk^
TLSACCEPT=psk^
TLSPSKIDENTITY=MyPSKID^
TLSPSKFILE="%INSTALLFOLDER%\mykey.psk"^
TLSCAFILE="c:\temp\f.txt1"^
TLSCRLFILE="c:\temp\f.txt2"^
TLSSERVERCERTISSUER="My CA"^
TLSSERVERCERTSUBJECT="My Cert"^
TLSCERTFILE="c:\temp\f.txt5"^
TLSKEYFILE="c:\temp\f.txt6"^
ENABLEPATH=1^
INSTALLFOLDER="%INSTALLFOLDER%"^
SKIP=fw^
ALLOWDENYKEY="DenyKey=vfs.file.contents[/etc/passwd]"
```

or

```
msiexec /l*v log.txt /i zabbix_agent-6.0.0-x86.msi /qn^
SERVER=192.168.6.76^
TLSCONNECT=psk^
TLSACCEPT=psk^
TLSPSKIDENTITY=MyPSKID^
TLSPSKVALUE=1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952
```

If both TLSPSKFILE and TLSPSKVALUE are passed, then TLSPSKVALUE will be written to TLSPSKFILE.

## 5 Mac OS agent installation from PKG

## Overview

Zabbix Mac OS agent can be installed from PKG installer packages available for [download](#). Versions with or without encryption are available.

## Installing agent

The agent can be installed using the graphical user interface or from the command line, for example:

```
sudo installer -pkg zabbix_agent-6.0.12-macos-amd64-openssl.pkg -target /
```

Make sure to use the correct Zabbix package version in the command. It must match the name of the downloaded package.

## Running agent

The agent will start automatically after installation or restart.

You may edit the configuration file at `/usr/local/etc/zabbix/zabbix_agentd.conf` if necessary.

To start the agent manually, you may run:

```
sudo launchctl start com.zabbix.zabbix_agentd
```

To stop the agent manually:

```
sudo launchctl stop com.zabbix.zabbix_agentd
```

During upgrade, the existing configuration file is not overwritten. Instead a new `zabbix_agentd.conf.NEW` file is created to be used for reviewing and updating the existing configuration file, if necessary. Remember to restart the agent after manual changes to the configuration file.

## Troubleshooting and removing agent

This section lists some useful commands that can be used for troubleshooting and removing Zabbix agent installation.

See if Zabbix agent is running:

```
ps aux | grep zabbix_agentd
```

See if Zabbix agent has been installed from packages:

```
pkgutil --pkgs | grep zabbix  
com.zabbix.pkg.ZabbixAgent
```

See the files that were installed from the installer package (note that the initial `/` is not displayed in this view):

```
pkgutil --only-files --files com.zabbix.pkg.ZabbixAgent  
Library/LaunchDaemons/com.zabbix.zabbix_agentd.plist  
usr/local/bin/zabbix_get  
usr/local/bin/zabbix_sender  
usr/local/etc/zabbix/zabbix_agentd/userparameter_examples.conf.NEW  
usr/local/etc/zabbix/zabbix_agentd/userparameter_mysql.conf.NEW  
usr/local/etc/zabbix/zabbix_agentd.conf.NEW  
usr/local/sbin/zabbix_agentd
```

Stop Zabbix agent if it was launched with `launchctl`:

```
sudo launchctl unload /Library/LaunchDaemons/com.zabbix.zabbix_agentd.plist
```

Remove files (including configuration and logs) that were installed with installer package:

```
sudo rm -f /Library/LaunchDaemons/com.zabbix.zabbix_agentd.plist  
sudo rm -f /usr/local/sbin/zabbix_agentd  
sudo rm -f /usr/local/bin/zabbix_get  
sudo rm -f /usr/local/bin/zabbix_sender  
sudo rm -rf /usr/local/etc/zabbix  
sudo rm -rf /var/log/zabbix
```

Forget that Zabbix agent has been installed:

```
sudo pkgutil --forget com.zabbix.pkg.ZabbixAgent
```

## 6 Unstable releases

### Overview

Packages for minor Zabbix version (i.e. Zabbix 6.0.x) release candidates are provided starting with Zabbix 6.0.9.

The instructions below are for enabling unstable Zabbix release repositories (disabled by default).

First, install or update to the latest zabbix-release package. To enable rc packages on your system do the following:

#### Red Hat Enterprise Linux

Open the `/etc/yum.repos.d/zabbix.repo` file and set `enabled=1` for the `zabbix-unstable` repo.

```
[zabbix-unstable]
name=Zabbix Official Repository (unstable) - $basearch
baseurl=https://repo.zabbix.com/zabbix/5.5/rhel/8/$basearch/
enabled=1
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-ZABBIX-A14FE591
```

#### Debian/Ubuntu

Open the `/etc/apt/sources.list.d/zabbix.list` and uncomment "Zabbix unstable repository".

```
# Zabbix unstable repository
deb https://repo.zabbix.com/zabbix/5.5/debian bullseye main
deb-src https://repo.zabbix.com/zabbix/5.5/debian bullseye main
```

#### SUSE

Open the `/etc/zypp/repos.d/zabbix.repo` file and set `enable=1` for the `zabbix-unstable` repo.

```
[zabbix-unstable]
name=Zabbix Official Repository
type=rpm-md
baseurl=https://repo.zabbix.com/zabbix/5.5/sles/15/x86_64/
gpgcheck=1
gpgkey=https://repo.zabbix.com/zabbix/5.5/sles/15/x86_64/repoata/repomd.xml.key
enabled=1
update=1
```

## 5 Installation from containers

**Docker** Zabbix provides [Docker](#) images for each Zabbix component as portable and self-sufficient containers to speed up deployment and update procedure.

Zabbix components come with MySQL and PostgreSQL database support, Apache2 and Nginx web server support. These images are separated into different images.

### Attention:

Since Zabbix 6.0, deterministic triggers need to be created during the installation. If binary logging is enabled for MySQL/MariaDB, this requires superuser privileges or setting the variable/configuration parameter `log_bin_trust_function_creators = 1`. See [Database creation scripts](#) for instructions how to set the variable.

Note that if executing from a console, the variable will only be set temporarily and will be dropped when a Docker is restarted. In this case, keep your SQL service running, only stop `zabbix-server` service by running `'docker compose down zabbix-server'` and then `'docker compose up -d zabbix-server'`.

Alternatively, you can set this variable in the configuration file.

### Docker base images

Zabbix components are provided on Ubuntu, Alpine Linux and CentOS base images:

| Image                  | Version       |
|------------------------|---------------|
| <a href="#">alpine</a> | 3.16          |
| <a href="#">ubuntu</a> | 22.04 (jammy) |

| Image  | Version |
|--------|---------|
| centos | 8       |

All images are configured to rebuild latest images if base images are updated.

#### Docker file sources

Everyone can follow Docker file changes using the Zabbix [official repository](#) on [github.com](#). You can fork the project or make your own images based on official Docker files.

#### Structure

All Zabbix components are available in the following Docker repositories:

- Zabbix agent - [zabbix/zabbix-agent](#)
- Zabbix server
  - Zabbix server with MySQL database support - [zabbix/zabbix-server-mysql](#)
  - Zabbix server with PostgreSQL database support - [zabbix/zabbix-server-pgsql](#)
- Zabbix web-interface
  - Zabbix web-interface based on Apache2 web server with MySQL database support - [zabbix/zabbix-web-apache-mysql](#)
  - Zabbix web-interface based on Apache2 web server with PostgreSQL database support - [zabbix/zabbix-web-apache-pgsql](#)
  - Zabbix web-interface based on Nginx web server with MySQL database support - [zabbix/zabbix-web-nginx-mysql](#)
  - Zabbix web-interface based on Nginx web server with PostgreSQL database support - [zabbix/zabbix-web-nginx-pgsql](#)
- Zabbix proxy
  - Zabbix proxy with SQLite3 database support - [zabbix/zabbix-proxy-sqlite3](#)
  - Zabbix proxy with MySQL database support - [zabbix/zabbix-proxy-mysql](#)
- Zabbix Java Gateway - [zabbix/zabbix-java-gateway](#)

Additionally there is SNMP trap support. It is provided as additional repository ([zabbix/zabbix-snmptraps](#)) based on Ubuntu Trusty only. It could be linked with Zabbix server and Zabbix proxy.

#### Versions

Each repository of Zabbix components contains the following tags:

- latest - latest stable version of a Zabbix component based on Alpine Linux image
- alpine-latest - latest stable version of a Zabbix component based on Alpine Linux image
- ubuntu-latest - latest stable version of a Zabbix component based on Ubuntu image
- alpine-6.0-latest - latest minor version of a Zabbix 6.0 component based on Alpine Linux image
- ubuntu-6.0-latest - latest minor version of a Zabbix 6.0 component based on Ubuntu image
- alpine-6.0.\* - different minor versions of a Zabbix 6.0 component based on Alpine Linux image, where \* is the minor version of Zabbix component
- ubuntu-6.0.\* - different minor versions of a Zabbix 6.0 component based on Ubuntu image, where \* is the minor version of Zabbix component

#### Initial configuration

After downloading the images, start the containers by executing `docker run` command followed by additional arguments to specify required **environment variables** and/or **mount points**. Some **configuration examples** are provided below.

##### Attention:

Zabbix must not be run as PID1/as an init process in containers.

#### Environment variables

All Zabbix component images provide environment variables to control configuration. These environment variables are listed in each component repository. These environment variables are options from Zabbix configuration files, but with different naming method. For example, `ZBX_LOGSLOWQUERIES` is equal to `LogSlowQueries` from Zabbix server and Zabbix proxy configuration files.

##### Attention:

Some of configuration options are not allowed to change. For example, `PIDFile` and `LogType`.

Some of components have specific environment variables, which do not exist in official Zabbix configuration files:

| Variable               | Components    | Description  |
|------------------------|---------------|--|
| DB_SERVER_HOST         | Server        | This variable is IP or DNS name of MySQL or PostgreSQL server.   |
|                        | Proxy         | By default, value is <code>mysql-server</code> or <code>postgres-server</code> for MySQL or PostgreSQL respectively  |
|                        | Web interface |  |
| DB_SERVER_PORT         | Server        | This variable is port of MySQL or PostgreSQL server.   |
|                        | Proxy         | By default, value is '3306' or '5432' respectively.  |
|                        | Web interface |  |
| MYSQL_USER             | Server        | MySQL database user.   |
|                        | Proxy         | By default, value is 'zabbix'.   |
|                        | Web-interface |  |
| MYSQL_PASSWORD         | Server        | MySQL database password.   |
|                        | Proxy         | By default, value is 'zabbix'.   |
|                        | Web interface |  |
| MYSQL_DATABASE         | Server        | Zabbix database name.  |
|                        | Proxy         | By default, value is 'zabbix' for Zabbix server and 'zabbix_proxy' for Zabbix proxy.   |
|                        | Web interface |  |
| POSTGRES_USER          | Server        | PostgreSQL database user.  |
|                        | Web interface | By default, value is 'zabbix'.   |
| POSTGRES_PASSWORD      | Server        | PostgreSQL database password.  |
|                        | Web interface | By default, value is 'zabbix'.   |
| POSTGRES_DB            | Server        | Zabbix database name.  |
|                        | Web interface | By default, value is 'zabbix'.   |
| PHP_TZ                 | Web-interface | Timezone in PHP format. Full list of supported timezones are available on <a href="http://php.net">php.net</a> .   |
|                        |               | By default, value is 'Europe/Riga'.  |
| ZBX_SERVER_NAME        | Web interface | Visible Zabbix installation name in right top corner of the web interface. By default, value is 'Zabbix Docker'  |
| ZBX_JAVAGATEWAY_ENABLE | Server        | Enables communication with Zabbix Java gateway to collect Java related checks.   |
|                        | Proxy         | By default, value is "false"   |
| ZBX_ENABLE_SNMP_TRAPS  | Server        | Enables SNMP trap feature. It requires <b>zabbix-snmptraps</b> instance and shared volume <code>/var/lib/zabbix/snmptraps</code> to Zabbix server or Zabbix proxy. |
|                        | Proxy         |  |

## Volumes

The images allow to use some mount points. These mount points are different and depend on Zabbix component type:

| Volume                                       | Description   |
|--|---|
| <b>Zabbix agent</b>                          |   |
| <code>/etc/zabbix/zabbix_agentd.d</code>     | The volume allows to include <code>*.conf</code> files and extend Zabbix agent using the <code>UserParameter</code> feature   |
| <code>/var/lib/zabbix/modules</code>         | The volume allows to load additional modules and extend Zabbix agent using the <code>LoadModule</code> feature  |
| <code>/var/lib/zabbix/enc</code>             | The volume is used to store TLS-related files. These file names are specified using <code>ZBX_TLSCAFILE</code> , <code>ZBX_TLSCRLFILE</code> , <code>ZBX_TLSKEY_FILE</code> and <code>ZBX_TLSPSKFILE</code> environment variables |
| <b>Zabbix server</b>                         |   |
| <code>/usr/lib/zabbix/alertscripts</code>    | The volume is used for custom alert scripts. It is the <code>AlertScriptsPath</code> parameter in <code>zabbix_server.conf</code>   |
| <code>/usr/lib/zabbix/externalscripts</code> | The volume is used by <code>external checks</code> . It is the <code>ExternalScripts</code> parameter in <code>zabbix_server.conf</code>  |
| <code>/var/lib/zabbix/modules</code>         | The volume allows to load additional modules and extend Zabbix server using the <code>LoadModule</code> feature   |
| <code>/var/lib/zabbix/enc</code>             | The volume is used to store TLS related files. These file names are specified using <code>ZBX_TLSCAFILE</code> , <code>ZBX_TLSCRLFILE</code> , <code>ZBX_TLSKEY_FILE</code> and <code>ZBX_TLSPSKFILE</code> environment variables |
| <code>/var/lib/zabbix/ssl/certs</code>       | The volume is used as location of SSL client certificate files for client authentication. It is the <code>SSLCertLocation</code> parameter in <code>zabbix_server.conf</code>   |
| <code>/var/lib/zabbix/ssl/keys</code>        | The volume is used as location of SSL private key files for client authentication. It is the <code>SSLKeyLocation</code> parameter in <code>zabbix_server.conf</code>   |

| Volume  | Description   |
|---|---|
| <code>/var/lib/zabbix/ssl/ssl_ca</code>                 | The volume is used as location of certificate authority (CA) files for SSL server certificate verification. It is the <code>SSLCALocation</code> parameter in <code>zabbix_server.conf</code>   |
| <code>/var/lib/zabbix/snmptraps</code>                  | The volume is used as location of <code>snmptraps.log</code> file. It could be shared by <code>zabbix-snmptraps</code> container and inherited using the <code>volumes_from</code> Docker option while creating a new instance of Zabbix server. SNMP trap processing feature could be enabled by using shared volume and switching the <code>ZBX_ENABLE_SNMP_TRAPS</code> environment variable to 'true'     |
| <code>/var/lib/zabbix/mibs</code>                       | The volume allows to add new MIB files. It does not support subdirectories, all MIBs must be placed in <code>/var/lib/zabbix/mibs</code>  |
| <b>Zabbix proxy</b>                                     |   |
| <code>/usr/lib/zabbix/externalscripts</code>            | The volume is used by <code>external checks</code> . It is the <code>ExternalScripts</code> parameter in <code>zabbix_proxy.conf</code>   |
| <code>/var/lib/zabbix/db_data/</code>                   | The volume allows to store database files on external devices. Supported only for Zabbix proxy with SQLite3   |
| <code>/var/lib/zabbix/modules</code>                    | The volume allows to load additional modules and extend Zabbix server using the <code>LoadModule</code> feature   |
| <code>/var/lib/zabbix/enc</code>                        | The volume is used to store TLS related files. These file names are specified using <code>ZBX_TLSCAFILE</code> , <code>ZBX_TLSCRLFILE</code> , <code>ZBX_TLSKEY_FILE</code> and <code>ZBX_TLSPSKFILE</code> environment variables   |
| <code>/var/lib/zabbix/ssl/certs</code>                  | The volume is used as location of SSL client certificate files for client authentication. It is the <code>SSLCertLocation</code> parameter in <code>zabbix_proxy.conf</code>  |
| <code>/var/lib/zabbix/ssl/keys</code>                   | The volume is used as location of SSL private key files for client authentication. It is the <code>SSLKeyLocation</code> parameter in <code>zabbix_proxy.conf</code>  |
| <code>/var/lib/zabbix/ssl/ssl_ca</code>                 | The volume is used as location of certificate authority (CA) files for SSL server certificate verification. It is the <code>SSLCALocation</code> parameter in <code>zabbix_proxy.conf</code>  |
| <code>/var/lib/zabbix/snmptraps</code>                  | The volume is used as location of <code>snmptraps.log</code> file. It could be shared by the <code>zabbix-snmptraps</code> container and inherited using the <code>volumes_from</code> Docker option while creating a new instance of Zabbix server. SNMP trap processing feature could be enabled by using shared volume and switching the <code>ZBX_ENABLE_SNMP_TRAPS</code> environment variable to 'true' |
| <code>/var/lib/zabbix/mibs</code>                       | The volume allows to add new MIB files. It does not support subdirectories, all MIBs must be placed in <code>/var/lib/zabbix/mibs</code>  |
| <b>Zabbix web interface based on Apache2 web server</b> |   |
| <code>/etc/ssl/apache2</code>                           | The volume allows to enable HTTPS for Zabbix web interface. The volume must contain the two <code>ssl.crt</code> and <code>ssl.key</code> files prepared for Apache2 SSL connections  |
| <b>Zabbix web interface based on Nginx web server</b>   |   |
| <code>/etc/ssl/nginx</code>                             | The volume allows to enable HTTPS for Zabbix web interface. The volume must contain the two <code>ssl.crt</code> , <code>ssl.key</code> files and <code>dhparam.pem</code> prepared for Nginx SSL connections   |
| <b>Zabbix snmptraps</b>                                 |   |
| <code>/var/lib/zabbix/snmptraps</code>                  | The volume contains the <code>snmptraps.log</code> log file named with received SNMP traps  |
| <code>/var/lib/zabbix/mibs</code>                       | The volume allows to add new MIB files. It does not support subdirectories, all MIBs must be placed in <code>/var/lib/zabbix/mibs</code>  |

For additional information use Zabbix official repositories in Docker Hub.

## Examples

### Example 1

The example demonstrates how to run Zabbix server with MySQL database support, Zabbix web interface based on the Nginx web server and Zabbix Java gateway.

1. Create network dedicated for Zabbix component containers:

```
docker network create --subnet 172.20.0.0/16 --ip-range 172.20.240.0/20 zabbix-net
```

2. Start empty MySQL server instance

```
docker run --name mysql-server -t \
-e MYSQL_DATABASE="zabbix" \
-e MYSQL_USER="zabbix" \
-e MYSQL_PASSWORD="zabbix_pwd" \
```



```
-e MYSQL_ROOT_PASSWORD="root_pwd" \
--network=zabbix-net \
--restart unless-stopped \
-d mysql:8.0 \
--character-set-server=utf8 --collation-server=utf8_bin \
--default-authentication-plugin=mysql_native_password
```

### 3. Start Zabbix Java gateway instance

```
docker run --name zabbix-java-gateway -t \
--network=zabbix-net \
--restart unless-stopped \
-d zabbix/zabbix-java-gateway:alpine-6.0-latest
```

### 4. Start Zabbix server instance and link the instance with created MySQL server instance

```
docker run --name zabbix-server-mysql -t \
-e DB_SERVER_HOST="mysql-server" \
-e MYSQL_DATABASE="zabbix" \
-e MYSQL_USER="zabbix" \
-e MYSQL_PASSWORD="zabbix_pwd" \
-e MYSQL_ROOT_PASSWORD="root_pwd" \
-e ZBX_JAVAGATEWAY="zabbix-java-gateway" \
--network=zabbix-net \
-p 10051:10051 \
--restart unless-stopped \
-d zabbix/zabbix-server-mysql:alpine-6.0-latest
```

#### Note:

Zabbix server instance exposes 10051/TCP port (Zabbix trapper) to host machine.

### 5. Start Zabbix web interface and link the instance with created MySQL server and Zabbix server instances

```
docker run --name zabbix-web-nginx-mysql -t \
-e ZBX_SERVER_HOST="zabbix-server-mysql" \
-e DB_SERVER_HOST="mysql-server" \
-e MYSQL_DATABASE="zabbix" \
-e MYSQL_USER="zabbix" \
-e MYSQL_PASSWORD="zabbix_pwd" \
-e MYSQL_ROOT_PASSWORD="root_pwd" \
--network=zabbix-net \
-p 80:8080 \
--restart unless-stopped \
-d zabbix/zabbix-web-nginx-mysql:alpine-6.0-latest
```

#### Note:

Zabbix web interface instance exposes 80/TCP port (HTTP) to host machine.

## Example 2

The example demonstrates how to run Zabbix server with PostgreSQL database support, Zabbix web interface based on the Nginx web server and SNMP trap feature.

### 1. Create network dedicated for Zabbix component containers:

```
docker network create --subnet 172.20.0.0/16 --ip-range 172.20.240.0/20 zabbix-net
```

### 2. Start empty PostgreSQL server instance

```
docker run --name postgres-server -t \
-e POSTGRES_USER="zabbix" \
-e POSTGRES_PASSWORD="zabbix_pwd" \
-e POSTGRES_DB="zabbix" \
--network=zabbix-net \
--restart unless-stopped \
-d postgres:latest
```

### 3. Start Zabbix snmptraps instance

```
docker run --name zabbix-snmptests -t \
  -v /zbx_instance/snmptests:/var/lib/zabbix/snmptests:rw \
  -v /var/lib/zabbix/mibs:/usr/share/snmp/mibs:ro \
  --network=zabbix-net \
  -p 162:1162/udp \
  --restart unless-stopped \
  -d zabbix/zabbix-snmptests:alpine-6.0-latest
```

**Note:**

Zabbix snmptest instance exposes the 162/UDP port (SNMP traps) to host machine.

4. Start Zabbix server instance and link the instance with created PostgreSQL server instance

```
docker run --name zabbix-server-pgsql -t \
  -e DB_SERVER_HOST="postgres-server" \
  -e POSTGRES_USER="zabbix" \
  -e POSTGRES_PASSWORD="zabbix_pwd" \
  -e POSTGRES_DB="zabbix" \
  -e ZBX_ENABLE_SNMP_TRAPS="true" \
  --network=zabbix-net \
  -p 10051:10051 \
  --volumes-from zabbix-snmptests \
  --restart unless-stopped \
  -d zabbix/zabbix-server-pgsql:alpine-6.0-latest
```

**Note:**

Zabbix server instance exposes the 10051/TCP port (Zabbix trapper) to host machine.

5. Start Zabbix web interface and link the instance with created PostgreSQL server and Zabbix server instances

```
docker run --name zabbix-web-nginx-pgsql -t \
  -e ZBX_SERVER_HOST="zabbix-server-pgsql" \
  -e DB_SERVER_HOST="postgres-server" \
  -e POSTGRES_USER="zabbix" \
  -e POSTGRES_PASSWORD="zabbix_pwd" \
  -e POSTGRES_DB="zabbix" \
  --network=zabbix-net \
  -p 443:8443 \
  -p 80:8080 \
  -v /etc/ssl/nginx:/etc/ssl/nginx:ro \
  --restart unless-stopped \
  -d zabbix/zabbix-web-nginx-pgsql:alpine-6.0-latest
```

**Note:**

Zabbix web interface instance exposes the 443/TCP port (HTTPS) to host machine.

Directory `/etc/ssl/nginx` must contain certificate with required name.

### Example 3

The example demonstrates how to run Zabbix server with MySQL database support, Zabbix web interface based on the Nginx web server and Zabbix Java gateway using podman on Red Hat 8.

1. Create new pod with name zabbix and exposed ports (web-interface, Zabbix server trapper):

```
podman pod create --name zabbix -p 80:8080 -p 10051:10051
```

2. (optional) Start Zabbix agent container in zabbix pod location:

```
podman run --name zabbix-agent \
  -e ZBX_SERVER_HOST="127.0.0.1,localhost" \
  --restart=always \
  --pod=zabbix \
  -d registry.connect.redhat.com/zabbix/zabbix-agent-60:latest
```

3. Create `./mysql/` directory on host and start Oracle MySQL server 8.0:

```
podman run --name mysql-server -t \
-e MYSQL_DATABASE="zabbix" \
-e MYSQL_USER="zabbix" \
-e MYSQL_PASSWORD="zabbix_pwd" \
-e MYSQL_ROOT_PASSWORD="root_pwd" \
-v ./mysql:/var/lib/mysql/:Z \
--restart=always \
--pod=zabbix \
-d mysql:8.0 \
--character-set-server=utf8 --collation-server=utf8_bin \
--default-authentication-plugin=mysql_native_password
```

4. Start Zabbix server container:

```
podman run --name zabbix-server-mysql -t \
-e DB_SERVER_HOST="127.0.0.1" \
-e MYSQL_DATABASE="zabbix" \
-e MYSQL_USER="zabbix" \
-e MYSQL_PASSWORD="zabbix_pwd" \
-e MYSQL_ROOT_PASSWORD="root_pwd" \
-e ZBX_JAVAGATEWAY="127.0.0.1" \
--restart=always \
--pod=zabbix \
-d registry.connect.redhat.com/zabbix/zabbix-server-mysql-60
```

5. Start Zabbix Java Gateway container:

```
podman run --name zabbix-java-gateway -t \
--restart=always \
--pod=zabbix \
-d registry.connect.redhat.com/zabbix/zabbix-java-gateway-60
```

6. Start Zabbix web-interface container:

```
podman run --name zabbix-web-mysql -t \
-e ZBX_SERVER_HOST="127.0.0.1" \
-e DB_SERVER_HOST="127.0.0.1" \
-e MYSQL_DATABASE="zabbix" \
-e MYSQL_USER="zabbix" \
-e MYSQL_PASSWORD="zabbix_pwd" \
-e MYSQL_ROOT_PASSWORD="root_pwd" \
--restart=always \
--pod=zabbix \
-d registry.connect.redhat.com/zabbix/zabbix-web-mysql-60
```

#### Note:

Pod zabbix exposes 80/TCP port (HTTP) to host machine from 8080/TCP of zabbix-web-mysql container.

**Docker Compose** Zabbix provides compose files also for defining and running multi-container Zabbix components in Docker. These compose files are available in Zabbix docker official repository on github.com: <https://github.com/zabbix/zabbix-docker>. These compose files are added as examples, they are overloaded. For example, they contain proxies with MySQL and SQLite3 support.

There are a few different versions of compose files:

| File name  | Description   |
|--|---|
| docker-compose_v3_alpine-mysql-latest            | The compose file starts the latest version of Zabbix 6.0 components on Alpine Linux with MySQL database support.                              |
| docker-compose_v3_alpine-mysql-latest-build      | The compose file locally builds the latest version of Zabbix 6.0 and runs Zabbix components on Alpine Linux with MySQL database support.      |
| docker-compose_v3_alpine-postgresql-latest       | The compose file starts the latest version of Zabbix 6.0 components on Alpine Linux with PostgreSQL database support.                         |
| docker-compose_v3_alpine-postgresql-latest-build | The compose file locally builds the latest version of Zabbix 6.0 and runs Zabbix components on Alpine Linux with PostgreSQL database support. |

| File name   | Description   |
|---|---|
| <code>docker-compose_v3_centos_mysql_latest.yaml</code> | The compose file starts the latest version of Zabbix 6.0 components on CentOS 8 with MySQL database support.                                  |
| <code>docker-compose_v3_centos_mysql_local.yaml</code>  | The compose file locally builds the latest version of Zabbix 6.0 and runs Zabbix components on CentOS 8 with MySQL database support.          |
| <code>docker-compose_v3_centos_pgsql_latest.yaml</code> | The compose file starts the latest version of Zabbix 6.0 components on CentOS 8 with PostgreSQL database support.                             |
| <code>docker-compose_v3_centos_pgsql_local.yaml</code>  | The compose file locally builds the latest version of Zabbix 6.0 and runs Zabbix components on CentOS 8 with PostgreSQL database support.     |
| <code>docker-compose_v3_ubuntu_mysql_latest.yaml</code> | The compose file starts the latest version of Zabbix 6.0 components on Ubuntu 20.04 with MySQL database support.                              |
| <code>docker-compose_v3_ubuntu_mysql_local.yaml</code>  | The compose file locally builds the latest version of Zabbix 6.0 and runs Zabbix components on Ubuntu 20.04 with MySQL database support.      |
| <code>docker-compose_v3_ubuntu_pgsql_latest.yaml</code> | The compose file starts the latest version of Zabbix 6.0 components on Ubuntu 20.04 with PostgreSQL database support.                         |
| <code>docker-compose_v3_ubuntu_pgsql_local.yaml</code>  | The compose file locally builds the latest version of Zabbix 6.0 and runs Zabbix components on Ubuntu 20.04 with PostgreSQL database support. |

#### Attention:

Available Docker compose files support version 3 of Docker Compose.

## Storage

Compose files are configured to support local storage on a host machine. Docker Compose will create a `zbx_env` directory in the folder with the compose file when you run Zabbix components using the compose file. The directory will contain the same structure as described above in the **Volumes** section and directory for database storage.

There are also volumes in read-only mode for `/etc/localtime` and `/etc/timezone` files.

## Environment files

In the same directory with compose files on github.com you can find files with default environment variables for each component in compose file. These environment files are named like `.env_<type of component>`.

## Examples

#### Note:

The commands listed below are for Docker Compose V2. If you are using Docker Compose V1, replace `docker compose` `-f` with `docker-compose -f`

### Example 1

```
# git checkout 6.0
# docker compose -f ./docker-compose_v3_alpine_mysql_latest.yaml up -d
```

The command will download latest Zabbix 6.0 images for each Zabbix component and run them in detach mode.

#### Attention:

Do not forget to download `.env_<type of component>` files from github.com official Zabbix repository with compose files.

### Example 2

```
# git checkout 6.0
# docker compose -f ./docker-compose_v3_ubuntu_mysql_local.yaml up -d
```

The command will download base image Ubuntu 20.04 (focal), then build Zabbix 6.0 components locally and run them in detach mode.

## Installation with OpenShift

## Overview

Zabbix helps you to do a real-time monitoring of millions of metrics collected from tens of thousands of servers, virtual machines and network devices. The Zabbix Operator allows users to easily deploy, manage, and maintain Zabbix deployments on OpenShift. By installing this integration you will be able to deploy Zabbix server/proxies and other components with a single command.

#### Supported features

Zabbix Operator comes with a few possible installation options:

- **Zabbix server** - a simple Zabbix installation with included Zabbix server, Zabbix web interface and Zabbix Java gateway with MySQL database support. The feature does not provide MySQL service and requires an external MySQL database.
- **Zabbix server (full)** - a Zabbix installation with included Zabbix server, Zabbix web interface, Zabbix Java gateway and MySQL server instance.
- **Zabbix proxy (SQLite3)** - a very simple way to gain power of Zabbix proxy. The feature has SQLite3 support for Zabbix proxies and allows to specify the amount of proxies.
- **Zabbix proxy (MySQL)** - another option of Zabbix proxy. This option supports and delivers a MySQL database. It is possible to use a built-in MySQL database instance or an external one.
- **Zabbix agent** - a Zabbix agent can be deployed on each available node for stability and performance monitoring on remote nodes. It allows to gather metrics with full automation!
- **Zabbix appliance** - a Zabbix appliance is a very simple way to test and check Zabbix features. This option provides all the core components in one solution. It includes Zabbix server, Zabbix Java gateway, Zabbix web interface and MySQL server in deployment. It is very useful for testing Zabbix features!

Currently Zabbix Operator is based on the Zabbix 6.0 LTS version and supports OpenShift 4.1, 4.2, 4.3, 4.4, 4.5, and 4.6.

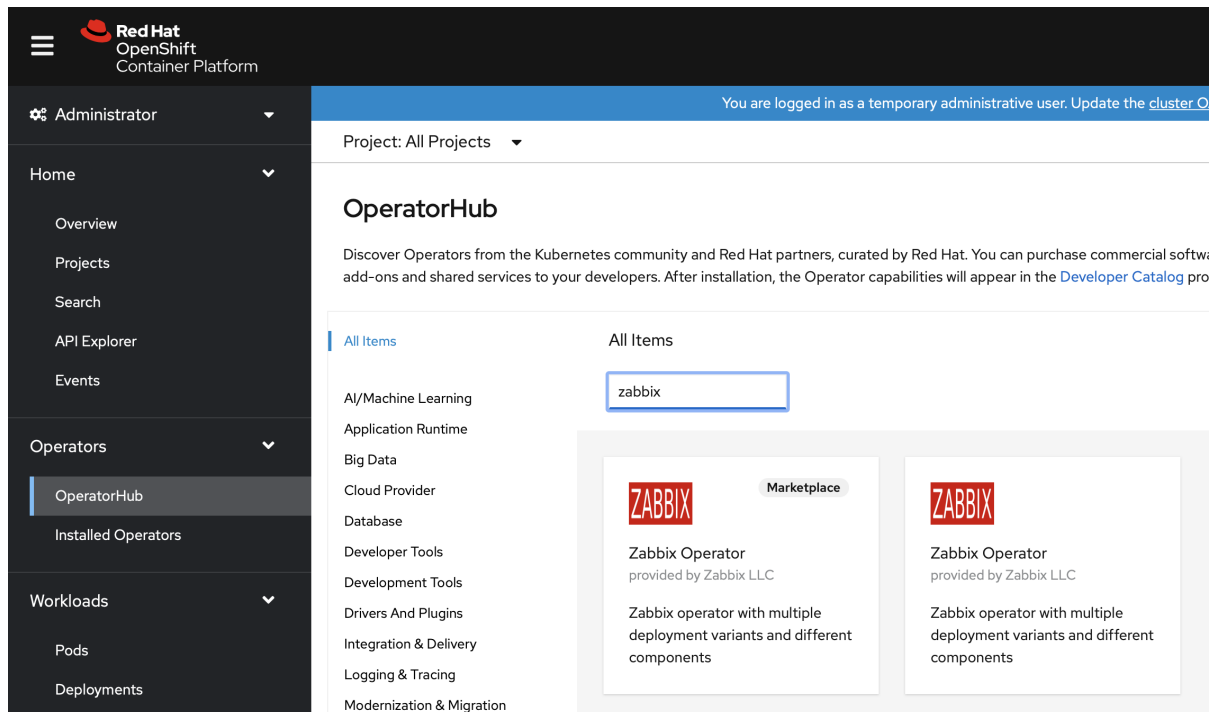
#### Installing Zabbix Operator

##### Using RedHat Marketplace

#### Attention:

The installation of Zabbix Operator using Red Hat Marketplace requires the OpenShift cluster to be registered in the Marketplace Portal, including the roll out of the PullSecret in your cluster. Failure to do so will result in an image pull authentication failure with the Red Hat registry.

1. Select the OperatorHub from the Operators submenu and search for Zabbix.



Choose the RedHat Marketplace option.

2. Select "Zabbix Operator" and click on *Purchase*.

#### Attention:

Openshift needs to be registered with the Red Hat Marketplace portal.

**Zabbix Operator**  
0.0.2 provided by Zabbix LLC

[Purchase](#) [Install](#)

**Latest version**  
0.0.2

**Capability level**  
☒ Basic Install  
☒ Seamless Upgrades  
☐ Full Lifecycle  
☐ Deep Insights  
☐ Auto Pilot

**Source**  
Marketplace

**Provider**  
Zabbix LLC

**Repository**  
N/A

**Container image**  
registry.marketplace.redhat.com/rhmy/zabbix/zabbix-operator-certified:sha256:c2dee633a667191d3272bf1652412ac1077455f18b90168ddca2ac8882f0c66

**Created at**  
21 Sep 2020, 11:03

**Support**  
[Get support](#)

**Marketplace Operator**  
This Operator is purchased through Red Hat Marketplace. After completing the purchase process, you can install the Operator on this or other OpenShift clusters. Visit Red Hat Marketplace for more details and to track your usage of this application.  
[Learn more about the Red Hat Marketplace](#)

**About this Operator**  
Zabbix helps you to real-time monitoring of millions of metrics collected from tens of thousands of servers, virtual machines and network devices. The Zabbix Operator allows users to easily deploy, manage, and maintain Zabbix deployments on OpenShift. By installing this integration you will be able to deploy Zabbix server / proxies and other components with a single command.

**Supported Features**

- Zabbix Server** - Simple Zabbix installation with included Zabbix server, Zabbix web-interface and Zabbix Java Gateway with MySQL database support. The feature does not provide MySQL service and requires an external MySQL database.
- Zabbix Server (Full)** - Zabbix installation with included Zabbix server, Zabbix web-interface, Zabbix Java Gateway and MySQL server instance.
- Zabbix proxy (SQLite3)** - Very simple way to gain power of Zabbix proxy. The feature has SQLite3 support for Zabbix proxies and allow to specify amount of proxies.
- Zabbix proxy (MySQL)** - Another option of Zabbix proxy. The option support and deliver MySQL database.
- Zabbix agent** - Zabbix agent can be deployed on each available node for stability and performance monitoring on remote nodes. It allows to gather metrics with full automation!
- Zabbix Appliance** - Zabbix appliance very simple way to test and check Zabbix features. The option provides all core components in one solution. It includes Zabbix server, Zabbix Java Gateway, Zabbix web-interface and MySQL server in deployment. It is very useful for testing Zabbix features!

**Prerequisites**

3. Select the most suitable install option.

**ZABBIX**

**Zabbix Monitoring Solution**  
By Zabbix

An enterprise-class open source universal distributed monitoring solution designed to monitor and track performance and availability of network devices, servers, web resources, virtual environments, applications, services and other IT resources.

**Certification standards**  
☒ Runs on OpenShift  
☒ Certified operators  
☒ Fully containerized  
☒ T1-T3 support  
☒ Vulnerability scans

**Capabilities level**  
☒ Basic install  
☒ Seamless upgrades  
☐ Full lifecycle  
☐ Deep insights  
☐ Auto pilot

**Last updated**  
28/07/2021, 20:13

**Categories**

**Pricing**

| Free trial  | Annual  | Annual  | Annual  |
|---|---|---|---|
| <b>Zabbix Trial Edition</b>   | <b>Advanced Edition</b>   | <b>Professional Edition</b>   | <b>Expert Edition</b>   |
| For 30 days   | Per SKU   | Per SKU   | Per SKU   |
| <b>Free</b>   | <b>\$18,700 USD</b>   | <b>\$27,000 USD</b>   | <b>\$43,900 USD</b>   |
| Try Zabbix for 30 days. Monitor your whole IT infrastructure including servers, network devices, OS, applications, web and virtual resources, peripherals | Monitor your whole IT infrastructure including servers, network devices, OS, applications, web and virtual resources, peripherals | Monitor your whole IT infrastructure including servers, network devices, OS, applications, web and virtual resources, peripherals | Monitor your whole IT infrastructure including servers, network devices, OS, applications, web and virtual resources, peripherals |
| <a href="#">Begin free trial</a>  | <a href="#">Configure</a>   | <a href="#">Configure</a>   | <a href="#">Configure</a>   |
| <input checked="" type="checkbox"/> Includes 1 Zabbix server and 1 Zabbix proxy   | <input checked="" type="checkbox"/> Includes 1 Zabbix server and up to 3 Zabbix proxies   | <input checked="" type="checkbox"/> Includes 1 Zabbix server and up to 10 Zabbix proxies  | <input checked="" type="checkbox"/> Includes 1 Zabbix server and up to 25 Zabbix proxies  |

4. Specify the product configuration to fit your needs.

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[Docs](#)
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[Marketplace](#) / [Zabbix Monitoring Solution](#) / Purchase

## Product configuration

### Zabbix Monitoring Solution

Advanced Edition

Starting at \$18,700.00 per SKU per year

Monitor your whole IT infrastructure including servers, network devices, OS, applications, web and virtual resources, peripherals

---

**SKU**

Number of SKUs

Unit price: \$18,700.00 USD per SKU

**Billing details**

Subscription term\*

Subscription is automatically renewed

#### Purchase summary

### Zabbix Monitoring Solution

Advanced Edition  
12 Months

|                                  |                        |
|----------------------------------|------------------------|
| 1 SKU<br><small>per year</small> | \$18,700.00 USD        |
| <b>Subtotal</b>                  | <b>\$18,700.00 USD</b> |
| Estimated tax                    | \$0.00 USD             |
| <b>Total</b>                     | <b>\$18,700.00 USD</b> |
| <b>Order Total</b>               | <b>\$18,700.00 USD</b> |

By submitting your order, you agree to the [Terms](#) for this product.

[Sign in to continue](#)

Operated by

5. Navigate to your software within Red Hat Marketplace and install the Zabbix Operator software as specified in the image.

[Workspace](#)
[Learn more](#)
[Blog](#)
[Docs](#)
[Support](#)

[Software](#)
[Datasets](#)
[Usage](#)
[Clusters](#)

## Software

1 product


Test

### Zabbix Monitoring Solution

Zabbix Trial Edition

Software version: 5.0.4

6. Install the Operator. Set the update approval strategy to *Automatic* to ensure that you always have the latest version of Zabbix components installed.

 Red Hat Marketplace

Workspace ▾ Learn more ▾ Blog Docs Support

Zabbix SIA's ... ▾

[My software](#) / [Zabbix Monitoring Solution](#) / [Install operator](#)

## Install Operator

[Prefer manual installation? →](#)

**Update channel**

Operators are organized into packages and streams of updates called "channels". If an operator is available through multiple channels, you can choose which one you want to subscribe to. [Learn more](#)

☒ Its

**Approval strategy**

Automatic updates keep the operator and any instances on the cluster up to date. Manual updates require approval and are done via OpenShift console or CLI. [Learn more](#)

☒ Automatic  
☐ Manual


**Target clusters**

Choose clusters where you want to install and manage this operator. Then select the Namespace scope for each cluster you are installing into. [Learn more](#)

| <input checked="" type="checkbox"/> | Name                                   | Platform            | Namespace Scope |
|-------------------------------------|--|---------------------|-----------------|
| <input checked="" type="checkbox"/> | alexey.pustovalov@zabbix.com-trial-ocp | Red Hat Marketplace | zabbix x ▾      |

[Cancel](#) [Install](#)


7. The Zabbix Operator is now installed into your specified cluster.

 Red Hat Marketplace

Workspace ▾ Learn more ▾ Blog Docs Support

Zabbix SIA's ... ▾

[Software](#) / [Zabbix Monitoring Solution](#)



By Zabbix

Software version  
5.0.4

Delivery method  
Operator

[Test](#)

Overview

Operators

Documentation

Support

Cluster name

Namespace

Status

Version

Updates

Channel

alexey.pustovalov@zabbix.com-trial-ocp

zabbix

Installing

--


Automatic

Its

:

[Install operator](#)

8. Go to Operators → Installed Operators.

 Red Hat

OpenShift Container Platform

Project: zabbix ▾

Grid

Alerts 1

Refresh

Help

Administrator ▾

Home ▸

Operators ▾

OperatorHub

Installed Operators

Workloads ▸

Networking ▸

Storage ▸

Builds ▸

Monitoring ▸

Compute ▸

User Management ▸

Administration ▸

Installed Operators

Installed Operators are represented by Cluster Service Versions within this namespace. For more information, see the [Understanding Operators documentation](#). Or create an Operator and Cluster Service Version using the [Operator SDK](#).

Name ▾ Search by name...


Name ↑

Managed Namespaces


Status

Last Updated

Provided APIs

 Zabbix Operator

0.0.2 provided by Zabbix LLC

 zabbix

Succeeded  
Up to date

a minute ago

Zabbix Server  
Zabbix Full  
Zabbix proxy (SQLite3)  
Zabbix proxy (MySQL)  
[View 2 more...](#)

9. Open the "Zabbix Operator" configuration page.

114



Red Hat OpenShift Container Platform

Project: zabbix

Installed Operators > Operator Details

**Zabbix Operator**  
0.0.2 provided by Zabbix LLC

Actions

Details YAML Subscription Events All Instances Zabbix Server Zabbix Full Zabbix proxy (SQLite3) Zabbix proxy (MySQL) Zabbix agent Zabbix Appliance

**Provided APIs**

- ZS Zabbix Server**  
Zabbix server with MySQL database support, Nginx web-server and Zabbix Java Gateway  
[Create Instance](#)
- ZF Zabbix Full**  
Zabbix server with MySQL database support, Nginx web-server and Zabbix Java Gateway  
[Create Instance](#)
- ZPS Zabbix proxy (SQLite3)**  
Zabbix proxy with SQLite database  
[Create Instance](#)
- ZPM Zabbix proxy (MySQL)**  
Zabbix proxy with MySQL database server  
[Create Instance](#)
- ZA Zabbix agent**  
Zabbix agent is deployed on a monitoring nodes to actively monitor local resources and applications  
[Create Instance](#)
- ZA Zabbix Appliance**  
Zabbix appliance (All-In-One) with MySQL database support, Nginx web-server and Zabbix Java Gateway  
[Create Instance](#)

**Provider**  
Zabbix LLC

**Support**  
[Get support](#)

**Created At**  
4 minutes ago

**Links**  
Zabbix  
<https://www.zabbix.com/>

Zabbix Official Documentation  
<https://www.zabbix.com/documentation/5.0/manual/quickstart>

**Downloads**  
<https://www.zabbix.com/download>

**Maintainers**  
Alexey Pustovalov  
[alexey.pustovalov@zabbix.com](mailto:alexey.pustovalov@zabbix.com)

**Description**

**About this Operator**

Zabbix helps you to real-time monitoring of millions of metrics collected from tens of thousands of servers, virtual machines and network devices. The Zabbix Operator allows users to easily deploy, manage, and maintain Zabbix deployments on OpenShift. By installing this integration you will be able to deploy Zabbix server / proxies and other components with a single command.

## Using OperatorHub

### Note:

If you have installed OpenShift in AWS ensure that the requisite ports are opened for the worker nodes' security group.

### 1. Select OperatorHub from the Operators submenu and search for Zabbix.

Red Hat OpenShift Container Platform

You are logged in as a temporary administrative user. Update the cluster O

Project: All Projects

**OperatorHub**

Discover Operators from the Kubernetes community and Red Hat partners, curated by Red Hat. You can purchase commercial software add-ons and shared services to your developers. After installation, the Operator capabilities will appear in the [Developer Catalog](#) page

All Items

zabbix

**ZABBIX** Marketplace  
Zabbix Operator  
provided by Zabbix LLC  
Zabbix operator with multiple deployment variants and different components

**ZABBIX**  
Zabbix Operator  
provided by Zabbix LLC  
Zabbix operator with multiple deployment variants and different components

### 2. Select Zabbix Operator and click on Install.

**OperatorHub**

Discover Operators from the Kubernetes community and Red Hat partners, curated by Red Hat. Add-ons and shared services to your developers. After installation, the Operator capabilities are available in the console.

**All Items**

zabbix

**Zabbix Operator**  
0.0.2 provided by Zabbix LLC

**Install**

**Latest version**  
0.0.2

**Capability level**

- ☒ Basic Install
- ☒ Seamless Upgrades
- ☐ Full Lifecycle
- ☐ Deep Insights
- ☐ Auto Pilot

**Source**  
Certified

**Provider**  
Zabbix LLC

**Repository**  
N/A

**Container image**  
registry.connect.redhat.com/zabbix/zabbixoperator-certified@sha256:c2dee633a667191d3272bf1652412ac1077455f18b90168dc8aa2ac8882f0c66

**Created at**  
21 Sep 2020, 11:03

**Support**  
Zabbix

**About this Operator**

Zabbix helps you to real-time monitoring of millions of metrics collected from tens of thousands of servers, virtual machines and network devices. The Zabbix Operator allows users to easily deploy, manage, and maintain Zabbix deployments on OpenShift. By installing this integration you will be able to deploy Zabbix server / proxies and other components with a single command.

**Supported Features**

- Zabbix Server** - Simple Zabbix installation with included Zabbix server, Zabbix web-interface and Zabbix Java Gateway with MySQL database support. The feature does not provide MySQL service and requires an external MySQL database.
- Zabbix Server (Full)** - Zabbix installation with included Zabbix server, Zabbix web-interface, Zabbix Java Gateway and MySQL server instance.
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- Zabbix Appliance** - Zabbix appliance very simple way to test and check Zabbix features. The option provides all core components in one solution. It includes Zabbix server, Zabbix Java Gateway, Zabbix web-interface and MySQL server in deployment. It is very useful for testing Zabbix features!

**Prerequisites**

All deployment options are require additional information during deployment. Please, check the following instructions and provide required configuration:

- Zabbix Server** - MySQL database host information and MySQL database credentials in specially formatted `Secret`. Additionally it is possible to specify SSL certificates for HTTPS support in `Secret`.
- Zabbix Server (Full)** - MySQL database credentials in specially formatted `Secret`. MySQL database volume name information. Additionally it is possible to specify SSL certificates for HTTPS support in `Secret`.
- Zabbix proxy (SQLite3)** - Zabbix server host information only.

### 3. Select the installation options.

**OperatorHub** > Operator Installation

**Install Operator**

Install your Operator by subscribing to one of the update channels to keep the Operator up to date. The strategy determines either manual or automatic updates.

**Update channel \***

- ☒ Its

**Installation mode \***

- ☐ All namespaces on the cluster (default)  
This mode is not supported by this Operator
- ☒ A specific namespace on the cluster  
Operator will be available in a single Namespace only.

**Installed Namespace \***

- ☒ Operator recommended Namespace: **zabbix**

**Namespace creation**  
Namespace **zabbix** does not exist and will be created.

**Update approval \***

- ☒ Automatic
- ☐ Manual

**Install** **Cancel**

**Zabbix Operator**  
0.0.2 provided by Zabbix LLC

**Provided APIs**

- ZS Zabbix Server**  
Zabbix server with MySQL database support, Nginx web-server and Zabbix Java Gateway
- ZF Zabbix Full**  
Zabbix server with MySQL database support, Nginx web-server and Zabbix Java Gateway
- ZPS Zabbix proxy (SQLite3)**  
Zabbix proxy with SQLite database
- ZPM Zabbix proxy (MySQL)**  
Zabbix proxy with MySQL database server
- ZA Zabbix agent**  
Zabbix agent is deployed on a monitoring nodes to actively monitor local resources and applications
- ZA Zabbix Appliance**  
Zabbix appliance (All-in-One) with MySQL database support, Nginx web-server and Zabbix Java Gateway

### 4. Go to Operators → Installed Operators.

**Installed Operators**

Installed Operators are represented by ClusterServiceVersions within this Namespace. For more information, see the [Understanding Operators documentation](#). Or create an Operator and ClusterServiceVersion using the [Operator SDK](#).

**Name** **Managed Namespaces** **Status** **Last updated** **Provided APIs**

| Name   | Managed Namespaces | Status                         | Last updated       | Provided APIs  |
|--|--------------------|--------------------------------|--------------------|--|
| <b>Zabbix Operator</b><br>0.0.2 provided by Zabbix LLC | <b>zabbix</b>      | <b>Succeeded</b><br>Up to date | 18 Aug 2021, 17:20 | <a href="#">Zabbix Server</a><br><a href="#">Zabbix Full</a><br><a href="#">Zabbix proxy (SQLite3)</a><br><a href="#">Zabbix proxy (MySQL)</a><br><a href="#">View 2 more...</a> |

### 5. Open the "Zabbix Operator" configuration page.

Red Hat OpenShift Container Platform

You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to log in.

Project: zabbix

Installed Operators > Operator details

**Zabbix Operator**  
0.0.2 provided by Zabbix LLC

Actions

Details YAML Subscription Events All instances Zabbix Server Zabbix Full Zabbix proxy (SQLite3) Zabbix proxy (MySQL) Zabbix agent Zabbix Appliance

**Provided APIs**

| API                               | Description   | Create instance |
|-----------------------------------|---|-----------------|
| <b>ZS Zabbix Server</b>           | Zabbix server with MySQL database support, Nginx web-server and Zabbix Java Gateway                 | Create instance |
| <b>ZF Zabbix Full</b>             | Zabbix server with MySQL database support, Nginx web-server and Zabbix Java Gateway                 | Create instance |
| <b>ZPS Zabbix proxy (SQLite3)</b> | Zabbix proxy with SQLite database   | Create instance |
| <b>ZPM Zabbix proxy (MySQL)</b>   | Zabbix proxy with MySQL database server   | Create instance |
| <b>ZA Zabbix agent</b>            | Zabbix agent is deployed on a monitoring nodes to actively monitor local resources and applications | Create instance |
| <b>ZA Zabbix Appliance</b>        | Zabbix appliance (All-in-One) with MySQL database support, Nginx web-server and Zabbix Java Gateway | Create instance |

**Provider**  
Zabbix LLC

**Created at**  
18 Aug 2021, 14:53

**Links**  
Zabbix  
<https://www.zabbix.com>

**Zabbix Official Documentation**  
<https://www.zabbix.com/documentation/5.0/manual/quickstart>

**Downloads**  
<https://www.zabbix.com/download>

**Maintainers**  
Alexey Pustovalov  
[alexey.pustovalov@zabbix.com](mailto:alexey.pustovalov@zabbix.com)

**Description**

**About this Operator**

Zabbix helps you to real-time monitoring of millions of metrics collected from tens of thousands of servers, virtual machines and network devices. The Zabbix Operator allows

## Configuration

Some of the operands (installation options) require additional resources to be created before. The following section describes these prerequisites. All possible configuration options are available during operand deployment. For example, **Zabbix proxy (MySQL)**:

Red Hat OpenShift Container Platform

Project: zabbix

Search for configuration options:

**TLS connection to database**  
Setting this option enforces to use TLS connection to database

**Zabbix server**  
Select Service  
IP address, optionally in CIDR notation, or hostname of Zabbix server

**Debug level**  
3  
Specifies debug level

**Host name**  
Unique, case sensitive Proxy name

**Configuration cache size**  
8M  
Size of configuration cache, in bytes

**Timeout**  
4  
Specifies how long we wait for agent, SNMP device or external check (in seconds)

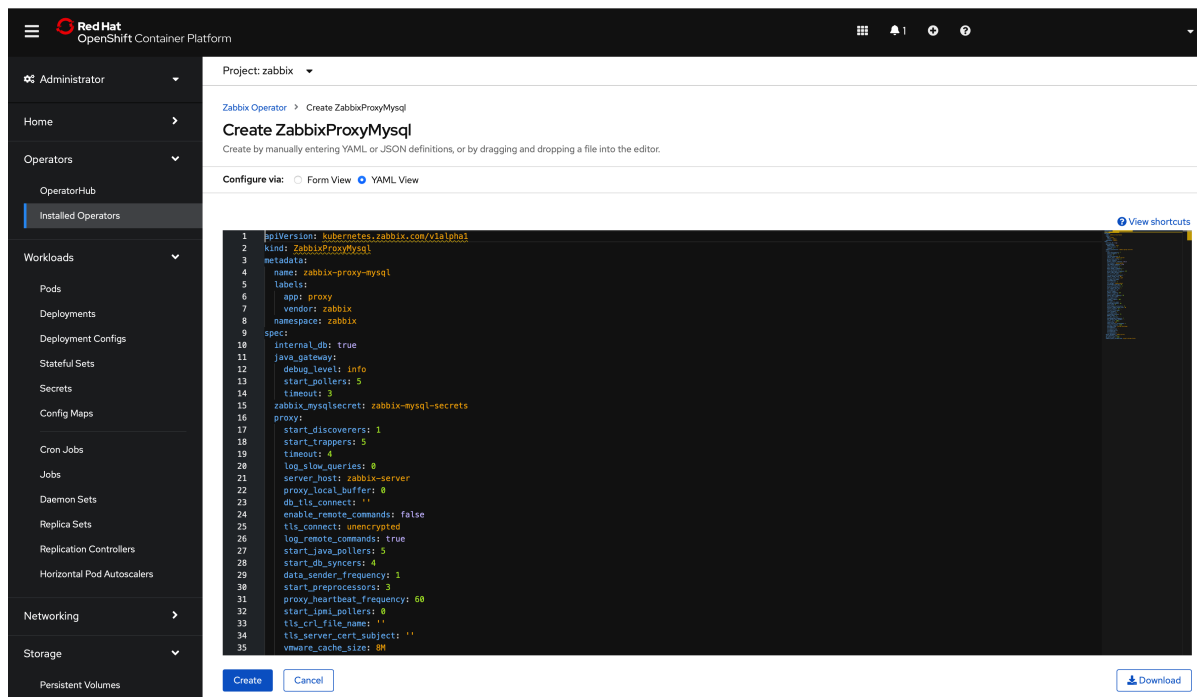
**Log slow queries**  
0  
How long a database query may take before being logged (in milliseconds)

**Proxy mode**  
0  
Proxy operating mode

**Zabbix server port**  
10051  
Port of Zabbix trapper on Zabbix server

**Configuration sync frequency**

The YAML section provides all available options with default values:



## Zabbix server

This operand has a few prerequisites:

1. An existing MySQL database entry point - a MySQL database/cluster must be created before running the "Zabbix Server" operand. For example, a standalone MySQL server with persistent volume:

```
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: mysql-pv-claim
spec:
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: 20Gi
---
```

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: mysql
spec:
  selector:
    matchLabels:
      app: mysql
  strategy:
    type: Recreate
  template:
    metadata:
      labels:
        app: mysql
    spec:
      containers:
        - image: mysql:8.0
          name: mysql
          args:
            - mysqld
            - '--character-set-server=utf8'
            - '--collation-server=utf8_bin'
            - '--default-authentication-plugin=mysql_native_password'
          env:
```

```

    # Use secret in real usage
    - name: MYSQL_ROOT_PASSWORD
      value: Welcome1!
  ports:
    - containerPort: 3306
      name: mysql
  volumeMounts:
    - name: mysql-persistent-storage
      mountPath: /var/lib/mysql
  volumes:
    - name: mysql-persistent-storage
      persistentVolumeClaim:
        claimName: mysql-pv-claim
---
apiVersion: v1
kind: Service
metadata:
  name: mysql
spec:
  ports:
    - port: 3306
  selector:
    app: mysql
  clusterIP: None

```

Please, note that Zabbix does not support a utf8\_mb4 charset and default caching\_sha2\_password authentication plugin.

**2.** MySQL credentials using secret - must be secret with mysql\_root\_password, mysql\_zabbix\_username and mysql\_zabbix\_password data. For example:

```

kind: Secret
apiVersion: v1
metadata:
  name: zabbix-server-secrets
data:
  mysql_root_password: V2VsY29tZTEh
  mysql_zabbix_password: emFiYm14X3N1cGVyIQ==
  mysql_zabbix_username: emFiYm14
type: Opaque

```

where all fields are encoded using base64. For example:

```

# echo -n "zabbix" | base64
emFiYm14Cg

```

An example of "Zabbix Server" operand configuration:

Red Hat OpenShift Container Platform

You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to log in.

Project: zabbix

Zabbix Operator > Create ZabbixServer

### Create ZabbixServer

Create by completing the form. Default values may be provided by the Operator authors.

Configure via: ☒ Form view ☐ YAML view

**Note:** Some fields may not be represented in this form view. Please select "YAML view" for full control.

**Zabbix Server**  
provided by Zabbix LLC  
Zabbix server with MySQL database support, Nginx web-server and Zabbix Java Gateway

**Name \***  
zabbix-server

**Labels**  
app=zabbix vendor=zabbix

**MySQL database host \***  
mysql  
MySQL database host name

**MySQL database name \***  
zabbix  
Database name for Zabbix installation

**MySQL database credentials secret \***  
zabbix-server-secret  
MySQL database credentials secret name

**Zabbix server configuration**  
Configuration parameters for Zabbix server

**Zabbix Java Gateway configuration**  
Configuration parameters for Zabbix Java Gateway

All configuration options are available using the form view, but it is possible to use the YAML view as well. For example:

Red Hat OpenShift Container Platform

You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to log in.

Project: zabbix

Zabbix Operator > Create ZabbixServer

### Create ZabbixServer

Create by manually entering YAML or JSON definitions, or by dragging and dropping a file into the editor.

Configure via: ☐ Form view ☒ YAML view

```

67:
68:   tlsCertPath: ''
69:   tlsPrivateKeyPath: ''
70:   debug_level: info
71:   start_pollers: 5
72:   timeout: 3
73:   zabbix_mysql_secret: zabbix-server-secret
74:   web_size: 2
75:   web:
76:     db_encryption: false
77:     server_name: Kubernetes Installation
78:     history_storage_types: ''
79:     db_double_ee754: true
80:     db_verify_host: false
81:     max_execution_time: 300
82:     enable_web_access_log: true
83:     db_cipher_list: ''
84:     ssl_settings: ''
85:     session_name: zbx_sessionid
86:     upload_max_filesize: 2M
87:     timezone: Europe/Riga
88:     gui_warning_msg: Zabbix is under maintenance.
89:     deny_gui_access: false
90:     post_max_size: 10M
91:     gui_access_ip_range: ''
92:     memory_limit: 128M
93:     max_input_time: 300
94:     mysql_database: zabbix
95:     web_enable_router: true
96:     java_gateway_size: 1
97:     db_server_port: 3306
98:

```

Create Cancel Download

Finally, the operand will create multiple pods. It is possible to examine them in the Workloads → Pods section:

Red Hat OpenShift Container Platform

You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to log in.

Project: zabbix

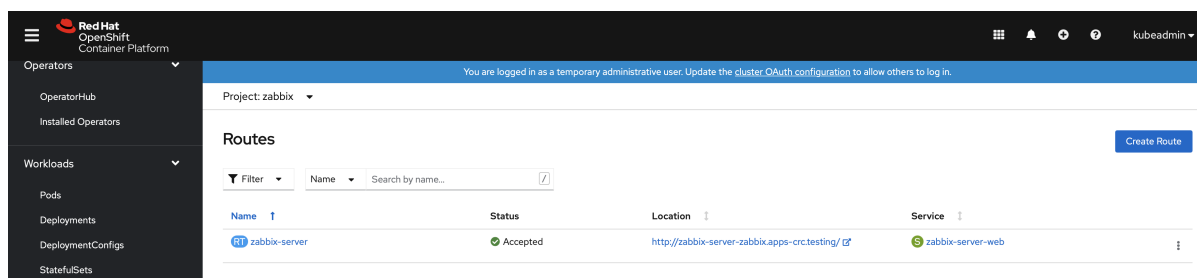
### Pods

Create Pod

Filter Name Search by name...

| Name                                       | Status  | Ready | Restarts | Owner                                | Memory | CPU | Created            |
|--|---------|-------|----------|--------------------------------------|--------|-----|--------------------|
| mysql-5cc4c4f5d5-d27pf                     | Running | 1/1   | 0        | mysql-5cc4c4f5d5                     | -      | -   | 18 Aug 2021, 19:45 |
| zabbix-operator-certified-66989ddb04-25685 | Running | 2/2   | 2        | zabbix-operator-certified-66989ddb04 | -      | -   | 18 Aug 2021, 14:55 |
| zabbix-server-java-gw-7945fcd98f-t567p     | Running | 1/1   | 0        | zabbix-server-java-gw-7945fcd98f     | -      | -   | 18 Aug 2021, 20:06 |
| zabbix-server-server-71975dc95d-7f4m       | Running | 1/1   | 0        | zabbix-server-server-71975dc95d      | -      | -   | 18 Aug 2021, 20:06 |
| zabbix-server-web-74b56f97d5-7pc56         | Running | 1/1   | 0        | zabbix-server-web-74b56f97d5         | -      | -   | 18 Aug 2021, 20:06 |
| zabbix-server-web-74b56f97d5-p4l79         | Running | 1/1   | 0        | zabbix-server-web-74b56f97d5         | -      | -   | 18 Aug 2021, 20:06 |

The route for Zabbix web interface is located under Networking → Routes. The URL provides access to the Zabbix web interface. In the following example it is `http://zabbix-server-zabbix.apps-crc.testing/`:



## Zabbix full

This operand has a few prerequisites:

1. MySQL volume claim - must be persistent volume claim. For example:

```
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: zabbix-database
  namespace: zabbix
spec:
  accessModes:
    - ReadWriteOnce
  volumeMode: Filesystem
  resources:
    requests:
      storage: 50Gi
```

2. MySQL credentials using secret - must be secret with `mysql_root_password`, `mysql_zabbix_username` and `mysql_zabbix_password` data. For example:

```
kind: Secret
apiVersion: v1
metadata:
  name: zabbix-full-secrets
data:
  mysql_root_password: V2VsY29tZTEh
  mysql_zabbix_password: emFiYml4X3N1cGVyIQ==
  mysql_zabbix_username: emFiYml4
type: Opaque
```

where all fields are encoded using base64. For example:

```
# echo -n "zabbix" | base64
emFiYml4Cg
```

An example of "Zabbix Full" operand configuration:

**Project:** zabbix

**Zabbix Operator** > Create ZabbixFull

Create by completing the form. Default values may be provided by the Operator authors.

Configure via: ☒ Form view ☐ YAML view

**Note:** Some fields may not be represented in this form view. Please select "YAML view" for full control.

**Zabbix Full**  
provided by Zabbix LLC  
Zabbix server with MySQL database server, Nginx web-server and Zabbix Java Gateway

**Name \***  
zabbix-full

**Labels**  
app=server x vendor=zabbix x

**MySQL database volume \***  
PVC zabbix-database

Volume claim for MySQL database

**MySQL database credentials secret \***  
zabbix-full-secrets

MySQL database credentials secret name

**MySQL CPU / memory resources**  
MySQL resources allocation

**Zabbix server configuration**  
Configuration parameters for Zabbix server

**Zabbix Java Gateway configuration**  
Configuration parameters for Zabbix Java Gateway

All configuration options are available using the form view, but it is possible to use the YAML view as well. For example:

**Project:** zabbix

**Zabbix Operator** > Create ZabbixFull

Create by manually entering YAML or JSON definitions, or by dragging and dropping a file into the editor.

Configure via: ☐ Form view ☒ YAML view

```

66  tlsCipherSuites: ''
67  java_gateway:
68    debug_level: info
69    start_pollers: 5
70    timeout: 3
71    zabbix_mysqlsecret: zabbix-full-secrets
72    web_size: 2
73  web:
74    db_encryption: false
75    server_name: Kubernetes installation
76    history_storage_types: ''
77    db_double_1000754: true
78    db_verify_hosts: false
79    max_execution_time: 300
80    enable_web_access_log: true
81    db_cipher_list: ''
82    ssl_settings: ''
83    session_name: zbx_sessionid
84    upload_max_filesize: 2M
85    timezone: Europe/Riga
86    gui_warning_msg: Zabbix is under maintenance.
87    deny_gui_access: false
88    post_max_size: 10M
89    gui_access_ip_range: ''
90    memory_limit: 220M
91    max_input_time: 300
92    web_enable_router: true
93    java_gateway_size: 1
94    zabbix_mysql_volumeclaim: zabbix-database
95

```

[Create](#) [Cancel](#) [Download](#)

Finally, the operand will create multiple pods. It is possible to examine them in the Workloads → Pods section:

**Project:** zabbix

**Pods** [Create Pod](#)

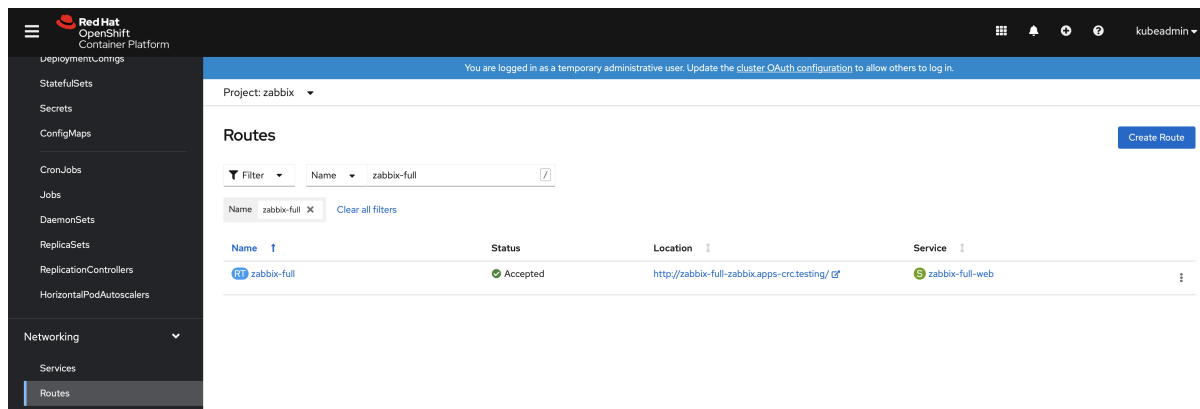
Filter: Name: zabbix-full [?] [x]

Clear all filters

| Name ↑                               | Status ↓ | Ready ↓ | Restarts ↓ | Owner ↓                        | Memory ↓ | CPU ↓ | Created ↓          |
|--------------------------------------|----------|---------|------------|--------------------------------|----------|-------|--------------------|
| zabbix-full-db-59768777fc-cp5mk      | Running  | 1/1     | 0          | zabbix-full-db-59768777fc      | -        | -     | 18 Aug 2021, 19:09 |
| zabbix-full-java-gw-7f46d4bccf-lw5m6 | Running  | 1/1     | 0          | zabbix-full-java-gw-7f46d4bccf | -        | -     | 18 Aug 2021, 19:18 |
| zabbix-full-server-545c4d55b9-5wgt2  | Running  | 1/1     | 0          | zabbix-full-server-545c4d55b9  | -        | -     | 18 Aug 2021, 19:09 |
| zabbix-full-web-bbcf7755b-hdlfv      | Running  | 1/1     | 0          | zabbix-full-web-bbcf7755b      | -        | -     | 18 Aug 2021, 19:09 |
| zabbix-full-web-bbcf7755b-n5fc8      | Running  | 1/1     | 0          | zabbix-full-web-bbcf7755b      | -        | -     | 18 Aug 2021, 19:09 |

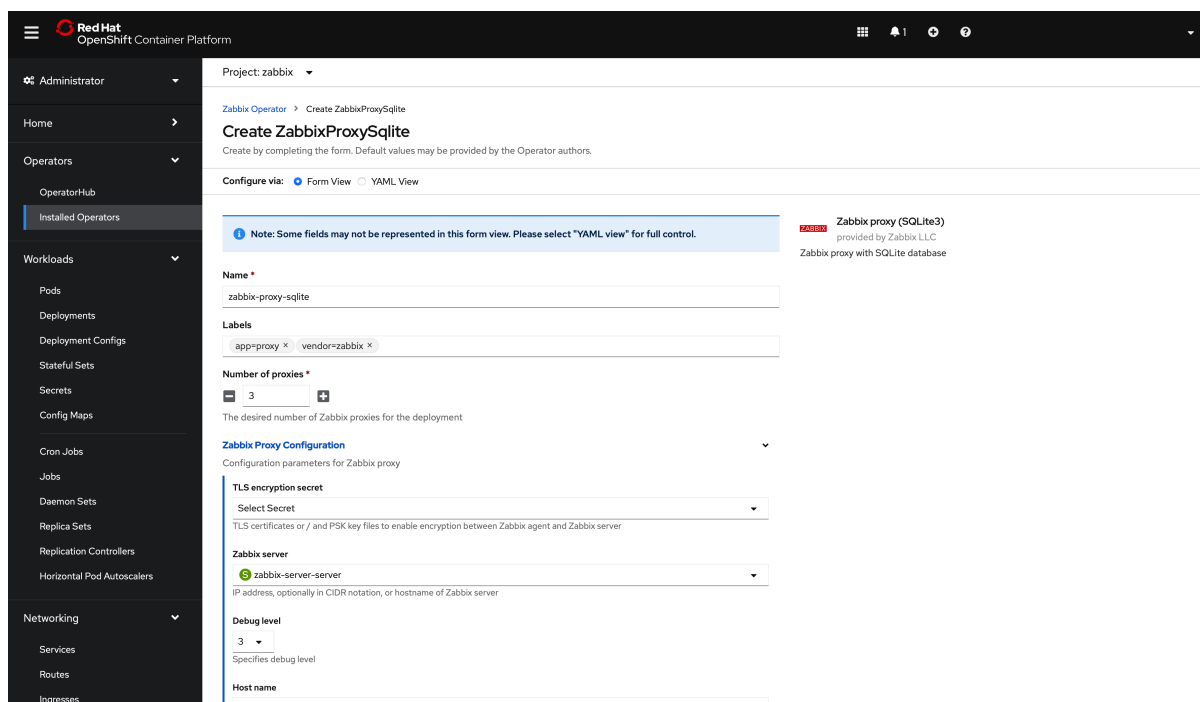
The route for Zabbix web interface is located under Networking → Routes. The URL provides access to the Zabbix web interface. In the following example it is `http://zabbix-full-zabbix.apps-crc.testing/`:



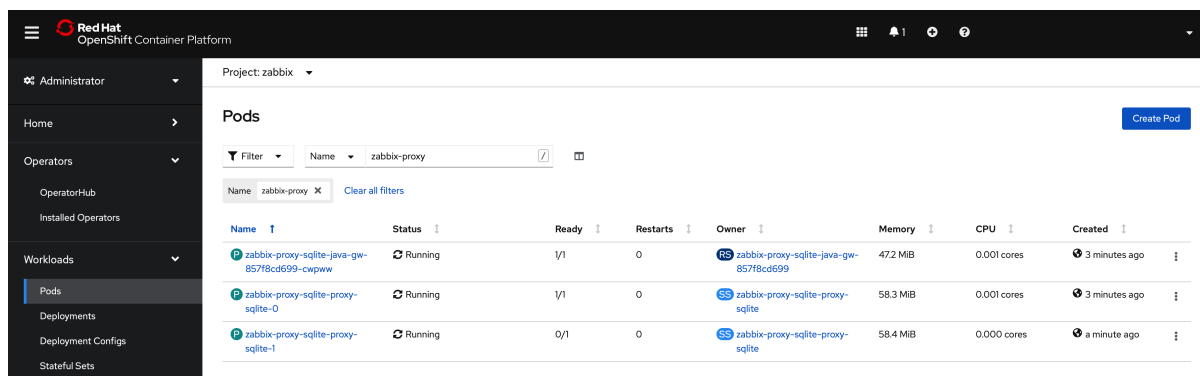


## Zabbix proxy (SQLite3)

An example of "Zabbix proxy (SQLite3)" operand configuration:



Finally, the operand will create multiple pods. It is possible to examine them in the Workloads → Pods section:



## Additional information

### Creating new secret

The following procedure describes how to create a new secret using Openshift Console.

1. Open the Workloads → Secrets section and switch project to the Zabbix Operator project (by default, "zabbix").

Project: zabbix

### Secrets

Filter Name Search by name...

| Name                                      | Type                                | Size | Created            |
|---|-------------------------------------|------|--------------------|
| builder-dockercfg-vrpdv                   | kubernetes.io/dockercfg             | 1    | 18 Aug 2021, 14:53 |
| builder-token-2s7wt                       | kubernetes.io/service-account-token | 4    | 18 Aug 2021, 14:53 |
| builder-token-jj6b5                       | kubernetes.io/service-account-token | 4    | 18 Aug 2021, 14:53 |
| default-dockercfg-xzsq8                   | kubernetes.io/dockercfg             | 1    | 18 Aug 2021, 14:53 |
| default-token-b2bnh                       | kubernetes.io/service-account-token | 4    | 18 Aug 2021, 14:53 |
| default-token-kwqjf                       | kubernetes.io/service-account-token | 4    | 18 Aug 2021, 14:53 |
| deployer-dockercfg-mnbgz                  | kubernetes.io/dockercfg             | 1    | 18 Aug 2021, 14:53 |
| deployer-token-7t2d5                      | kubernetes.io/service-account-token | 4    | 18 Aug 2021, 14:53 |
| deployer-token-gh5v7                      | kubernetes.io/service-account-token | 4    | 18 Aug 2021, 14:53 |
| zabbix-agent-dockercfg-l6ccq              | kubernetes.io/dockercfg             | 1    | 18 Aug 2021, 14:53 |
| zabbix-agent-token-4jfbw                  | kubernetes.io/service-account-token | 4    | 18 Aug 2021, 14:53 |
| zabbix-agent-token-6jgpk                  | kubernetes.io/service-account-token | 4    | 18 Aug 2021, 14:53 |
| zabbix-operator-certified-dockercfg-lm16h | kubernetes.io/dockercfg             | 1    | 18 Aug 2021, 14:53 |

## 2. Create a new secret using the *From YAML* option.

### Create Secret

Create by manually entering YAML or JSON definitions, or by dragging and dropping a file into the editor.

```

1 kind: Secret
2 apiVersion: v1
3 metadata:
4   name: zabbix-server-secret
5 data:
6   mysql_root_password: enF1Ym14X3N1c0V0YXJ3b3Q=
7   mysql_zabbix_password: enF1Ym14X3V2ZDZjOGZzc3dvcnQ=
8   mysql_zabbix_username: enF1Ym14Cg==
9 type: Opaque
  
```

Buttons: Create, Cancel, Download

#### Secret

Schema

Secret holds secret data of a certain type. The total bytes of the values in the Data field must be less than MaxSecretSize bytes.

- apiVersion** `string`  
APIVersion defines the versioned schema of this representation of an object. Servers should convert recognized schemas to the latest internal value, and may reject unrecognized values. More info: <https://git.k8s.io/community/contributors/devel/sig-architecture/api-conventions.md#resources>
- data** `object`  
Data contains the secret data. Each key must consist of alphanumeric characters, '-', '\_' or '.'. The serialized form of the secret data is a base64 encoded string, representing the arbitrary (possibly non-string) data value here. Described in <https://tools.ietf.org/html/rfc4648#section-4>
- immutable** `boolean`  
Immutable, if set to true, ensures that data stored in the Secret cannot be updated (only object metadata can be modified). If not set to true, the field can be modified at any time. Defaulted to nil.
- kind** `string`

## SSL certificates for HTTPS

It is possible to enable HTTPS directly in the Zabbix web interface pods. In this case create the following secret using the YAML option:

```

kind: Secret
apiVersion: v1
metadata:
  name: zabbix-web-sslsecret
data:
  ssl.crt: >-
    < ssl.crt data>
  ssl.key: >-
    < ssl.key data >
  dhparam.pem: >-
    < dhparam.pem data >
  
```

The names of certificates and DH Parameters file are static. Please use the listed in the above example only!

MySQL database certificate base encryption

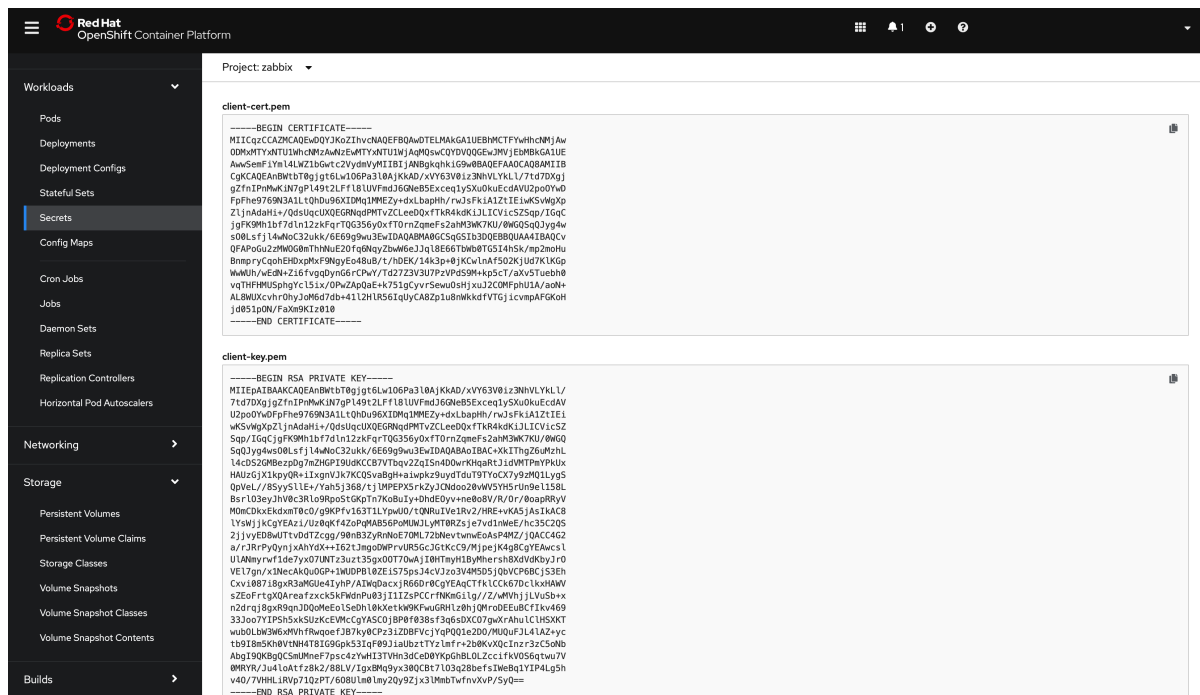
MySQL database side:

```
apiVersion: v1
data:
  root-ca.pem: >-
    < root-ca.pem data>
  server-cert.pem: >-
    < server-cert.pem data>
  server-key.pem: >-
    < server-key.pem data>
kind: Secret
metadata:
  name: zabbix-db-server-tls-secret
type: Opaque
```

Zabbix components side:

```
apiVersion: v1
data:
  client-cert.pem: >-
    < client-cert.pem data>
  client-key.pem: >-
    < client-key.pem data>
  root-ca.pem: >-
    < root-ca.pem data>
kind: Secret
metadata:
  name: zabbix-db-client-tls-secret
type: Opaque
```

Certificates must include "-----BEGIN RSA PRIVATE KEY-----" and "-----END RSA PRIVATE KEY-----". For example:



Then, during deployment, in the Zabbix component section and MySQL server (if using built-in server) choose the proper "TLS connection to database" option value and the "MySQL database certificates (client)" secret value.

Known issues

1. Zabbix agent does not have the possibility to determine proper node name. It always has dynamic hostname.

## 6 Web interface installation

This section provides step-by-step instructions for installing Zabbix web interface. Zabbix frontend is written in PHP, so to run it a PHP supported webserver is needed.

**Note:**  
You can find out more about setting up SSL for Zabbix frontend by referring to these [best practices](#).

Welcome screen

Open Zabbix frontend URL in the browser. If you have installed Zabbix from packages, the URL is:

- for Apache: `http://<server_ip_or_name>/zabbix`
- for Nginx: `http://<server_ip_or_name>`

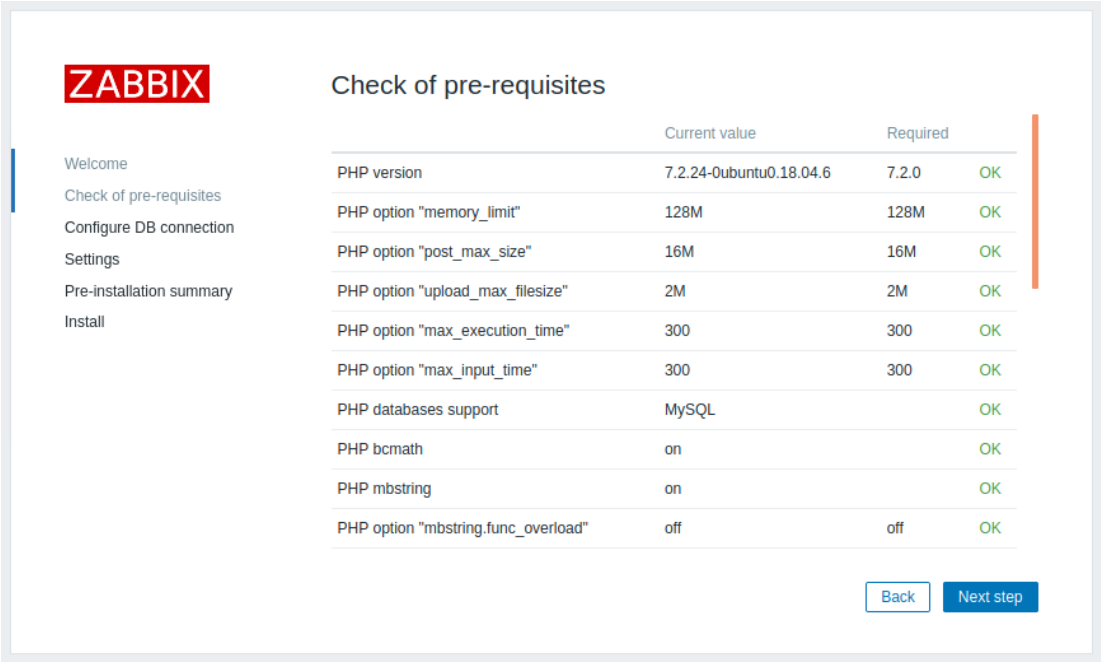
You should see the first screen of the frontend installation wizard.

Use the *Default language* drop-down menu to change system default language and continue the installation process in the selected language (optional). For more information, see [Installation of additional frontend languages](#).



Check of pre-requisites

Make sure that all software prerequisites are met.



| Pre-requisite                             | Minimum value                             | Description   |
|---|---|---|
| <i>PHP version</i>                        | 7.2.5                                     |   |
| <i>PHP memory_limit option</i>            | 128MB                                     | In php.ini:<br>memory_limit = 128M  |
| <i>PHP post_max_size option</i>           | 16MB                                      | In php.ini:<br>post_max_size = 16M  |
| <i>PHP upload_max_filesize option</i>     | 2MB                                       | In php.ini:<br>upload_max_filesize = 2M   |
| <i>PHP max_execution_time option</i>      | 300 seconds (values 0 and -1 are allowed) | In php.ini:<br>max_execution_time = 300   |
| <i>PHP max_input_time option</i>          | 300 seconds (values 0 and -1 are allowed) | In php.ini:<br>max_input_time = 300   |
| <i>PHP session.auto_start option</i>      | must be disabled                          | In php.ini:<br>session.auto_start = 0   |
| <i>Database support</i>                   | One of: MySQL, Oracle, PostgreSQL.        | One of the following modules must be installed:<br>mysql, oci8, pgsql   |
| <i>bcmath</i>                             |   | php-bcmath  |
| <i>mbstring</i>                           |   | php-mbstring  |
| <i>PHP mb-string.func_overload option</i> | must be disabled                          | In php.ini:<br>mbstring.func_overload = 0   |
| <i>sockets</i>                            |   | php-net-socket. Required for user script support.   |
| <i>gd</i>                                 | 2.0.28                                    | php-gd. PHP GD extension must support PNG images ( <i>--with-png-dir</i> ), JPEG ( <i>--with-jpeg-dir</i> ) images and FreeType 2 ( <i>--with-freetype-dir</i> ).   |
| <i>libxml</i>                             | 2.6.15                                    | php-xml   |
| <i>xmlwriter</i>                          |   | php-xmlwriter   |
| <i>xmlreader</i>                          |   | php-xmlreader   |
| <i>ctype</i>                              |   | php-ctype   |
| <i>session</i>                            |   | php-session   |
| <i>gettext</i>                            |   | php-gettext<br>Since Zabbix 2.2.1, the PHP gettext extension is not a mandatory requirement for installing Zabbix. If gettext is not installed, the frontend will work as usual, however, the translations will not be available. |

Optional pre-requisites may also be present in the list. A failed optional prerequisite is displayed in orange and has a *Warning* status. With a failed optional pre-requisite, the setup may continue.

**Attention:**

If there is a need to change the Apache user or user group, permissions to the session folder must be verified. Otherwise Zabbix setup may be unable to continue.

Configure DB connection

Enter details for connecting to the database. Zabbix database must already be created.

ZABBIX

Welcome

Check of pre-requisites

Configure DB connection

Settings

Pre-installation summary

Install

Configure DB connection

Please create database manually, and set the configuration parameters for connection to this database. Press "Next step" button when done.

Database typeMySQL

Database hostlocalhost

Database port00 - use default port

Database namezabbix

Store credentials inPlain textHashiCorp Vault

Userzabbix

Password

Database TLS encryptionConnection will not be encrypted because it uses a socket file (on Unix) or shared memory (Windows).

BackNext step

If the *Database TLS encryption* option is checked, then additional fields for **configuring the TLS connection** to the database appear in the form (MySQL or PostgreSQL only).

If HashiCorp Vault option is selected for storing credentials, additional fields are available for specifying the Vault API endpoint, secret path and authentication token:

ZABBIX

Welcome

Check of pre-requisites

Configure DB connection

Settings

Pre-installation summary

Install

Configure DB connection

Please create database manually, and set the configuration parameters for connection to this database. Press "Next step" button when done.

Database typeMySQL

Database hostlocalhost

Database port00 - use default port

Database namezabbix

Store credentials inPlain textHashiCorp Vault

Vault API endpointhttps://localhost:8200

Vault secret pathpath/to/secret

Vault authentication token

Database TLS encryption

BackNext step

## Settings

Entering a name for Zabbix server is optional, however, if submitted, it will be displayed in the menu bar and page titles.

Set the default **time zone** and theme for the frontend.

ZABBIX

Welcome

Check of pre-requisites

Configure DB connection

Settings

Pre-installation summary

Install

Settings

Zabbix server name

Default time zone

Default theme

Back

Next step

## Pre-installation summary

Review a summary of settings.

ZABBIX

Welcome

Check of pre-requisites

Configure DB connection

Settings

Pre-installation summary

Install

Pre-installation summary

Please check configuration parameters. If all is correct, press "Next step" button, or "Back" button to change configuration parameters.

Database type

Database server

Database port

Database name

Database user

Database password

TLS encryption

Zabbix server

Zabbix server port

Zabbix server name

Back

Next step

## Install

If installing Zabbix from sources, download the configuration file and place it under conf/ in the webserver HTML documents subdirectory where you copied Zabbix PHP files to.

**ZABBIX**

Welcome

Check of pre-requisites


Configure DB connection

Settings

Pre-installation summary

Install

Install



Details ▲

Cannot create the configuration file.

Unable to create the configuration file.

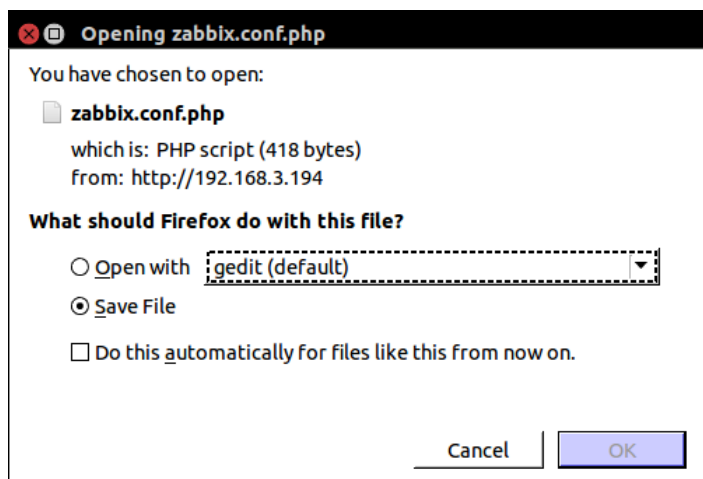
Alternatively, you can install it manually:

1. [Download the configuration file](#)

2. Save it as "/var/www/html/zabbix/conf/zabbix.conf.php"

Back

Finish

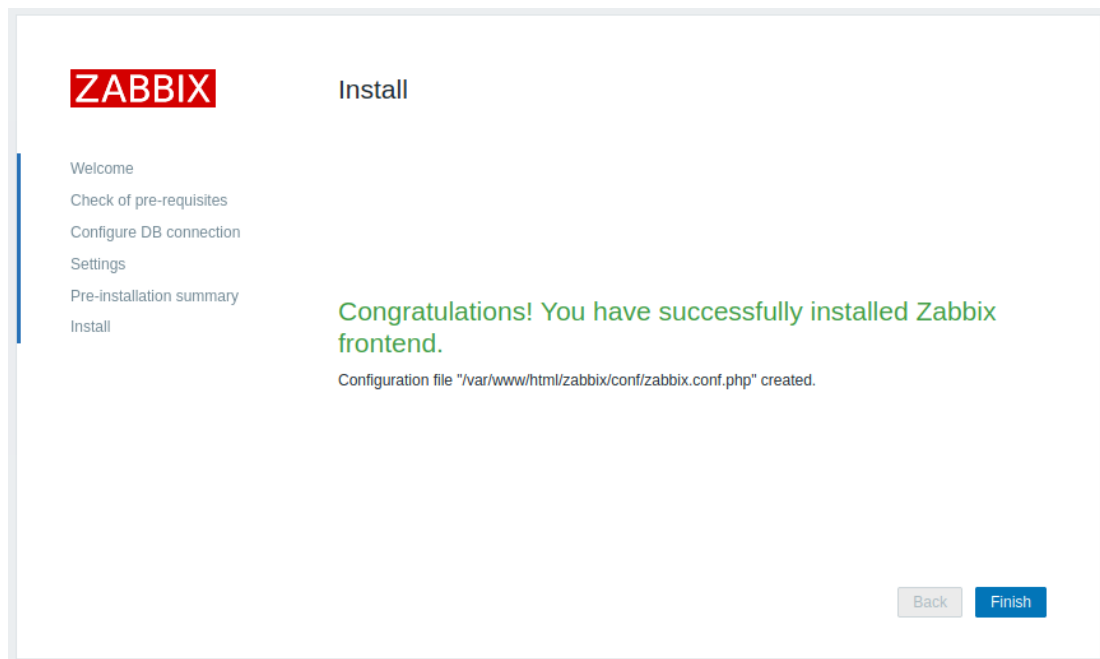


**Note:**

Providing the webserver user has write access to conf/ directory the configuration file would be saved automatically and it would be possible to proceed to the next step right away.

Finish the installation.





Log in

Zabbix frontend is ready! The default user name is **Admin**, password **zabbix**.

Proceed to [getting started with Zabbix](#).

## 1 Debian/Ubuntu frontend installation

### Overview

Starting from version 5.0, Zabbix frontend requires PHP version 7.2 or later. Unfortunately, older versions of Debian & Ubuntu provide only PHP versions below 7.2.

Supported PHP versions by distribution

| Distribution         | PHP Version |
|----------------------|-------------|
| Debian 12 (bookworm) | 8.2         |

| Distribution          | PHP Version |
|-----------------------|-------------|
| Debian 11 (bullseye)  | 7.4         |
| Debian 10 (buster)    | 7.3         |
| Debian 9 (stretch)    | 7.0         |
| Debian 8 (jessie)     | 5.6         |
| Ubuntu 20.04 (focal)  | 7.4         |
| Ubuntu 18.04 (bionic) | 7.2         |
| Ubuntu 16.04 (xenial) | 7.0         |
| Ubuntu 14.04 (trusty) | 5.5         |
| Raspbian 10 (buster)  | 7.3         |
| Raspbian 8 (stretch)  | 7.0         |

On *stretch*, *jessie*, *xenial* and *trusty* distributions, PHP 7.2 dependency is not available, and therefore Zabbix frontend 5.0 or newer cannot be easily installed. Considering this, `zabbix-frontend-php` package has been replaced with `zabbix-frontend-php-deprecated` package on aforementioned distributions.

The main difference is absence of direct dependencies on any php or web-server packages. Thus, the user can (and must) provide these dependencies on their own. In other words, installing `zabbix-frontend-php-deprecated` package on its own will not give you a working frontend. A web server as well as PHP 7.2 with its modules have to be installed manually (use PPAs / build PHP from source). We don't endorse any particular method.

**Note:**

The official way of getting PHP 7.2 or later on older versions of Debian/Ubuntu is to upgrade to buster/bionic.

PHP modules required for Zabbix frontend are `php-gd`, `php-bcmath`, `php-mbstring`, `php-xml`, `php-ldap` and `php-json`.

## 7 Upgrade procedure

### Overview

This section provides upgrade information for Zabbix **6.0**:

- using packages:
  - for [Red Hat Enterprise Linux](#)
  - for [Debian/Ubuntu](#)
- using [sources](#)

Direct upgrade to Zabbix 6.0.x is possible from Zabbix **5.4.x**, **5.2.x**, **5.0.x**, **4.4.x**, **4.2.x**, **4.0.x**, **3.4.x**, **3.2.x**, **3.0.x**, **2.4.x**, **2.2.x** and **2.0.x**. For upgrading from earlier versions consult Zabbix documentation for 2.0 and earlier.

**Note:**

Please be aware that after upgrading some third-party software integrations in Zabbix might be affected, if the external software is not compatible with the upgraded Zabbix version.

### 1 Upgrade from sources

#### Overview

This section provides the steps required for a successful **upgrade** from Zabbix **5.4.x** to Zabbix **6.0.x** using official Zabbix sources.

While upgrading Zabbix agents is not mandatory (but recommended), Zabbix server and proxies must be of the **same major version**. Therefore, in a server-proxy setup, Zabbix server and all proxies have to be stopped and upgraded. Keeping proxies running no longer will bring any benefit as during proxy upgrade their old data will be discarded and no new data will be gathered until proxy configuration is synced with server.

**Attention:**

It is no longer possible to start the upgraded server and have older and unupgraded proxies report data to a newer server. This approach, which was never recommended nor supported by Zabbix, now is officially disabled, as the server will ignore data from unupgraded proxies.

Note that with SQLite database on proxies, history data from proxies before the upgrade will be lost, because SQLite database upgrade is not supported and the SQLite database file has to be manually removed. When proxy is started for the first time and the SQLite database file is missing, proxy creates it automatically.

Depending on database size the database upgrade to version 6.0 may take a long time.

**Warning:**

Before the upgrade make sure to read the relevant **upgrade notes!**

The following upgrade notes are available:

| Upgrade from | Read full upgrade notes  | Most important changes between versions   |
|--------------|--|---|
| 5.4.x        | For:<br>Zabbix <b>6.0</b>  | Minimum required database versions upped;<br>Server/proxy will not start if outdated database;<br>Audit log records lost because of database structure change.  |
| 5.2.x        | For:<br>Zabbix <b>5.4</b><br>Zabbix <b>6.0</b>   | Minimum required database versions upped;<br>Aggregate items removed as a separate type.  |
| 5.0.x LTS    | For:<br>Zabbix <b>5.2</b><br>Zabbix <b>5.4</b><br>Zabbix <b>6.0</b>  | Minimum required PHP version upped from 7.2.0 to 7.2.5.   |
| 4.4.x        | For:<br>Zabbix <b>5.0</b><br>Zabbix <b>5.2</b><br>Zabbix <b>5.4</b><br>Zabbix <b>6.0</b>   | Support of IBM DB2 dropped;<br>Minimum required PHP version upped from 5.4.0 to 7.2.0;<br>Minimum required database versions upped;<br>Changed Zabbix PHP file directory.   |
| 4.2.x        | For:<br>Zabbix <b>4.4</b><br>Zabbix <b>5.0</b><br>Zabbix <b>5.2</b><br>Zabbix <b>5.4</b><br>Zabbix <b>6.0</b>  | Jabber, Ez Texting media types removed.   |
| 4.0.x LTS    | For:<br>Zabbix <b>4.2</b><br>Zabbix <b>4.4</b><br>Zabbix <b>5.0</b><br>Zabbix <b>5.2</b><br>Zabbix <b>5.4</b><br>Zabbix <b>6.0</b>   | Older proxies no longer can report data to an upgraded server;<br>Newer agents no longer will be able to work with an older Zabbix server.  |
| 3.4.x        | For:<br>Zabbix <b>4.0</b><br>Zabbix <b>4.2</b><br>Zabbix <b>4.4</b><br>Zabbix <b>5.0</b><br>Zabbix <b>5.2</b><br>Zabbix <b>5.4</b><br>Zabbix <b>6.0</b>                      | 'libpthread' and 'zlib' libraries now mandatory;<br>Support for plain text protocol dropped and header is mandatory;<br>Pre-1.4 version Zabbix agents are no longer supported;<br>The Server parameter in passive proxy configuration now mandatory.  |
| 3.2.x        | For:<br>Zabbix <b>3.4</b><br>Zabbix <b>4.0</b><br>Zabbix <b>4.2</b><br>Zabbix <b>4.4</b><br>Zabbix <b>5.0</b><br>Zabbix <b>5.2</b><br>Zabbix <b>5.4</b><br>Zabbix <b>6.0</b> | SQLite support as backend database dropped for Zabbix server/frontend;<br>Perl Compatible Regular Expressions (PCRE) supported instead of POSIX extended;<br>'libpcre' and 'libevent' libraries mandatory for Zabbix server;<br>Exit code checks added for user parameters, remote commands and system.run[] items without the 'nowait' flag as well as Zabbix server executed scripts;<br>Zabbix Java gateway has to be upgraded to support new functionality. |

| Upgrade from | Read full upgrade notes  | Most important changes between versions  |
|--------------|--|--|
| 3.0.x LTS    | For:<br>Zabbix <a href="#">3.2</a><br>Zabbix <a href="#">3.4</a><br>Zabbix <a href="#">4.0</a><br>Zabbix <a href="#">4.2</a><br>Zabbix <a href="#">4.4</a><br>Zabbix <a href="#">5.0</a><br>Zabbix <a href="#">5.2</a><br>Zabbix <a href="#">5.4</a><br>Zabbix <a href="#">6.0</a>   | Database upgrade may be slow, depending on the history table size.   |
| 2.4.x        | For:<br>Zabbix <a href="#">3.0</a><br>Zabbix <a href="#">3.2</a><br>Zabbix <a href="#">3.4</a><br>Zabbix <a href="#">4.0</a><br>Zabbix <a href="#">4.2</a><br>Zabbix <a href="#">4.4</a><br>Zabbix <a href="#">5.0</a><br>Zabbix <a href="#">5.2</a><br>Zabbix <a href="#">5.4</a><br>Zabbix <a href="#">6.0</a>   | Minimum required PHP version upped from 5.3.0 to 5.4.0<br>LogFile agent parameter must be specified  |
| 2.2.x LTS    | For:<br>Zabbix <a href="#">2.4</a><br>Zabbix <a href="#">3.0</a><br>Zabbix <a href="#">3.2</a><br>Zabbix <a href="#">3.4</a><br>Zabbix <a href="#">4.0</a><br>Zabbix <a href="#">4.2</a><br>Zabbix <a href="#">4.4</a><br>Zabbix <a href="#">5.0</a><br>Zabbix <a href="#">5.2</a><br>Zabbix <a href="#">5.4</a><br>Zabbix <a href="#">6.0</a>                               | Node-based distributed monitoring removed  |
| 2.0.x        | For:<br>Zabbix <a href="#">2.2</a><br>Zabbix <a href="#">2.4</a><br>Zabbix <a href="#">3.0</a><br>Zabbix <a href="#">3.2</a><br>Zabbix <a href="#">3.4</a><br>Zabbix <a href="#">4.0</a><br>Zabbix <a href="#">4.2</a><br>Zabbix <a href="#">4.4</a><br>Zabbix <a href="#">5.0</a><br>Zabbix <a href="#">5.2</a><br>Zabbix <a href="#">5.4</a><br>Zabbix <a href="#">6.0</a> | Minimum required PHP version upped from 5.1.6 to 5.3.0;<br>Case-sensitive MySQL database required for proper server work;<br>character set utf8 and utf8_bin collation is required for Zabbix server to work properly with MySQL database. See <a href="#">database creation scripts</a> .<br>'mysqli' PHP extension required instead of 'mysql' |

You may also want to check the [requirements](#) for 6.0.

**Note:**

It may be handy to run two parallel SSH sessions during the upgrade, executing the upgrade steps in one and monitoring the server/proxy logs in another. For example, run `tail -f zabbix_server.log` or `tail -f zabbix_proxy.log` in the second SSH session showing you the latest log file entries and possible errors in real time. This can be critical for production instances.

## Server upgrade process

### 1 Stop server

Stop Zabbix server to make sure that no new data is inserted into database.

## 2 Back up the existing Zabbix database

This is a very important step. Make sure that you have a backup of your database. It will help if the upgrade procedure fails (lack of disk space, power off, any unexpected problem).

## 3 Back up configuration files, PHP files and Zabbix binaries

Make a backup copy of Zabbix binaries, configuration files and the PHP file directory.

## 4 Install new server binaries

Use these [instructions](#) to compile Zabbix server from sources.

## 5 Review server configuration parameters

Make sure to implement the latest configuration parameters (if any) usually mentioned in the relevant subsection of *Upgrade notes* and *What's new* page.

## 6 Start new Zabbix binaries

Start new binaries. Check log files to see if the binaries have started successfully.

Zabbix server will automatically upgrade the database. When starting up, Zabbix server reports the current (mandatory and optional) and required database versions. If the current mandatory version is older than the required version, Zabbix server automatically executes the required database upgrade patches. The start and progress level (percentage) of the database upgrade is written to the Zabbix server log file. When the upgrade is completed, a "database upgrade fully completed" message is written to the log file. If any of the upgrade patches fail, Zabbix server will not start. Zabbix server will also not start if the current mandatory database version is newer than the required one. Zabbix server will only start if the current mandatory database version corresponds to the required mandatory version.

```
8673:20161117:104750.259 current database version (mandatory/optional): 03040000/03040000
8673:20161117:104750.259 required mandatory version: 03040000
```

Before you start the server:

- Make sure the database user has enough permissions (create table, drop table, create index, drop index)
- Make sure you have enough free disk space.

## 7 Install new Zabbix web interface

The minimum required PHP version is 7.2.5. Update if needed and follow [installation instructions](#).

## 8 Clear web browser cookies and cache

After the upgrade you may need to clear web browser cookies and web browser cache for the Zabbix web interface to work properly.

### Proxy upgrade process

#### 1 Stop proxy

Stop Zabbix proxy.

#### 2 Back up configuration files and Zabbix proxy binaries

Make a backup copy of the Zabbix proxy binary and configuration file.

#### 3 Install new proxy binaries

Use these [instructions](#) to compile Zabbix proxy from sources.

#### 4 Review proxy configuration parameters

Make sure to review [Upgrade notes](#) to check if any changes in the configuration parameters are required.

#### 5 Start new Zabbix proxy

Start the new Zabbix proxy. Check log files to see if the proxy has started successfully.

Zabbix proxy will automatically upgrade the database. Database upgrade takes place similarly as when starting [Zabbix server](#).

### Agent upgrade process

#### **Attention:**

Upgrading agents is not mandatory. You only need to upgrade agents if it is required to access the new functionality.

The upgrade procedure described in this section may be used for upgrading both the Zabbix agent and the Zabbix agent 2.

#### 1 Stop agent

Stop Zabbix agent.

## 2 Back up configuration files and Zabbix agent binaries

Make a backup copy of the Zabbix agent binary and configuration file.

## 3 Install new agent binaries

Use these [instructions](#) to compile Zabbix agent from sources.

Alternatively, you may download pre-compiled Zabbix agents from the [Zabbix download page](#).

## 4 Review agent configuration parameters

There are no mandatory changes in this version neither to **agent** nor to **agent 2** parameters.

## 5 Start new Zabbix agent

Start the new Zabbix agent. Check log files to see if the agent has started successfully.

## Upgrade between minor versions

When upgrading between minor versions of 6.0.x (for example from 6.0.1 to 6.0.3) it is required to execute the same actions for server/proxy/agent as during the upgrade between major versions. The only difference is that when upgrading between minor versions no changes to the database are made.

# 2 Upgrade from packages

## Overview

This section provides the steps required for a successful **upgrade** using official RPM and DEB packages provided by Zabbix for:

- **Red Hat Enterprise Linux**
- **Debian/Ubuntu**

## Zabbix packages from OS repositories

Often, OS distributions (in particular, Debian-based distributions) provide their own Zabbix packages.

Note that these packages are not supported by Zabbix, they are typically out of date and lack the latest features and bug fixes. Only the packages from [repo.zabbix.com](#) are officially supported.

If you are upgrading from packages provided by OS distributions (or had them installed at some point), follow this procedure to switch to official Zabbix packages:

1. Always uninstall the old packages first.
2. Check for residual files that may have been left after deinstallation.
3. Install official packages following [installation instructions](#) provided by Zabbix.

Never do a direct update, as this may result in a broken installation.

# 1 Red Hat Enterprise Linux

## Overview

This section provides the steps required for a successful **upgrade** from Zabbix **5.4.x** to the latest version of Zabbix **6.0.x** using official Zabbix packages for Red Hat Enterprise Linux.

While upgrading Zabbix agents is not mandatory (but recommended), Zabbix server and proxies must be of the **same major version**. Therefore, in a server-proxy setup, Zabbix server and all proxies have to be stopped and upgraded. Keeping proxies running during server upgrade no longer will bring any benefit as during proxy upgrade their old data will be discarded and no new data will be gathered until proxy configuration is synced with server.

Note that with SQLite database on proxies, history data from proxies before the upgrade will be lost, because SQLite database upgrade is not supported and the SQLite database file has to be manually removed. When proxy is started for the first time and the SQLite database file is missing, proxy creates it automatically.

Depending on database size the database upgrade to version 6.0 may take a long time.

### Warning:

Before the upgrade make sure to read the relevant **upgrade notes**!

The following upgrade notes are available:

| Upgrade from | Read full upgrade notes  | Most important changes between versions   |
|--------------|--|---|
| 5.4.x        | For:<br>Zabbix 6.0   | Minimum required database versions upped;<br>Server/proxy will not start if outdated database;<br>Audit log records lost because of database structure change.  |
| 5.2.x        | For:<br>Zabbix 5.4<br>Zabbix 6.0   | Minimum required database versions upped;<br>Aggregate items removed as a separate type.  |
| 5.0.x LTS    | For:<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0   | Minimum required PHP version upped from 7.2.0 to 7.2.5.   |
| 4.4.x        | For:<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0   | Support of IBM DB2 dropped;<br>Minimum required PHP version upped from 5.4.0 to 7.2.0;<br>Minimum required database versions upped;<br>Changed Zabbix PHP file directory.   |
| 4.2.x        | For:<br>Zabbix 4.4<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0   | Jabber, Ez Texting media types removed.   |
| 4.0.x LTS    | For:<br>Zabbix 4.2<br>Zabbix 4.4<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0   | Older proxies no longer can report data to an upgraded server;<br>Newer agents no longer will be able to work with an older Zabbix server.  |
| 3.4.x        | For:<br>Zabbix 4.0<br>Zabbix 4.2<br>Zabbix 4.4<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0                             | 'libpthreads' and 'zlib' libraries now mandatory;<br>Support for plain text protocol dropped and header is mandatory;<br>Pre-1.4 version Zabbix agents are no longer supported;<br>The Server parameter in passive proxy configuration now mandatory.   |
| 3.2.x        | For:<br>Zabbix 3.4<br>Zabbix 4.0<br>Zabbix 4.2<br>Zabbix 4.4<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0               | SQLite support as backend database dropped for Zabbix server/frontend;<br>Perl Compatible Regular Expressions (PCRE) supported instead of POSIX extended;<br>'libpcre' and 'libevent' libraries mandatory for Zabbix server;<br>Exit code checks added for user parameters, remote commands and system.run[] items without the 'nowait' flag as well as Zabbix server executed scripts;<br>Zabbix Java gateway has to be upgraded to support new functionality. |
| 3.0.x LTS    | For:<br>Zabbix 3.2<br>Zabbix 3.4<br>Zabbix 4.0<br>Zabbix 4.2<br>Zabbix 4.4<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0 | Database upgrade may be slow, depending on the history table size.  |

| Upgrade from | Read full upgrade notes  | Most important changes between versions  |
|--------------|--|--|
| 2.4.x        | For:<br>Zabbix <a href="#">3.0</a><br>Zabbix <a href="#">3.2</a><br>Zabbix <a href="#">3.4</a><br>Zabbix <a href="#">4.0</a><br>Zabbix <a href="#">4.2</a><br>Zabbix <a href="#">4.4</a><br>Zabbix <a href="#">5.0</a><br>Zabbix <a href="#">5.2</a><br>Zabbix <a href="#">5.4</a><br>Zabbix <a href="#">6.0</a>   | Minimum required PHP version upped from 5.3.0 to 5.4.0<br>LogFile agent parameter must be specified  |
| 2.2.x LTS    | For:<br>Zabbix <a href="#">2.4</a><br>Zabbix <a href="#">3.0</a><br>Zabbix <a href="#">3.2</a><br>Zabbix <a href="#">3.4</a><br>Zabbix <a href="#">4.0</a><br>Zabbix <a href="#">4.2</a><br>Zabbix <a href="#">4.4</a><br>Zabbix <a href="#">5.0</a><br>Zabbix <a href="#">5.2</a><br>Zabbix <a href="#">5.4</a><br>Zabbix <a href="#">6.0</a>                               | Node-based distributed monitoring removed  |
| 2.0.x        | For:<br>Zabbix <a href="#">2.2</a><br>Zabbix <a href="#">2.4</a><br>Zabbix <a href="#">3.0</a><br>Zabbix <a href="#">3.2</a><br>Zabbix <a href="#">3.4</a><br>Zabbix <a href="#">4.0</a><br>Zabbix <a href="#">4.2</a><br>Zabbix <a href="#">4.4</a><br>Zabbix <a href="#">5.0</a><br>Zabbix <a href="#">5.2</a><br>Zabbix <a href="#">5.4</a><br>Zabbix <a href="#">6.0</a> | Minimum required PHP version upped from 5.1.6 to 5.3.0;<br>Case-sensitive MySQL database required for proper server work;<br>character set utf8 and utf8_bin collation is required for Zabbix server to work properly with MySQL database. See <a href="#">database creation scripts</a> .<br>'mysqli' PHP extension required instead of 'mysql' |

You may also want to check the [requirements](#) for 6.0.

**Note:**

It may be handy to run two parallel SSH sessions during the upgrade, executing the upgrade steps in one and monitoring the server/proxy logs in another. For example, run `tail -f zabbix_server.log` or `tail -f zabbix_proxy.log` in the second SSH session showing you the latest log file entries and possible errors in real time. This can be critical for production instances.

For instructions on upgrading between Zabbix 6.0.x minor versions (for example, from 6.0.1 to 6.0.3), see [Upgrade between minor versions](#).

## Upgrade procedure

### 1 Stop Zabbix processes

Stop Zabbix server to make sure that no new data is inserted into database.

```
systemctl stop zabbix-server
```

If upgrading Zabbix proxy, agent, or agent 2, stop these components too:

```
systemctl stop zabbix-proxy
```

```
systemctl stop zabbix-agent
```

```
systemctl stop zabbix-agent2
```



**Attention:**

It is no longer possible to start the upgraded server and have older and unupgraded proxies report data to a newer server. This approach, which was never recommended nor supported by Zabbix, now is officially disabled, as the server will ignore data from unupgraded proxies.

## 2 Back up the existing Zabbix database

This is a very important step. Make sure that you have a backup of your database. It will help if the upgrade procedure fails (lack of disk space, power off, any unexpected problem).

## 3 Back up configuration files, PHP files and Zabbix binaries

Make a backup copy of Zabbix binaries, configuration files and the PHP file directory.

Configuration files:

```
mkdir /opt/zabbix-backup/  
cp /etc/zabbix/zabbix_server.conf /opt/zabbix-backup/  
cp /etc/httpd/conf.d/zabbix.conf /opt/zabbix-backup/
```

PHP files and Zabbix binaries:

```
cp -R /usr/share/zabbix/ /opt/zabbix-backup/  
cp -R /usr/share/zabbix-* /opt/zabbix-backup/
```

## 4 Update repository configuration package

Before proceeding with the upgrade, update your current repository package to the latest version to ensure compatibility with the newest packages and to include any recent security patches or bug fixes.

On **RHEL 9**, run:

```
rpm -Uvh https://repo.zabbix.com/zabbix/6.0/rhel/9/x86_64/zabbix-release-latest.el9.noarch.rpm
```

On **RHEL 8**, run:

```
rpm -Uvh https://repo.zabbix.com/zabbix/6.0/rhel/8/x86_64/zabbix-release-latest.el8.noarch.rpm
```

For older RHEL versions, replace the link above with the correct one from [Zabbix repository](#). Note, however, that packages for those versions may not include all Zabbix components. For a list of components included, see [Zabbix packages](#).

Then, clean up the dnf package manager's cache (including headers, metadata, and package files downloaded during previous installations or updates):

```
dnf clean all
```

On the next dnf operation, dnf will download fresh metadata from the repositories since the old metadata is cleared.

See also: [Known issues](#) for updating the repository configuration package on RHEL.

## 5 Upgrade Zabbix components

To upgrade Zabbix components you may run something like:

```
dnf install zabbix-server-mysql zabbix-web-mysql zabbix-agent
```

- If using PostgreSQL, substitute mysql with postgresql in the command.
- If upgrading the proxy, substitute server with proxy in the command.
- If upgrading the agent 2, substitute zabbix-agent with zabbix-agent2 zabbix-agent2-plugin-\* in the command.

**Attention:**

Upgrading Zabbix agent 2 with the `dnf install zabbix-agent2` command could lead to an error. For more information, see [Known issues](#).

Then, to upgrade the web frontend with Apache and restart Apache, run:

```
dnf install zabbix-apache-conf  
systemctl restart httpd
```

## 6 Review component configuration parameters

Make sure to review [Upgrade notes](#) to check if any changes in the configuration parameters are required.

## 7 Start Zabbix processes

Start the updated Zabbix components.

```
systemctl start zabbix-server
systemctl start zabbix-proxy
systemctl start zabbix-agent
systemctl start zabbix-agent2
```

8 Clear web browser cookies and cache

After the upgrade you may need to clear web browser cookies and web browser cache for the Zabbix web interface to work properly.

Upgrade between minor versions

It is possible to upgrade between Zabbix 6.0.x minor versions (for example, from 6.0.1 to 6.0.3).

To upgrade Zabbix minor version, please run:

```
dnf upgrade 'zabbix-*'
```

To upgrade Zabbix server minor version only, please run:

```
dnf upgrade 'zabbix-server-*'
```

To upgrade Zabbix agent minor version only, please run:

```
dnf upgrade 'zabbix-agent-*'
```

or, for Zabbix agent 2:

```
dnf upgrade 'zabbix-agent2-*'
```

## 2 Debian/Ubuntu

### Overview

This section provides the steps required for a successful **upgrade** from Zabbix **5.4.x** to the latest version of Zabbix **6.0.x** using official Zabbix packages for Debian/Ubuntu.

While upgrading Zabbix agents is not mandatory (but recommended), Zabbix server and proxies must be of the **same major version**. Therefore, in a server-proxy setup, Zabbix server and all proxies have to be stopped and upgraded. Keeping proxies running during server upgrade no longer will bring any benefit as during proxy upgrade their old data will be discarded and no new data will be gathered until proxy configuration is synced with server.

Note that with SQLite database on proxies, history data from proxies before the upgrade will be lost, because SQLite database upgrade is not supported and the SQLite database file has to be manually removed. When proxy is started for the first time and the SQLite database file is missing, proxy creates it automatically.

Depending on database size the database upgrade to version 6.0 may take a long time.

#### **Warning:**

Before the upgrade make sure to read the relevant **upgrade notes**!

The following upgrade notes are available:

| Upgrade from | Read full upgrade notes   | Most important changes between versions  |
|--------------|---|--|
| 5.4.x        | For:<br>Zabbix <b>6.0</b>   | Minimum required database versions upped;<br>Server/proxy will not start if outdated database;<br>Audit log records lost because of database structure change. |
| 5.2.x        | For:<br>Zabbix <b>5.4</b><br>Zabbix <b>6.0</b>                      | Minimum required database versions upped;<br>Aggregate items removed as a separate type.   |
| 5.0.x LTS    | For:<br>Zabbix <b>5.2</b><br>Zabbix <b>5.4</b><br>Zabbix <b>6.0</b> | Minimum required PHP version upped from 7.2.0 to 7.2.5.  |

| Upgrade from | Read full upgrade notes  | Most important changes between versions   |
|--------------|--|---|
| 4.4.x        | For:<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0   | Support of IBM DB2 dropped;<br>Minimum required PHP version upped from 5.4.0 to 7.2.0;<br>Minimum required database versions upped;<br>Changed Zabbix PHP file directory.   |
| 4.2.x        | For:<br>Zabbix 4.4<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0   | Jabber, Ez Texting media types removed.   |
| 4.0.x LTS    | For:<br>Zabbix 4.2<br>Zabbix 4.4<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0   | Older proxies no longer can report data to an upgraded server;<br>Newer agents no longer will be able to work with an older Zabbix server.  |
| 3.4.x        | For:<br>Zabbix 4.0<br>Zabbix 4.2<br>Zabbix 4.4<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0   | 'libpthread' and 'zlib' libraries now mandatory;<br>Support for plain text protocol dropped and header is mandatory;<br>Pre-1.4 version Zabbix agents are no longer supported;<br>The Server parameter in passive proxy configuration now mandatory.  |
| 3.2.x        | For:<br>Zabbix 3.4<br>Zabbix 4.0<br>Zabbix 4.2<br>Zabbix 4.4<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0                             | SQLite support as backend database dropped for Zabbix server/frontend;<br>Perl Compatible Regular Expressions (PCRE) supported instead of POSIX extended;<br>'libpcre' and 'libevent' libraries mandatory for Zabbix server;<br>Exit code checks added for user parameters, remote commands and system.run[] items without the 'nowait' flag as well as Zabbix server executed scripts;<br>Zabbix Java gateway has to be upgraded to support new functionality. |
| 3.0.x LTS    | For:<br>Zabbix 3.2<br>Zabbix 3.4<br>Zabbix 4.0<br>Zabbix 4.2<br>Zabbix 4.4<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0               | Database upgrade may be slow, depending on the history table size.  |
| 2.4.x        | For:<br>Zabbix 3.0<br>Zabbix 3.2<br>Zabbix 3.4<br>Zabbix 4.0<br>Zabbix 4.2<br>Zabbix 4.4<br>Zabbix 5.0<br>Zabbix 5.2<br>Zabbix 5.4<br>Zabbix 6.0 | Minimum required PHP version upped from 5.3.0 to 5.4.0<br>LogFile agent parameter must be specified   |

| Upgrade from | Read full upgrade notes  | Most important changes between versions  |
|--------------|--|--|
| 2.2.x LTS    | For:<br>Zabbix <a href="#">2.4</a><br>Zabbix <a href="#">3.0</a><br>Zabbix <a href="#">3.2</a><br>Zabbix <a href="#">3.4</a><br>Zabbix <a href="#">4.0</a><br>Zabbix <a href="#">4.2</a><br>Zabbix <a href="#">4.4</a><br>Zabbix <a href="#">5.0</a><br>Zabbix <a href="#">5.2</a><br>Zabbix <a href="#">5.4</a><br>Zabbix <a href="#">6.0</a>                               | Node-based distributed monitoring removed  |
| 2.0.x        | For:<br>Zabbix <a href="#">2.2</a><br>Zabbix <a href="#">2.4</a><br>Zabbix <a href="#">3.0</a><br>Zabbix <a href="#">3.2</a><br>Zabbix <a href="#">3.4</a><br>Zabbix <a href="#">4.0</a><br>Zabbix <a href="#">4.2</a><br>Zabbix <a href="#">4.4</a><br>Zabbix <a href="#">5.0</a><br>Zabbix <a href="#">5.2</a><br>Zabbix <a href="#">5.4</a><br>Zabbix <a href="#">6.0</a> | Minimum required PHP version upped from 5.1.6 to 5.3.0;<br>Case-sensitive MySQL database required for proper server work;<br>character set utf8 and utf8_bin collation is required for Zabbix server to work properly with MySQL database. See <a href="#">database creation scripts</a> .<br>'mysqli' PHP extension required instead of 'mysql' |

You may also want to check the [requirements](#) for 6.0.

**Note:**

It may be handy to run two parallel SSH sessions during the upgrade, executing the upgrade steps in one and monitoring the server/proxy logs in another. For example, run `tail -f zabbix_server.log` or `tail -f zabbix_proxy.log` in the second SSH session showing you the latest log file entries and possible errors in real time. This can be critical for production instances.

For instructions on upgrading between Zabbix 6.0.x minor versions (for example, from 6.0.1 to 6.0.3), see [Upgrade between minor versions](#).

## Upgrade procedure

### 1 Stop Zabbix processes

Stop Zabbix server to make sure that no new data is inserted into database.

```
systemctl stop zabbix-server
```

If upgrading Zabbix proxy, agent, or agent 2, stop these components too:

```
systemctl stop zabbix-proxy
systemctl stop zabbix-agent
systemctl stop zabbix-agent2
```

### 2 Back up the existing Zabbix database

This is a very important step. Make sure that you have a backup of your database. It will help if the upgrade procedure fails (lack of disk space, power off, any unexpected problem).

### 3 Back up configuration files, PHP files and Zabbix binaries

Make a backup copy of Zabbix binaries, configuration files and the PHP file directory.

Configuration files:

```
mkdir /opt/zabbix-backup/
cp /etc/zabbix/zabbix_server.conf /opt/zabbix-backup/
cp /etc/apache2/conf-enabled/zabbix.conf /opt/zabbix-backup/
```

PHP files and Zabbix binaries:

```
cp -R /usr/share/zabbix/ /opt/zabbix-backup/
cp -R /usr/share/zabbix-* /opt/zabbix-backup/
```

#### 4 Update repository configuration package

Before proceeding with the upgrade, uninstall your current repository package:

```
rm -Rf /etc/apt/sources.list.d/zabbix.list
```

Then, install the latest repository configuration package to ensure compatibility with the newest packages and to include any recent security patches or bug fixes.

On **Debian 12**, run:

```
wget https://repo.zabbix.com/zabbix/6.0/debian/pool/main/z/zabbix-release/zabbix-release_latest+debian12_all.deb
dpkg -i zabbix-release_latest+debian12_all.deb
```

On **Debian 11**, run:

```
wget https://repo.zabbix.com/zabbix/6.0/debian/pool/main/z/zabbix-release/zabbix-release_latest+debian11_all.deb
dpkg -i zabbix-release_latest+debian11_all.deb
```

On **Debian 10**, run:

```
wget https://repo.zabbix.com/zabbix/6.0/debian/pool/main/z/zabbix-release/zabbix-release_latest+debian10_all.deb
dpkg -i zabbix-release_latest+debian10_all.deb
```

For older Debian versions, replace the link above with the correct one from [Zabbix repository](#). Note, however, that packages for those versions may not include all Zabbix components. For a list of components included, see [Zabbix packages](#).

On **Ubuntu 24.04**, run:

```
wget https://repo.zabbix.com/zabbix/6.0/ubuntu/pool/main/z/zabbix-release/zabbix-release_latest+ubuntu24.04_all.deb
dpkg -i zabbix-release_latest+ubuntu24.04_all.deb
```

On **Ubuntu 22.04**, run:

```
wget https://repo.zabbix.com/zabbix/6.0/ubuntu/pool/main/z/zabbix-release/zabbix-release_latest+ubuntu22.04_all.deb
dpkg -i zabbix-release_latest+ubuntu22.04_all.deb
```

On **Ubuntu 20.04**, run:

```
wget https://repo.zabbix.com/zabbix/6.0/ubuntu/pool/main/z/zabbix-release/zabbix-release_latest+ubuntu20.04_all.deb
dpkg -i zabbix-release_latest+ubuntu20.04_all.deb
```

On **Ubuntu 18.04**, run:

```
wget https://repo.zabbix.com/zabbix/6.0/ubuntu/pool/main/z/zabbix-release/zabbix-release_latest+ubuntu18.04_all.deb
dpkg -i zabbix-release_latest+ubuntu18.04_all.deb
```

For older Ubuntu versions, replace the link above with the correct one from [Zabbix repository](#). Note, however, that packages for those versions may not include all Zabbix components. For a list of components included, see [Zabbix packages](#).

You may see a prompt about the Zabbix repository configuration:

```
Configuration file '/etc/apt/sources.list.d/zabbix.list'
==> Deleted (by you or by a script) since installation.
==> Package distributor has shipped an updated version.
What would you like to do about it ? Your options are:
Y or I  : install the package maintainer's version
N or O  : keep your currently-installed version
D       : show the differences between the versions
Z       : start a shell to examine the situation
The default action is to keep your current version.
*** zabbix.list (Y/I/N/O/D/Z) [default=N] ?
```

Enter Y (or I) to install the package maintainer's version of the Zabbix repository configuration.

Then, update the repository information:

```
apt update
```

#### 5 Upgrade Zabbix components

To upgrade Zabbix components you may run something like:

```
apt install --only-upgrade zabbix-server-mysql zabbix-frontend-php zabbix-agent
```

- If using PostgreSQL, substitute `mysql` with `pgsql` in the command.
- If upgrading the proxy, substitute `server` with `proxy` in the command.
- If upgrading the Zabbix agent 2, substitute `zabbix-agent` with `zabbix-agent2 zabbix-agent2-plugin-*` in the command.

**Attention:**

Upgrading Zabbix agent 2 with the `apt install zabbix-agent2` command could lead to an error. For more information, see [Known issues](#).

You may see a prompt about the Zabbix server (or proxy) configuration:

```
Configuration file '/etc/zabbix/zabbix_server.conf'
==> Modified (by you or by a script) since installation.
==> Package distributor has shipped an updated version.
What would you like to do about it ? Your options are:
Y or I  : install the package maintainer's version
N or O  : keep your currently-installed version
D       : show the differences between the versions
Z       : start a shell to examine the situation
The default action is to keep your current version.
*** zabbix_server.conf (Y/I/N/O/D/Z) [default=N] ?
```

Enter the option that best fits your situation. For example, enter `D` to compare the current and new configuration, then decide if you want to install the package maintainer's version (`Y` or `I`).

Then, to upgrade the web frontend with Apache and restart Apache, run:

```
apt install zabbix-apache-conf
systemctl restart apache2
```

Distributions **prior to Debian 10 (buster) / Ubuntu 18.04 (bionic) / Raspbian 10 (buster)** do not provide PHP 7.2 or newer, which is required for Zabbix frontend 6.0. See [information](#) about installing Zabbix frontend on older distributions.

## 6 Review component configuration parameters

Make sure to review [Upgrade notes](#) to check if any changes in the configuration parameters are required.

## 7 Start Zabbix processes

Start the updated Zabbix components.

```
systemctl start zabbix-server
systemctl start zabbix-proxy
systemctl start zabbix-agent
systemctl start zabbix-agent2
```

## 8 Clear web browser cookies and cache

After the upgrade you may need to clear web browser cookies and web browser cache for the Zabbix web interface to work properly.

## Upgrade between minor versions

It is possible to upgrade between Zabbix 6.0.x minor versions (for example, from 6.0.1 to 6.0.3).

First, update the repository information:

```
apt update
```

Then, to upgrade Zabbix minor version, please run:

```
apt install --only-upgrade 'zabbix*'
```

To upgrade Zabbix server minor version only, please run:

```
apt install --only-upgrade 'zabbix-server*'
```

To upgrade Zabbix agent minor version only, please run:

```
apt install --only-upgrade 'zabbix-agent*'
```

or, for Zabbix agent 2:

```
apt install --only-upgrade 'zabbix-agent2*'
```

## 8 Known issues

See also: [Compilation issues](#).

Proxy startup with MySQL 8.0.0-8.0.17

zabbix\_proxy on MySQL versions 8.0.0-8.0.17 fails with the following "access denied" error:

```
[Z3001] connection to database 'zabbix' failed: [1227] Access denied; you need (at least one of) the SUPER
```

That is due to MySQL 8.0.0 starting to enforce special permissions for setting session variables. However, in 8.0.18 this behavior was removed: [As of MySQL 8.0.18, setting the session value of this system variable is no longer a restricted operation](#).

The workaround is based on granting additional privileges to the zabbix user:

For MySQL versions 8.0.14 - 8.0.17:

```
grant SESSION_VARIABLES_ADMIN on *.* to 'zabbix'@'localhost';
```

For MySQL versions 8.0.0 - 8.0.13:

```
grant SYSTEM_VARIABLES_ADMIN on *.* to 'zabbix'@'localhost';
```

Timescale DB: high memory usage with large number of partitions

PostgreSQL versions 9.6-12 use too much memory when updating tables with a large number of partitions. This issue manifests itself when Zabbix updates trends on systems with TimescaleDB if trends are split into relatively small (e.g. 1 day) chunks. This leads to hundreds of chunks present in the trends tables with default housekeeping settings - the condition where PostgreSQL is likely to run out of memory.

The issue has been resolved since Zabbix 5.0.1 for new installations with TimescaleDB, but if TimescaleDB was set up with Zabbix before that, please see [ZBX-16347](#) for the migration notes.

Timescale DB 2.5.0: compression policy can fail on tables that contain integers

This issue manifests when TimescaleDB 2.5.0 is used. It has been resolved since TimescaleDB 2.5.1.

For more information, please see [TimescaleDB Issue #3773](#).

Upgrade

SQL mode setting for successful upgrade

The `sql_mode` setting in MySQL/MariaDB must have the "STRICT\_TRANS\_TABLES" mode set. If it is absent, the Zabbix database upgrade will fail (see also [ZBX-19435](#)).

Upgrade with MariaDB 10.2.1 and before

Upgrading Zabbix may fail if database tables were created with MariaDB 10.2.1 and before, because in those versions the default row format is compact. This can be fixed by changing the row format to dynamic (see also [ZBX-17690](#)).

Templates

Template compatibility in dual-stack (IPv4/IPv6) environments

In dual-stack environments (systems configured to support both IPv4 and IPv6), the hostname `localhost` typically resolves to both IPv4 and IPv6 addresses. Due to the common prioritization of IPv6 over IPv4 by many operating systems and DNS resolvers, Zabbix templates may fail to work correctly if the service being monitored is configured to listen only on IPv4.

Services that are not configured to listen on IPv6 addresses may become inaccessible, leading to monitoring failures. Users might configure access correctly for IPv4 but still face connectivity issues due to the default behavior of prioritizing IPv6.

A workaround for this is to ensure that the services (Nginx, Apache, PostgreSQL, etc.) are configured to listen on both IPv4 and IPv6 addresses, and Zabbix server/agent is allowed access via IPv6. Additionally, in Zabbix templates and configurations, use `localhost` explicitly instead of `127.0.0.1` to ensure compatibility with both IPv4 and IPv6.

**For example**, when monitoring PostgreSQL with the [PostgreSQL by Zabbix agent 2](#) template, you may need to edit the `pg_hba.conf` file to allow connections for the `zbx_monitor` user. If the dual-stack environment prioritizes IPv6 (system resolves `localhost` to `::1`) and you configure `localhost` but only add an IPv4 entry (`127.0.0.1/32`), the connection will fail because there is no matching IPv6 entry.

The following `pg_hba.conf` file example ensures that the `zbx_monitor` user can connect to any database from the local machine using both IPv4 and IPv6 addresses with different authentication methods:

| # | TYPE | DATABASE | USER        | ADDRESS      | METHOD        |
|---|------|----------|-------------|--------------|---------------|
|   | host | all      | zbx_monitor | localhost    | trust         |
|   | host | all      | zbx_monitor | 127.0.0.1/32 | md5           |
|   | host | all      | zbx_monitor | ::1/128      | scram-sha-256 |

If necessary, you can also use the IPv4 address (127.0.0.1) directly when configuring the [PostgreSQL by Zabbix agent 2](#) template macro for the connection string.

#### Accidental installation of EPEL Zabbix packages

With EPEL repository installed and enabled, installing Zabbix from packages will lead to EPEL Zabbix packages being installed rather than official Zabbix packages.

In this case uninstall Zabbix packages from EPEL, i.e.:

```
dnf remove zabbix-server-mysql
```

Block Zabbix packages from EPEL. Add the following line in the `/etc/yum.conf` file:

```
exclude=zabbix6.0*
```

Install Zabbix server again:

```
dnf install zabbix-server-mysql
```

Notice that official Zabbix packages have the word `release` in their version string:

```
6.0.25-release1.el8
```

#### Zabbix packages for RHEL on Red Hat UBI environments

When installing Zabbix from Red Hat Enterprise Linux packages on [Red Hat Universal Base Image](#) environments, ensure access to required repositories and dependencies. Zabbix packages depend on `libOpenIPMI.so` and `libOpenIPMIposix.so` libraries, which are not provided by any package in the default package manager repositories enabled on UBI systems and will result in installation failures.

The `libOpenIPMI.so` and `libOpenIPMIposix.so` libraries are available in the `OpenIPMI-libs` package, which is provided by the `redhat-#-for-<arch>-appstream-rpms` repository. Access to this repository is curated by subscriptions, which, in the case of UBI environments, get propagated by mounting repository configuration and secrets directories of the RHEL host into the container file-system namespace.

For more information, see [ZBX-24291](#).

#### Expired signing key for RHEL packages

When upgrading Zabbix on [Red Hat Enterprise Linux](#), you may encounter an expired signing key issue for packages on [Zabbix repository](#). When a signing key expires, attempts to verify package signatures will result in an error indicating that the certificate or key is no longer valid. For example:

```
error: Verifying a signature using certificate D9AA84C2B617479C6E4FCF4D19F2475308EFA7DD (Zabbix LLC (Jul 2
  1. Certificate 19F2475308EFA7DD invalid: certificate is not alive
     because: The primary key is not live
     because: Expired on 2024-07-04T11:41:23Z
  2. Key 19F2475308EFA7DD invalid: key is not alive
     because: The primary key is not live
     because: Expired on 2024-07-04T11:41:23Z
```

To resolve such issues, manually reinstall the latest `zabbix-release` package for your specific variant of RHEL (replace the link below with the correct one from [Zabbix repository](#)).

For example, on **RHEL 9**, run:

```
rpm -Uvh https://repo.zabbix.com/zabbix/6.0/rhel/9/x86_64/zabbix-release-latest.el9.noarch.rpm
```

Then, update the repository information:

```
dnf update
```

For more information, see [ZBX-24761](#).

#### Database TLS connection with MariaDB

Database TLS connection is not supported with the `verify_ca` option for the `DBTLSConnect` [parameter](#) if MariaDB is used.

#### Possible deadlocks with MySQL/MariaDB



When running under high load, and with more than one LLD worker involved, it is possible to run into a deadlock caused by an InnoDB error related to the row-locking strategy (see [upstream bug](#)). The error has been fixed in MySQL since 8.0.29, but not in MariaDB. For more details, see [ZBX-21506](#).

#### Global event correlation

Events may not get correlated correctly if the time interval between the first and second event is very small, i.e. half a second and less.

#### Numeric (float) data type range with PostgreSQL 11 and earlier

PostgreSQL 11 and earlier versions only support floating point value range of approximately -1.34E-154 to 1.34E+154.

#### NetBSD 8.0 and newer

Various Zabbix processes may randomly crash on startup on the NetBSD versions 8.X and 9.X. That is due to the too small default stack size (4MB), which must be increased by running:

```
ulimit -s 10240
```

For more information, please see the related problem report: [ZBX-18275](#).

#### Regular expression limitations in Zabbix agent 2

Zabbix agent 2 does not support lookaheads and lookbehinds in regular expressions due to the standard Go regexp library limitations.

#### IPMI checks

IPMI checks will not work with the standard OpenIPMI library package on Debian prior to 9 (stretch) and Ubuntu prior to 16.04 (xenial). To fix that, recompile OpenIPMI library with OpenSSL enabled as discussed in [ZBX-6139](#).

#### SSH checks

- Some Linux distributions like Debian, Ubuntu do not support encrypted private keys (with passphrase) if the libssh2 library is installed from packages. Please see [ZBX-4850](#) for more details.
- When using libssh 0.9.x on some Linux distributions with OpenSSH 8 SSH checks may occasionally report "Cannot read data from SSH server". This is caused by a libssh [issue](#) ([more detailed report](#)). The error is expected to have been fixed by a stable libssh 0.9.5 release. See also [ZBX-17756](#) for details.
- Using the pipe "|" in the SSH script may lead to a "Cannot read data from SSH server" error. In this case it is recommended to upgrade the libssh library version. See also [ZBX-21337](#) for details.

#### ODBC checks

- MySQL unixODBC driver should not be used with Zabbix server or Zabbix proxy compiled against MariaDB connector library and vice versa, if possible it is also better to avoid using the same connector as the driver due to an [upstream bug](#). Suggested setup:

PostgreSQL, SQLite or Oracle connector → MariaDB or MySQL unixODBC driver MariaDB connector → MariaDB unixODBC driver MySQL connector → MySQL unixODBC driver

See [ZBX-7665](#) for more information and available workarounds.

- XML data queried from Microsoft SQL Server may get truncated in various ways on Linux and UNIX systems.
- It has been observed that using ODBC checks for monitoring Oracle databases using various versions of Oracle Instant Client for Linux causes Zabbix server to crash. See also: [ZBX-18402](#), [ZBX-20803](#).
- If using FreeTDS UnixODBC driver, you need to prepend a 'SET NOCOUNT ON' statement to an SQL query (for example, SET NOCOUNT ON DECLARE @strsql NVARCHAR(max) SET @strsql = ...). Otherwise, database monitor item in Zabbix will fail to retrieve the information with an error "SQL query returned empty result". See [ZBX-19917](#) for more information.

#### Incorrect request method parameter in items

The request method parameter, used only in HTTP checks, may be incorrectly set to '1', a non-default value for all items as a result of upgrade from a pre-4.0 Zabbix version. For details on how to fix this situation, see [ZBX-19308](#).

#### Web monitoring and HTTP agent

Zabbix server leaks memory on some Linux distributions due to an [upstream bug](#) when "SSL verify peer" is enabled in web scenarios or HTTP agent. Please see [ZBX-10486](#) for more information and available workarounds.

#### Simple checks

There is a bug in **fping** versions earlier than v3.10 that mishandles duplicate echo replay packets. This may cause unexpected results for `icmpping`, `icmppingloss`, `icmppingsec` items. It is recommended to use the latest version of **fping**. Please see [ZBX-11726](#) for more details.

#### Errors with fping execution in rootless containers

When containers are running in rootless mode or in a specific-restrictions environment, you may face errors related to fping execution when performing ICMP checks, such as `fping: Operation not permitted` or `all packets to all resources lost`.

To fix this problem add `--cap-add=net_raw` to "docker run" or "podman run" commands.

Additionally fping execution in non-root environments may require `sysctl` modification, i.e.:

```
sudo sysctl -w "net.ipv4.ping_group_range=0 1995"
```

where "1995" is the zabbix GID. For more details, see [ZBX-22833](#).

#### SNMP checks

If the OpenBSD operating system is used, a use-after-free bug in the Net-SNMP library up to the 5.7.3 version can cause a crash of Zabbix server if the `SourceIP` parameter is set in the Zabbix server configuration file. As a workaround, please do not set the `SourceIP` parameter. The same problem applies also for Linux, but it does not cause Zabbix server to stop working. A local patch for the `net-snmp` package on OpenBSD was applied and will be released with OpenBSD 6.3.

#### SNMP data spikes

Spikes in SNMP data have been observed that may be related to certain physical factors like voltage spikes in the mains. See [ZBX-14318](#) more details.

#### SNMP traps

The "net-snmp-perl" package, needed for SNMP traps, has been removed in RHEL 8.0-8.2; re-added in RHEL 8.3.

So if you are using RHEL 8.0-8.2, the best solution is to upgrade to RHEL 8.3.

Please also see [ZBX-17192](#) for more information.

#### Alerter process crash in RHEL 7

Instances of a Zabbix server alerter process crash have been encountered in RHEL 7. Please see [ZBX-10461](#) for details.

#### Upgrading Zabbix agent 2 (6.0.5 or older)

When upgrading Zabbix agent 2 (version 6.0.5 or older) from packages, a plugin-related file conflict error may occur. To fix the error, back up your agent 2 configuration (if necessary), uninstall agent 2 and install it anew.

On RHEL-based systems, run:

```
dnf remove zabbix-agent2
dnf install zabbix-agent2
```

On Debian-based systems, run:

```
apt remove zabbix-agent2
apt install zabbix-agent2
```

For more information, see [ZBX-23250](#).

#### Flipping frontend locales

It has been observed that frontend locales may flip without apparent logic, i. e. some pages (or parts of pages) are displayed in one language while other pages (or parts of pages) in a different language. Typically the problem may appear when there are several users, some of whom use one locale, while others use another.

A known workaround to this is to disable multithreading in PHP and Apache.

The problem is related to how setting the locale works in PHP: locale information is maintained per process, not per thread. So in a multi-thread environment, when there are several projects run by same Apache process, it is possible that the locale gets changed in another thread and that changes how data can be processed in the Zabbix thread.

For more information, please see related problem reports:

- [ZBX-10911](#) (Problem with flipping frontend locales)
- [ZBX-16297](#) (Problem with number processing in graphs using the `bcdiv` function of BC Math functions)

## PHP 7.3 opcache configuration

If "opcache" is enabled in the PHP 7.3 configuration, Zabbix frontend may show a blank screen when loaded for the first time. This is a registered [PHP bug](#). To work around this, please set the "opcache.optimization\_level" parameter to 0x7FFFBFDF in the PHP configuration (php.ini file).

## Graphs

### Daylight Saving Time

Changes to Daylight Saving Time (DST) result in irregularities when displaying X axis labels (date duplication, date missing, etc.).

### Sum aggregation

When using **sum aggregation** in a graph for period that is less than one hour, graphs display incorrect (multiplied) values when data come from trends.

### Text overlapping

For some frontend languages (e.g., Japanese), local fonts can cause text overlapping in graph legend. To avoid this, use version 2.3.0 (or later) of PHP GD extension.

### Log file monitoring

`log[]` and `logrt[]` items repeatedly reread log file from the beginning if file system is 100% full and the log file is being appended (see [ZBX-10884](#) for more information).

### Slow MySQL queries

Zabbix server generates slow SELECT queries in case of non-existing values for items. This [issue](#) is known to occur in MySQL 5.6/5.7 versions (for an extended discussion, see [ZBX-10652](#)), and, in specific cases, may also occur in later MySQL versions. A workaround to this is disabling the [index\\_condition\\_pushdown](#) or [prefer\\_ordering\\_index](#) optimizer in MySQL. Note, however, that this workaround may not fix all issues related to slow queries.

### Slow configuration sync with Oracle

Configuration sync might be slow in Zabbix 6.0 installations with Oracle DB that have high number of items and item preprocessing steps. This is caused by the Oracle database engine speed processing *nclob* type fields.

To improve performance, you can convert the field types from *nclob* to *nvarchar2* by manually applying the database patch [items\\_nvarchar2\\_prepare.sql](#). Note that this conversion will reduce the maximum field size limit from 65535 bytes to 4000 bytes for item preprocessing parameters and item parameters such as *Description*, Script item's field *Script*, HTTP agent item's fields *Request body* and *Headers*, Database monitor item's field *SQL query*. Queries to determine template names that need to be deleted before applying the patch are provided in the patch as a comment. Alternatively, if MAX\_STRING\_SIZE is set you can change *nvarchar2(4000)* to *nvarchar2(32767)* in the patch queries to set the 32767 bytes field size limit.

For an extended discussion, see [ZBX-22363](#).

## API login

A large number of open user sessions can be created when using custom scripts with the `user.login` **method** without a following `user.logout`.

### Persistent filter settings from links

When opening a link to Zabbix frontend page that contains filter settings, including the time selector, the filter is automatically saved in the database for the user, replacing the previously saved filter and/or time selector settings for that page. These settings remain active until the user manually updates or resets them.

### IPv6 address issue in SNMPv3 traps

Due to a net-snmp bug, IPv6 address may not be correctly displayed when using SNMPv3 in SNMP traps. For more details and a possible workaround, see [ZBX-14541](#).

### Trimmed long IPv6 IP address in failed login information

A failed login attempt message will display only the first 39 characters of a stored IP address as that's the character limit in the database field. That means that IPv6 IP addresses longer than 39 characters will be shown incompletely.

### Zabbix agent checks on Windows

Non-existing DNS entries in a `Server` parameter of Zabbix agent configuration file (`zabbix_agentd.conf`) may increase Zabbix agent response time on Windows. This happens because Windows DNS caching daemon doesn't cache negative responses for IPv4 addresses. However, for IPv6 addresses negative responses are cached, so a possible workaround to this is disabling IPv4 on the host.

## YAML export/import

There are some known issues with **YAML export/import**:

- Error messages are not translatable;
- Valid JSON with a .yaml file extension sometimes cannot be imported;
- Unquoted human-readable dates are automatically converted to Unix timestamps.

## Setup wizard on SUSE with NGINX and php-fpm

Frontend setup wizard cannot save configuration file on SUSE with NGINX + php-fpm. This is caused by a setting in `/usr/lib/systemd/system/php-fpm.service` unit, which prevents Zabbix from writing to `/etc`. (introduced in [PHP 7.4](#)).

There are two workaround options available:

- Set the [ProtectSystem](#) option to 'true' instead of 'full' in the php-fpm systemd unit.
- Manually save `/etc/zabbix/web/zabbix.conf.php` file.

## Chromium for Zabbix web service on Ubuntu 20

Though in most cases, Zabbix web service can run with Chromium, on Ubuntu 20.04 using Chromium causes the following error:

```
Cannot fetch data: chrome failed to start:cmd_run.go:994:
WARNING: cannot create user data directory: cannot create
"/var/lib/zabbix/snap/chromium/1564": mkdir /var/lib/zabbix: permission denied
Sorry, home directories outside of /home are not currently supported. See https://forum.snapcraft.io/t/112
```

This error occurs because `/var/lib/zabbix` is used as a home directory of user 'zabbix'.

## MySQL custom error codes

If Zabbix is used with MySQL installation on Azure, an unclear error message *[9002] Some errors occurred* may appear in Zabbix logs. This generic error text is sent to Zabbix server or proxy by the database. To get more information about the cause of the error, check Azure logs.

## Invalid regular expressions after switching to PCRE2

In Zabbix 6.0 support for PCRE2 has been added. Even though PCRE is still supported, Zabbix installation packages for RHEL 7 and newer, SLES (all versions), Debian 9 and newer, Ubuntu 16.04 and newer have been updated to use PCRE2. While providing many benefits, switching to PCRE2 may cause certain existing PCRE regexp patterns becoming invalid or behaving differently. In particular, this affects the pattern `^[w-l.]`. In order to make this regexp valid again without affecting semantics, change the expression to `^[w-l]`. This happens due to the fact that PCRE2 treats the dash sign as a delimiter, creating a range inside a character class. The following Zabbix installation packages have been updated and now use PCRE2: RHEL 7 and newer, SLES (all versions), Debian 9 and newer, Ubuntu 16.04 and newer.

## Wrong conversion of services in Zabbix 6.0.0-6.0.2

In Zabbix 6.0, new more flexible service status calculation algorithms were introduced.

After an upgrade from Zabbix <6.0 to Zabbix 6.0.0, 6.0.1, 6.0.2, the service status calculation rules 'Most critical if all children have problems' and 'Most critical of child services' will become swapped. Services created in Zabbix 6.0.0 and newer will have correct status calculation rules.

When upgrading from versions <6.0 to Zabbix 6.0.3 or newer, Zabbix will correctly update service status calculation rules. Upgrading from 6.0.x to 6.0.3 will have no effect on service status calculation rules.

## Geomap widget error

The maps in the Geomap widget may not load correctly, if you have upgraded from an older Zabbix version with NGINX and didn't switch to the new NGINX configuration file during the upgrade.

To fix the issue, you can discard the old configuration file, use the configuration file from 6.0 package and reconfigure it as described in the [download instructions](#) in section e. *Configure PHP for Zabbix frontend*.

Alternatively, you can manually edit an existing NGINX configuration file (typically, `/etc/zabbix/nginx.conf`). To do so, open the file and locate the following block:

```
location ~ /(api\|/|conf[^\.]|include|locale|vendor) {
    deny                all;
    return              404;
}
```

Then, replace this block with:

```
location ~ /(api\|/|conf[^\.]|include|locale) {
    deny          all;
    return        404;
}

location /vendor {
    deny          all;
    return        404;
}
```

Incorrect information from nested host groups in maps

Information from nested host groups is incorrectly displayed in maps, for example:

- Host group label displays the problem summary not including all hosts in nested host groups;
- "Host group elements" view does not display a separate map element for each host in the nested host groups;
- Map label displays summary of all problems not including those in nested host groups.

Logrotate for Zabbix server and proxy

The logrotate utility is only included into packages for zabbix-agent, zabbix-agent2 and zabbix-web-service, but needs to be installed separately for Zabbix server and proxy. The logrotate dependency has been added to the server and proxy packages for RHEL and SUSE starting from Zabbix 6.4.4rc1.

Issues in Zabbix 6.0.11

JSONPath parsing errors

JSONPath parsing errors occur in case of leading whitespace and empty array/object. Fixed in Zabbix 6.0.12.

AND/OR evaluation in LLD filters

The evaluation of AND/OR expressions in the low-level discovery filters/overrides may fail in this version. Fixed in Zabbix 6.0.12.

Missing files in Windows agent archive

The Windows Zabbix agent download ZIP file is missing zabbix\_sender.h and zabbix\_sender.lib files in versions 6.0.0-6.0.27, required for zabbix\_sender.dll.

Use case with global variables shared across webhook calls

As global variables are shared across different webhook calls, the following code will result in the tag value counter gradually increasing:

```
try
{
    aa = aa + 1;
}
catch(e)
{
    aa = 0;
}

result = {
    'tags': {
        'endpoint': aa
    }
};
return JSON.stringify(result);
```

Using local variables instead of global ones is recommended to make sure that each script operates on its own data and that there are no collisions between simultaneous calls.

Processor groups on Windows

Microsoft documentation states that systems with fewer than 64 logical processors always have a single processor group, Group 0. However, Zabbix users have reported a rare bug [ZBX-20260](#), when there are two processor groups on systems with 64 or less logical processors. This resulted in having the "\Processor(n)" performance counters for only one processor group out of two. The actual root cause of this bug is not known. However, a similar case was described at [stackoverflow.com](#), and the root cause there was in interoperation between BIOS and Windows.

Limits of filtering with utf8mb4 collations

Filters (e.g., in *Configuration* → *Maintenance*) may not function correctly when applied to entities containing certain Unicode characters (e.g., *æ*, *ø*). This issue arises due to how the default `utf8mb4_bin` collation for MySQL or MariaDB databases handles sorting and comparison of Unicode characters.

To address this limitation, users can change the collation of database columns to alternatives such as `utf8mb4_0900_bin`, `utf8mb4_0900_ai_ci`, or `utf8mb4_unicode_520_ci`. Note, however, that changing the collation may cause unexpected behavior in the handling of empty spaces, as well as sorting and filtering for other characters.

For more information on changing collations, see [MySQL documentation](#) or [MariaDB documentation](#). For details on collation differences, see [Unicode Character Sets](#) in MySQL documentation.

## 1 Compilation issues

These are the known issues regarding Zabbix compilation from sources. For all other cases, see the [Known issues](#) page.

Compiling Zabbix agent on HP-UX

If you install the PCRE library from the popular HP-UX package site <http://hpux.connect.org.uk> (for example, from file `pcre-8.42-ia64_64-11.31.depot`), only the 64-bit version of the library will be installed in the `/usr/local/lib/hpux64` directory.

In this case, for successful agent compilation, a customized option is needed for the `configure` script, for example:

```
CFLAGS="+DD64" ./configure --enable-agent --with-libpcre-include=/usr/local/include --with-libpcre-lib=/usr
```

Library in a non-standard location

Zabbix allows you to specify a library located in a non-standard location. In the example below, Zabbix will run `curl-config` from the specified non-standard location and use its output to determine the correct `libcurl` to use.

```
$ ./configure --enable-server --with-mysql --with-libcurl=/usr/local/bin/curl-config
```

This will work if it is the only `libcurl` installed in the system, but might not if there is another `libcurl` installed in a standard location (by the package manager, for example). Such is the case when you need a newer version of the library for Zabbix and the older one for other applications.

Therefore, specifying a component in a non-standard location will not always work when the same component also exists in a standard location.

For example, if you use a newer `libcurl` installed in `/usr/local` with the `libcurl` package still installed, Zabbix might pick up the wrong one and compilation will fail:

```
usr/bin/ld: ../../src/libs/zbxhttp/libzbxhttp.a(http.o): in function 'zbx_http_convert_to_utf8':  
/tmp/zabbix-master/src/libs/zbxhttp/http.c:957: undefined reference to 'curl_easy_header'  
collect2: error: ld returned 1 exit status
```

Here, the function `curl_easy_header()` is not available in the older `/usr/lib/x86_64-linux-gnu/libcurl.so`, but is available in the newer `/usr/local/lib/libcurl.so`.

The problem lies with the order of linker flags, and one solution is to specify the full path to the library in an `LDFLAGS` variable:

```
$ LDFLAGS="-Wl,--no-as-needed /usr/local/lib/libcurl.so" ./configure --enable-server --with-mysql --with-l
```

Note the `-Wl,--no-as-needed` option which might be needed on some systems (see also: default linking options on [Debian-based](#) systems).

## 9 Template changes

This page lists all changes to the stock templates that are shipped with Zabbix.

Note that upgrading to the latest Zabbix version will not automatically upgrade the templates used. It is suggested to modify the templates in existing installations by:

- Downloading the latest templates from the [Zabbix Git repository](#);
- Then, while in *Configuration* → *Templates* you can import them manually into Zabbix. If templates with the same names already exist, the *Delete missing* options should be checked when importing to achieve a clean import. This way the old items that are no longer in the updated template will be removed (note that it will mean losing history of these old items).

## CHANGES IN 6.0.0

### Updated template format

As of Zabbix 6.0, all templates follow an updated format, which may impact the import of pre-6.0 templates.

The updated default template name no longer contains the initial denominator 'Template' or the target application, e.g. 'Net' or 'OS'. The target application is instead specified in the **template file** using tags.

For example, as of Zabbix 6.0, 'Template Net TP-LINK SNMP' is named 'TP-LINK by SNMP'; 'Template OS Windows SNMP' is named 'Windows by SNMP', whereby its YAML export file contains the following tags:

```
tags:
  - tag: class
    value: os
```

In the new format, each template and its elements are also assigned a UUID property for looking up matching objects, for example:

```
groups:
  - uuid: 846977d1dfed4968bc5f8bdb363285bc
    name: 'Templates/Operating systems'
templates:
  - uuid: f9a59315c8944853bb91c0a9ec3056d7
    template: 'Windows by SNMP'
    name: 'Windows by SNMP'
```

Importing a pre-6.0 template in Zabbix 6.0 may therefore result in the old template being renamed and suggested to be merged with the updated template. To avoid any unwanted merges, consider implementing one of these options:

- Migrating your setup to the updated template format and moving customizations (if any) to separate templates.
- Renaming your pre-6.0 template to include a custom prefix or suffix, e.g. 'Template OS Windows SNMP *custom*'. In most cases, this can be done directly in the import file. If not, you can use the Zabbix frontend or API to rename and export the templates.
- Adding a `uuid` tag and custom value to the template import file.

To compare templates between different Zabbix versions, you can open a given template in the [Zabbix Git repository](#) and switch between the relevant release branches.

### New templates

See the list of **new templates** in Zabbix 6.0.0.

### Changes in templates

- The `{#FSLABEL}` macro has been added to the corresponding item names and descriptions in *Windows by Zabbix agent* and *Windows by Zabbix agent active* templates
- The `vfs.file.cksum[/etc/passwd]` agent item has been changed to `vfs.file.cksum[/etc/passwd,sha256]`
- A new check `zabbix[process,odbc poller,avg,busy]` has been added to *Zabbix server*, *Zabbix proxy*, *Remote Zabbix server* and *Remote Zabbix proxy* templates. The metric is used for monitoring the average time for which ODBC processes have been busy during the last minute (in percentage).

## CHANGES IN 6.0.2

The template *Generic Java JMX* now contains two discovery rules:

- Garbage collector discovery
- Memory pool discovery

## CHANGES IN 6.0.3

A new template *OpenWeatherMap by HTTP* is available.

The following changes have been made in the existing templates:

- In the templates *Windows services by Zabbix agent*, *Windows services by Zabbix agent active*, *Windows by Zabbix agent*, *Windows by Zabbix agent active* `{$SERVICE.NAME.NOT_MATCHES}` macro value has been updated to filter out an extended list of services.
- The template *PostgreSQL by Zabbix agent 2* now will check the number of slow queries and generate a problem if the amount exceeds a threshold.

## CHANGES IN 6.0.4

New templates are available:

- *TrueNAS SNMP* - monitoring of TrueNAS storage OS by SNMP
- *Proxmox VE by HTTP* - see setup instructions for [HTTP templates](#)

The templates *SMART by Zabbix agent 2* and *SMART by Zabbix agent 2 (active)* have been updated:

- the *Attribute discovery* LLD rule has been deleted, whereas the *Disk discovery* LLD rule will now discover disks based on the pre-defined vendor-specific set of attributes;
- **smart.disk.get** item can now return information about a specific disk only, instead of all disks.

New macros allowing to define warning and critical thresholds of the filesystem utilization for virtual file system monitoring have been added to the templates *HOST-RESOURCES-MIB storage SNMP*, *Linux by Prom*, *Linux filesystems SNMP*, *Linux filesystems by Zabbix agent active*, *Linux filesystems by Zabbix agent*, *Mellanox SNMP*, *PFSense SNMP*, *Windows filesystems by Zabbix agent active*, *Windows filesystems by Zabbix agent*. Filesystem utilization triggers have been updated to use these macros.

#### CHANGES IN 6.0.5

New templates are available:

- CockroachDB by HTTP
- Envoy Proxy by HTTP
- HashiCorp Consul Cluster by HTTP
- HashiCorp Consul Node by HTTP

See setup instructions for [HTTP templates](#).

#### CHANGES IN 6.0.6

New templates are available:

- HPE MSA 2040 Storage by HTTP
- HPE MSA 2060 Storage by HTTP
- HPE Primera by HTTP

See setup instructions for [HTTP templates](#).

#### CHANGES IN 6.0.7

A new [template](#) *HPE Synergy by HTTP* is available.

The templates *HashiCorp Consul Node by HTTP* and *HashiCorp Consul Cluster by HTTP* now support Consul namespaces.

[PostgreSQL Agent 2 template](#) has been updated:

A trigger for detecting checksum failures has been added to the Dbstat item of the PostgreSQL Agent 2 template. According to [PostgreSQL documentation](#), you can use checksums on data pages to help detect corruption by the I/O system that would otherwise be silent.

#### CHANGES IN 6.0.8

A new [template](#) *OPNsense by SNMP* is available.

#### CHANGES IN 6.0.13

New templates are available:

- AWS EC2 by HTTP
- AWS by HTTP
- AWS RDS instance by HTTP
- AWS S3 bucket by HTTP
- Azure by HTTP
- Control-M server by HTTP
- Control-M enterprise manager by HTTP
- Veeam Backup Enterprise Manager by HTTP
- Veeam Backup and Replication by HTTP

See setup instructions for [HTTP templates](#).

The template [Oracle by Zabbix agent 2](#) has been updated:

- The following static items, that requested data for all existing relevant DB objects in a single query, have been removed:
  - "Oracle: Get archive log info"
  - "Oracle: Get ASM stats"
  - "Oracle: Get CDB and No-CDB info"
  - "Oracle: Get PDB info"
  - "Oracle: Get tablespaces stats"



- The following agent item prototypes have been added to the corresponding discovery rules:
  - Archive log discovery rule: "Archivelog '#{DEST\_NAME}': Get archive log info"
  - ASM disk groups discovery: "ASM '#{DGNAME}': Get ASM stats"
  - Database discovery: "Oracle Database '#{DBNAME}': Get CDB and No-CDB info"
  - PDB discovery: "Oracle Database '#{DBNAME}': Get PDB info"
  - Tablespace discovery: "Oracle TBS '#{TABLESPACE}': Get tablespace stats"

#### CHANGES IN 6.0.18

A new [template Google Cloud Platform by HTTP \(GCP by HTTP\)](#) is available.

See setup instructions for [HTTP templates](#).

The template *Azure by HTTP* now also works with Azure Cosmos DB for MongoDB.

#### CHANGES IN 6.0.20

New templates are available:

- [AWS ECS Cluster by HTTP](#) (along with its [Serverless Cluster version](#))
- [Cisco SD-WAN by HTTP](#)
- [OpenStack by HTTP](#), which includes *OpenStack Nova by HTTP* template for monitoring OpenStack Nova service
- [PostgreSQL by ODBC](#)

#### CHANGES IN 6.0.21

New template is available:

- [AWS Cost Explorer by HTTP](#)

#### CHANGES IN 6.0.22

New templates are available:

- [Acronis Cyber Protect Cloud by HTTP](#)
- [HashiCorp Nomad by HTTP](#)
- [MantisBT by HTTP](#)

#### CHANGES IN 6.0.23

##### **New templates**

New templates are available:

- [FortiGate by HTTP](#)
- [FortiGate by SNMP](#)
- [Nextcloud by HTTP](#)

##### **Updated templates**

- [PostgreSQL by ODBC](#) and [PostgreSQL by Zabbix agent 2](#) templates now include the item and trigger for monitoring PostgreSQL version.
- [Cisco Meraki organization by HTTP](#) template has been supplemented with items, item prototypes, LLD rules, and macros related to authentication, licenses, networks, SAML roles, and VPN statuses.

#### CHANGES IN 6.0.24

##### **New templates**

New template is available:

- [HPE iLO by HTTP](#)

##### **Updated templates**

Integration with OpenShift has been added to [Kubernetes cluster state by HTTP](#) template.

#### CHANGES IN 6.0.26

##### **New templates**

The set of [Azure by HTTP](#) templates has been supplemented with the Azure Cost Management by HTTP template.

##### **Updated templates**

[MSSQL by ODBC](#) template has been updated for working with AlwaysOn features such as Failover Cluster Instances (FCI) and Availability Groups (AG). It is now possible to use the template for monitoring a host in cluster, standalone host and host by cluster name. A macro for instance name is no longer used; when the master is switched, it is not required to change any macros:

- new LLD rules and metrics for quorum and quorum members have been added;
- the type of the LLD rules has been changed from “Database monitor” to “Dependent item”;
- items with `db.odbc.discovery` key have been turned into items dependent on the `db.odbc.get` item
- new item has been added - MSSQL DB ‘{#DBNAME}’: Recovery model, which returns the database recovery model under the database discovery;
- new macros, namely, `{MSSQL.BACKUP_FULL.USED}`, `{MSSQL.BACKUP_DIFF.USED}`, `{MSSQL.BACKUP_LOG.USED}`, have been added - those can be used for disabling backup age triggers for a certain database.

CHANGES IN 6.0.27

### New templates

A new template is available:

- [YugabyteDB by HTTP](#), which includes the *YugabyteDB Cluster by HTTP* template for monitoring each YugabyteDB cluster.

CHANGES IN 6.0.28

### New templates

New templates are available:

- [AWS ELB Application Load Balancer by HTTP](#)
- [Check Point Next Generation Firewall by SNMP](#)
- [MSSQL by Zabbix agent 2](#)

CHANGES IN 6.0.29

### New templates

A new template is available:

- [Oracle Cloud by HTTP](#), a master template that discovers various Oracle Cloud Infrastructure (OCI) services and resources.

### Updated templates

- [FortiGate by SNMP](#) template has been supplemented with metrics regarding VPN, high availability (HA), wireless termination points (WTPs), SD-WAN health checks, and HW sensors.
- [MySQL by ODBC](#) template has been supplemented with the items “MySQL: Get database” and “MySQL: Get replication”. The LLD rules “Database discovery” and “Replication discovery” have been changed to the “Dependent item” type.
- [Oracle by ODBC](#) template has been supplemented with the items “Oracle: Get archive log”, “Oracle: Get ASM disk groups”, “Oracle: Get database”, “Oracle: Get PDB”, and “Oracle: Get tablespace”. The LLD rules “Archive log discovery”, “ASM disk groups discovery”, “Database discovery”, “PDB discovery”, and “Tablespace discovery” have been changed to the “Dependent item” type.
- The VMware Hypervisor template within the [VMware](#) and [VMware FQDN](#) template sets has been supplemented with a new LLD rule, “Sensor discovery”.

CHANGES IN 6.0.30

### New templates

The AWS ELB template set has been supplemented with the template [AWS ELB Network Load Balancer by HTTP](#).

### Updated templates

The [OS templates](#) (agent, SNMP, and Prometheus-based) have been given a mounted filesystem update. In mounted filesystem discovery, the “Space is low” and “Space is critically low” triggers no longer have the absolute threshold and burst condition.

CHANGES IN 6.0.31

### New templates

A new template is available:

- [Jira Data Center by JMX](#), a template for monitoring Jira Data Center health.

CHANGES IN 6.0.32

### New templates

A new template is available:

The set of [Azure by HTTP](#) templates has been supplemented with the Azure VM Scale Set by HTTP template.

### Updated templates

The templates [Zabbix server health](#), [Remote Zabbix server health](#), [Zabbix proxy health](#), and [Remote Zabbix proxy health](#) have been updated for improved data visualization in item graphs by regrouping the displayed metrics.

#### CHANGES IN 6.0.33

##### New templates

A new template is available:

- [AWS Lambda by HTTP](#), a template for monitoring AWS Lambda metrics.

#### CHANGES IN 6.0.34

##### New templates

New templates are available:

- [GitHub repository by HTTP](#), a template for monitoring GitHub repositories.
- [Microsoft 365 reports by HTTP](#), a template for monitoring Microsoft 365 services.

#### CHANGES IN 6.0.35

##### New templates

A new template is available:

- [Huawei OceanStor V6 by SNMP](#), a template for monitoring SAN Huawei OceanStor V6.

##### Updated templates

- In all [APC templates](#), the discovery rule for external defective battery packs has been supplemented with a filter to avoid creating unsupported items.
- In the templates [MSSQL by Zabbix agent 2](#) and [MSSQL by ODBC](#), a timeout has been added and certain item keys have been adjusted to increase monitoring stability.

#### CHANGES IN 6.0.36

##### New templates

A new template is available:

- [Nutanix Prism Element by HTTP](#), a template set that also includes the templates *Nutanix Cluster Prism Element by HTTP* and *Nutanix Host Prism Element by HTTP*.

##### Updated templates

- The template *VMware Hypervisor* within the [VMware](#) and [VMware FQDN](#) template sets has been updated with the option to be used as a standalone template.
- [Proxmox VE by HTTP](#) has been updated with new items and trigger prototypes for disk space usage in LXC containers.
- In the template [MSSQL by ODBC](#), the performance counter query has been updated to improve data retrieval. Both [MSSQL by ODBC](#) and [MSSQL by Zabbix agent 2](#) template documentation has been reviewed and updated.

#### CHANGES IN 6.0.39

##### New templates

A new template is available:

- The [Azure by HTTP](#) template set has been supplemented with the template *Azure SQL Managed Instance by HTTP*.

##### Updated templates

- All [Dell HTTP and SNMP](#) templates have been updated with improvements, including fixes for items, macros, and scripts.
- The templates [MSSQL by ODBC](#) and [MSSQL by Zabbix agent 2](#) have been updated with filters to include or exclude discovered quorum members by name as well as a service filter that allows filtering by cluster name to exclude empty clusters. Please see [Breaking changes](#) for additional information on *MSSQL by Zabbix agent 2*.

#### CHANGES IN 6.0.40

##### New templates

A new template is available:

- The template set [Zabbix server health](#) has been supplemented with the templates *Zabbix server health by Zabbix agent*, *Zabbix server health by Zabbix agent active*, and [Zabbix proxy health](#) - with *Zabbix proxy health by Zabbix agent* and *Zabbix proxy health by Zabbix agent active*, enabling the monitoring of internal Zabbix metrics via Zabbix agent.

## 10 Upgrade notes for 6.0.0

These notes are for upgrading from Zabbix 5.4.x to Zabbix 6.0.0. All notes are grouped into:

- **Critical** - the most critical information related to the upgrade process and the changes in Zabbix functionality
- **Informational** - all remaining information describing the changes in Zabbix functionality

It is possible to upgrade to Zabbix 6.0.0 from versions before Zabbix 5.4.0. See the [upgrade procedure](#) section for all relevant information about upgrading from previous Zabbix versions.

**Critical** To complete successful Zabbix server upgrade on MySQL and MariaDB, you may require to set `GLOBAL log_bin_trust_function_creators = 1` in MySQL if binary logging is enabled, there are no superuser privileges and `log_bin_trust_function_creators = 1` is not set in MySQL configuration file.

To set the variable using the MySQL console, run:

```
mysql> SET GLOBAL log_bin_trust_function_creators = 1;
```

Once the upgrade has been successfully completed, `log_bin_trust_function_creators` can be disabled:

```
mysql> SET GLOBAL log_bin_trust_function_creators = 0;
```

### Databases

To create the optimal user experience and ensure the best Zabbix performance in various production environments, the support of some older database releases has been dropped. This primarily applies to the database versions that are nearing their end of service life point and versions with unfixed issues that may interfere with normal performance.

Starting from Zabbix 6.0, the following **database** versions are officially supported:

- *MySQL/Percona* 8.0.X
- *MariaDB* 10.5.X - 10.6.X
- *PostgreSQL* 13.X
- *Oracle* 19c - 21c
- *TimescaleDB* 2.0.1-2.3
- *SQLite* 3.3.5-3.34.X

By default, Zabbix server and proxy will not start if an unsupported database version is detected. It is now possible, though not recommended, to turn off DB version check by modifying `AllowUnsupportedDBVersions` configuration parameter for the **server** or **proxy**.

### Primary keys

Primary keys are now used for all tables, including history tables, in new installations.

There is no automatic upgrade to primary keys for existing installations. Instructions for a **manual upgrade** of history tables to primary keys in pre-existing installations are available for **MySQL/MariaDB**, **PostgreSQL**, **TimescaleDB v1** and **v2**, and **Oracle**.

### PCRE2 support

Support for PCRE2 has been added. PCRE is still supported, but Zabbix can only be compiled with one of the libraries PCRE or PCRE2, both cannot be used at the same time.

The following Zabbix installation packages have been updated and now use PCRE2:

- RHEL 7 and newer
- SLES (all versions)
- Debian 9 and newer
- Ubuntu 16.04 and newer

Please note that after switching to PCRE2, you may need to update some regular expressions. In particular, the pattern `^[\w-\.]` needs to be changed to `^[ -\\w\\. ]` to continue working correctly - see [Known issues](#) for a more detailed explanation.

### Separate processing for ODBC checks

ODBC checks processing is now performed by separate server/proxy processes *odbc pollers*. Previously, ODBC checks were performed by regular pollers, which also work with Zabbix agent items, SSH checks, etc.

A new configuration parameter *StartODBCPollers* has been added to Zabbix **server** and **proxy** configuration files with the default value *1*. This parameter may need to be adjusted based on the number of ODBC checks performed by the server or proxy. You may also want to reduce the number of regular pollers set by the *StartPollers* parameter accordingly.

Internal item `zabbix[process,<type>]` can be used to monitor ODBC pollers load.

#### Audit log

In order to improve audit logging in Zabbix and make the Audit log complete and reliable, the previously existing database structure had to be reworked. During an upgrade DB tables `auditlog` and `auditlog_details` will be replaced by the new table `auditlog` with a different format. **Old audit records will not be preserved.**

New **section** *Audit log* has been added to the *Administration*→*General* menu allowing to enable (default) or disable audit logging. Housekeeping settings for audit, previously located under the *Housekeeper* menu section, have also been moved to the new *Audit log* section. Existing housekeeping settings will be saved.

#### API changes

See the list of **API changes** in Zabbix 6.0.0.

#### Monitoring → Overview removed

The Overview section in the Monitoring menu has been removed completely. The same functionality can be still accessed by using the *Data overview* and *Trigger overview* dashboard **widgets**.

#### Changing dependency for inherited triggers disabled

The possibility to change dependencies for triggers inherited from a template is now disabled. The reason is that upon updating the dependencies of a template trigger, the dependencies of inherited triggers are overwritten. Thus it is more reliable always to set trigger dependencies only on the root template level.

#### Macros

##### Positional macros no longer supported

The support for positional macros in item name (`$1`, `$2...$9`), deprecated since Zabbix 4.0, has been fully removed.

##### User macros in item name no longer supported

The support for user macros in item names (including discovery rule names), deprecated since Zabbix 4.0, has been fully removed.

##### Simple macros replaced by expression macros

The functionality of simple macros has been **transferred** to expression macros. The existing simple macros will be converted to expression macros during the upgrade. Macros that can not be converted without exceeding the length limit will not be converted with a warning printed in the log file.

#### **Informational** Deprecated internal items for history/trends

The following internal items are now deprecated and will be removed in a future major release:

- `zabbix[history]`
- `zabbix[history_log]`
- `zabbix[history_str]`
- `zabbix[history_text]`
- `zabbix[history_uint]`
- `zabbix[trends]`
- `zabbix[trends_uint]`

#### Zabbix agent 2 plugins

Each Zabbix agent 2 plugin now has a separate **configuration file**. By default, these files are located in the `./zabbix_agent2.d/plugins.d/` directory. The path is specified in the `Include` parameter of the agent 2 configuration file and can be relative to the **zabbix\_agent2.conf** or **zabbix\_agent2.win.conf** file location.

#### User passwords

Previously, spaces in user passwords have been automatically trimmed in both the User configuration form and the Login form. After the introduction of configurable **password complexity requirements**, spaces in passwords are no longer trimmed. So users, who thought that they had spaces in their passwords, will not be able to log in as usual and will have to enter their 'old' password without spaces. To continue using passwords with spaces, they will need to recreate their passwords.

#### Bulk processing for Prometheus metrics

As bulk processing of dependent items has been introduced in the preprocessing queue for Prometheus metrics, dependent items will no longer be processed in parallel and that may have an affect on how fast they are processed.

#### Runtime command transfer

Zabbix server and proxy runtime commands are now sent via socket instead of Unix signals. This change allows to improve user experience working with runtime control options:

- Results of the command execution are now printed to the console.
- It is possible to send longer input parameters, such as HA node name instead of node number.

Favorite custom graphs no longer supported

It is no longer possible to add custom graphs to favorites in *Monitoring -> Hosts -> Graphs*. After the upgrade any existing custom graphs will be removed from favorites.

Service monitoring

Several **major updates** related to service monitoring functionality have been made. An existing service tree configuration will be changed during an upgrade in the following way:

- Trigger-based dependencies between problems and services are replaced by tag-based mapping of services to problems. Triggers that have been linked to a service will get a new tag `ServiceLink: <trigger ID>:<trigger name>` (tag value will be truncated to 32 characters). Linked services will get the same **problem tag**.
- Hard and soft dependencies no longer exist. Instead, a service will have multiple parent services.
- The 'Status calculation algorithm' will be upgraded using the following rules:
  - Do not calculate → Set status to OK
  - Problem, if at least one child has a problem → Most critical of child services
  - Problem, if all children have problems → Most critical if all children have problems
- SLA is no longer a service attribute, but a separate entity which can be assigned to multiple services. During an upgrade, identical SLAs will be grouped and one SLA per each group will be created. Services will get a new **service tag** `SLA:<ID>` for matching.

See also:

- Detailed description of **service monitoring upgrade**;
- Configuration of **services**.

## 11 Upgrade notes for 6.0.1

Configuration syncer

Performance of the configuration syncer has been improved. It is recommended to increase the `CacheSize` on server/proxy if there is a large amount of templates. It is also recommended to remove unused templates.

Note that the default `CacheSize` on server/proxy has been increased to 32M.

Item changes

Native support for the **items** `net.dns` and `net.dns.record` has been added to Zabbix agent 2. On Zabbix agent 2 for Windows, these items now allow custom DNS IP addresses in the `ip` parameter and no longer ignore `timeout` and `count` parameters.

## 12 Upgrade notes for 6.0.2

This minor version doesn't have any upgrade notes.

## 13 Upgrade notes for 6.0.3

This minor version doesn't have any upgrade notes.

## 14 Upgrade notes for 6.0.4

This minor version doesn't have any upgrade notes.

## 15 Upgrade notes for 6.0.5

This minor version doesn't have any upgrade notes.

## 16 Upgrade notes for 6.0.6

**Loadable MongoDB plugin** MongoDB [plugin](#) is no longer part of Zabbix agent 2 and is now available as a loadable plugin instead. List of supported MongoDB versions has been extended to 2.6-5.3.

Plugin functionality and set of supported [items](#) haven't change.

The MongoDB plugin, along with other loadable plugins which may potentially be added in the future, is stored in the new repository [zabbix-agent2-plugins](#). The package *zabbix-release* now adds this repository to the user's system.

To continue monitoring MongoDB on the installations from official Zabbix packages, update *zabbix-release* package and install *zabbix-agent2-plugin-mongodb* package.

Sources are available on [CDN](#).

## 17 Upgrade notes for 6.0.7

**Symlink name expansion** Symlink name and full path of the symlink are now returned in `vfs.dir.get[]` and `vfs.file.get[]` items, instead of resolving to the symlink target.

## 18 Upgrade notes for 6.0.8

This minor version doesn't have any upgrade notes.

## 19 Upgrade notes for 6.0.9

This minor version doesn't have any upgrade notes.

## 20 Upgrade notes for 6.0.10

### Breaking changes

**PostgreSQL plugin moved to loadable plugins** The PostgreSQL [plugin](#) is no longer built-in in Zabbix agent 2. Instead it is now a loadable plugin in the agent 2.

This change may/will break automations with Ansible, Chef, etc, because it is no longer possible to pull the plugin repository directly.

See also: [PostgreSQL loadable plugin](#) repository

## 21 Upgrade notes for 6.0.11

### Breaking changes

**DB schema update** A new column *name\_upper* has been added to the database table **items**. The column contains a capitalized version of the item name or the LLD rule name. This change has been implemented to allow the use of the index with case-insensitive search for API query **optimization**.

**Optimized API queries** API database queries, used when searching through names in the *hosts* and *items* tables, have been optimized and will now be processed more efficiently. As a result of this change, deterministic triggers need to be created during an upgrade.

On MySQL and MariaDB, this requires `GLOBAL log_bin_trust_function_creators = 1` to be set if binary logging is enabled and there is no superuser privileges and `log_bin_trust_function_creators = 1` is not set in MySQL configuration file. To set the variable using MySQL console, run:

```
mysql> SET GLOBAL log_bin_trust_function_creators = 1;
```

Once the upgrade has been successfully completed, `log_bin_trust_function_creators` can be disabled:

```
mysql> SET GLOBAL log_bin_trust_function_creators = 0;
```

Triggers are also created for PostgreSQL and Oracle database.

**JSONPath parsing errors** JSONPath parsing errors occur in this version in case of leading whitespace and empty array/object. Fixed in Zabbix 6.0.12.

**AND/OR evaluation in LLD filters** The evaluation of AND/OR expressions in the low-level discovery filters/overrides may fail in this version. Fixed in Zabbix 6.0.12.

## 22 Upgrade notes for 6.0.12

**Improved performance of history syncers** The performance of history syncers has been improved by introducing a new read-write lock. This reduces locking between history syncers, trappers and proxy pollers by using a shared read lock while accessing the configuration cache. The new lock can be write locked only by the configuration syncer performing a configuration cache reload.

## 23 Upgrade notes for 6.0.13

**Breaking changes** Loadable plugin versioning

**Loadable plugins** for Zabbix agent 2 now use the same versioning system as Zabbix itself. The following version changes have been made:

- MongoDB 1.2.0 -> MongoDB 6.0.13
- PostgreSQL 1.2.1 -> PostgreSQL 6.0.13

These plugins are supported for any minor version of Zabbix 6.0. Note that source code repository for each plugin now contains a dedicated *release/6.0* branch (previously, there was only *master* branch).

**Configuration import** See changes in the **configuration import** process.

**Query separate tablespaces in Oracle databases with Zabbix agent 2** The following **Zabbix agent 2 items**, supported for the Oracle plugin, now have additional optional parameters:

- `oracle.diskgroups.stats[<existingParameters>,<diskgroup>]`
- `oracle.archive.info[<existingParameters>,<destination>]`
- `oracle.cdb.info[<existingParameters>,<database>]`
- `oracle.pdb.info[<existingParameters>,<database>]`
- `oracle.ts.stats[<existingParameters>,<tablespace>,<type>]`

These parameters allow to query separate instances of data instead of all data, thus improving performance.



**Open file descriptor limit increase for Zabbix agent 2** The systemd service file shipped in Zabbix agent 2 packages now declares the open file descriptor limit of 8196. Previously, the system default limit of 1024 has been used. The new limit is sufficient for the default Zabbix agent 2 configuration. If you have a non-standard agent 2 configuration, for example, use additional plugins or extended features, this limit may need to be manually increased further. In this case, adjust the `LimitNOFILE` parameter in the systemd unit file.

## 24 Upgrade notes for 6.0.14

**Limits for JavaScript objects in preprocessing** The following limits for **JavaScript objects** in preprocessing have been introduced:

- The total size of all messages that can be logged with the `log()` method has been limited to 8 MB per script execution.
- The initialization of multiple `HttpRequest` objects has been limited to 10 per script execution.
- The total length of header fields that can be added to a single `HttpRequest` object with the `addHeader()` method has been limited to 128 Kbytes (special characters and header names included).

## 25 Upgrade notes for 6.0.15

This minor version doesn't have any upgrade notes.

## 26 Upgrade notes for 6.0.16

This minor version doesn't have any upgrade notes.

## 27 Upgrade notes for 6.0.17

**HTML support in Geomap attribution dropped** The attribution text for the **Geomap dashboard widget** can now only contain plain text; HTML support has been dropped. If this field already contains HTML, it will be rendered as plain text after the upgrade.

In **Geographical maps** settings in the Administration → General section, the field *Attribution* is now only visible when *Tile provider* is set to *Other*.

## 28 Upgrade notes for 6.0.18

**Proxy history housekeeping** The limitation on the amount of outdated information deleted from the proxy database per proxy history housekeeping cycle has been removed.

Previously the **housekeeper** deleted only no more than 4 times the **HousekeepingFrequency** hours of outdated information. For example, if **HousekeepingFrequency** was set to "1", no more than 4 hours of outdated information (starting from the oldest entry) was deleted. In cases when a proxy would constantly receive data older than set in **ProxyOfflineBuffer**, this could result in excessive data accumulation.

Now this limitation has been removed, providing a more effective proxy history housekeeping solution.

## 29 Upgrade notes for 6.0.19

**Aggregate functions** The **count\_foreach** function now returns '0' for a matching item in the array, if no data are present for the item or the data do not match the filter. Previously such items would be ignored (no data added to the aggregation).

### 30 Upgrade notes for 6.0.20

This minor version doesn't have any upgrade notes.

### 31 Upgrade notes for 6.0.21

Maximum JSON depth

The maximum allowed JSON depth has been set to 64 to improve security and performance during JSON parsing.

Macro functions

The range of the `fmtnum` **macro function** is now limited to 0-20.

### 32 Upgrade notes for 6.0.22

Autoregistration table cleared from orphaned records

Previously the `autoreg_host` table was never cleared. Now orphaned records that reference neither an autoregistration event nor an existing host will be removed by the Housekeeper.

PostgreSQL plugin parameters

The following PostgreSQL plugin parameters are no longer mandatory if `Plugins.PostgreSQL.Sessions.<SessionName>.TLSConnect` is set to `verify_ca` or `verify_full`:

- `Plugins.PostgreSQL.Sessions.<SessionName>.TLSCertFile`
- `Plugins.PostgreSQL.Sessions.<SessionName>.TLSKeyFile`

### 33 Upgrade notes for 6.0.23

#### Breaking changes Agent 2 plugins

MySQL

The correct master host is now returned if specified in the `mysql.replication.get_slave_status[]` **item** "masterHost" parameter. Previously the "masterHost" parameter was ignored and always the first master host was returned.

If this parameter is not specified, all hosts are returned.

#### MySQL plugin parameters

The following MySQL plugin parameters are no longer mandatory if `Plugins.Mysql.Sessions.<SessionName>.TLSConnect` is set to `verify_ca` or `verify_full`:

- `Plugins.Mysql.Sessions.<SessionName>.TLSCertFile`
- `Plugins.Mysql.Sessions.<SessionName>.TLSKeyFile`

PostgreSQL-TimescaleDB combination no longer checked

Zabbix no longer checks for the supported PostgreSQL-TimescaleDB combination. As before, Zabbix does check for the supported PostgreSQL version or TimescaleDB version separately.

### 34 Upgrade notes for 6.0.24

MongoDB plugin parameters

The following MongoDB plugin parameters are no longer mandatory if `Plugins.MongoDB.Sessions.<SessionName>.TLSConnect` is set to `verify_ca` or `verify_full`:

- Plugins.MongoDB.Sessions.<SessionName>.TLSCertFile
- Plugins.MongoDB.Sessions.<SessionName>.TLSKeyFile

See also: [MongoDB plugin parameters](#)

### 35 Upgrade notes for 6.0.25

Consistency introduced in sha256 checksums of vfs.file.cksum item

In earlier Zabbix versions, the Zabbix agent item `vfs.file.cksum` produced different sha256 sums for the same file depending on the platform (processor architecture) – sha256 sums on AIX, HP-UX (Itanium) and Solaris (SPARC) differed from those produced on Intel x86-64 platforms.

The issue has now been fixed; however, after upgrading, monitoring sha256 sums of files on AIX, HP-UX, or Solaris SPARC may result in false positives of files having been modified.

### 36 Upgrade notes for 6.0.26

This minor version doesn't have any upgrade notes.

### 37 Upgrade notes for 6.0.27

Zabbix agent 2 support on Windows

To prevent critical security vulnerabilities, the minimum Windows version for Zabbix agent 2 has been raised to Windows 10/Server 2016. See note under [Supported platforms](#) for more information.

### 38 Upgrade notes for 6.0.28

Guest user authorization

Automatic login for the guest user has been removed. After this change, the guest user will need to log in like any other user. Previously, a guest could immediately get to almost any monitoring or reporting page without going through authorization.

Invalid regular expression in proc.\* items

`proc.*` agent items will now become 'not supported' if an invalid regular expression is supplied.

### 39 Upgrade notes for 6.0.29

This minor version doesn't have any upgrade notes.

### 40 Upgrade notes for 6.0.30

This minor version doesn't have any upgrade notes.

### 41 Upgrade notes for 6.0.31

This minor version doesn't have any upgrade notes.

## 42 Upgrade notes for 6.0.32

New index on auditlog table

A new index has been added to the auditlog table to improve database and frontend response times when filtering records by *Recordset ID* in the [Audit log](#).

Note that users with large audit logs may experience extended upgrade times due to the database size.

Server to stop with read-only database

A standalone Zabbix server will now stop if the database becomes read-only.

## 43 Upgrade notes for 6.0.33

This minor version does not have any upgrade notes.

## 44 Upgrade notes for 6.0.34

### Databases Database changes

A slow template cloning issue has been resolved by adding indexes for the uuid field. This change may cause long upgrade times on large datasets.

### Processes Problems no longer cached without enabled services

The service manager no longer caches problems if there are no services enabled.

The service manager will check for enabled services in configuration cache during startup and cache problems only if there are enabled services; it will also detect when the first service is added/last service removed and will initialize/free the problem cache.

## 45 Upgrade notes for 6.0.35

Agent 2 package support for RHEL 6 dropped

Since Zabbix 6.0.35, Zabbix agent 2 packages are no longer available for [RHEL 6](#) due to Go 1.22 (and newer) being incompatible with GCC 4.4.7 provided by RHEL 6, which results in compilation errors. Note, however, that [Zabbix agent packages](#) are still supported.

## 46 Upgrade notes for 6.0.36

This minor version does not have any upgrade notes.

## 47 Upgrade notes for 6.0.37

This minor version does not have any upgrade notes.

## 48 Upgrade notes for 6.0.38

### Breaking changes

Java 11 required for Java gateway

Zabbix Java gateway now requires Java 11 for runtime (building from source is still possible with Java 8), due to updated minimum logback library versions:

| Library                         | New minimum version | Old minimum version |
|---------------------------------|---------------------|---------------------|
| <a href="#">logback-classic</a> | <b>1.5.16</b>       | 1.2.9               |
| <a href="#">logback-core</a>    | <b>1.5.16</b>       | 1.2.9               |
| <a href="#">slf4j-api</a>       | <b>2.0.16</b>       | 1.7.32              |

## 49 Upgrade notes for 6.0.39

### Breaking changes

MSSQL Zabbix agent 2 plugin update

The template [MSSQL by Zabbix agent 2](#) has been updated with filters to include or exclude discovered quorum members by name as well as a service filter that allows filtering by cluster name to exclude empty clusters. To have the template work without errors, the [MSSQL Zabbix agent 2 plugin](#) must be updated to a version equal to or above 6.0.39.

## 50 Upgrade notes for 6.0.40

This minor version does not have any upgrade notes.

## 5 Quickstart

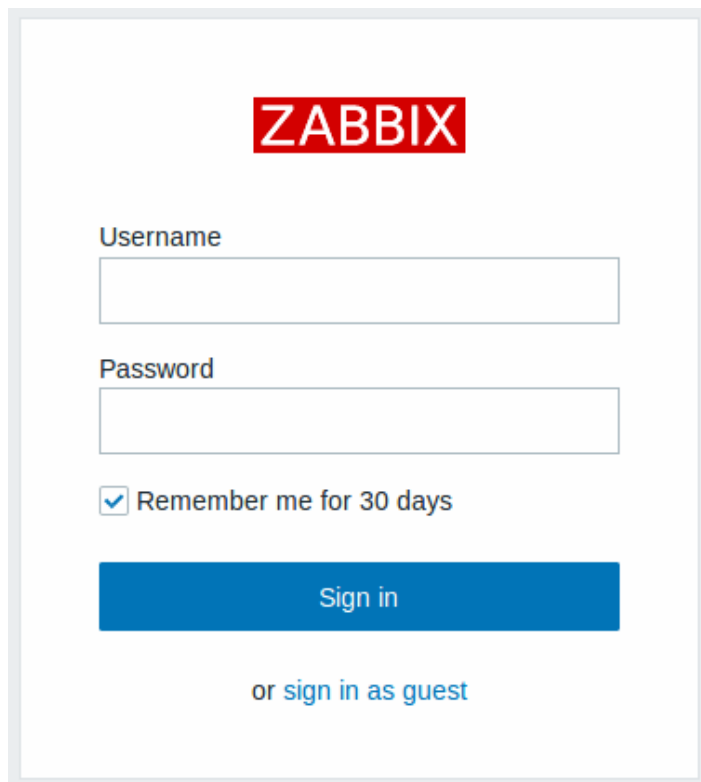
Please use the sidebar to access content in the Quickstart section.

### 1 Login and configuring user

#### Overview

In this section, you will learn how to log in and set up a system user in Zabbix.

#### Login



The image shows the Zabbix login interface. At the top is the ZABBIX logo in a red box. Below it are two input fields for 'Username' and 'Password'. A checkbox labeled 'Remember me for 30 days' is checked. A blue 'Sign in' button is below the password field. At the bottom, there is a link 'or sign in as guest'.

This is the Zabbix welcome screen. Enter the user name **Admin** with password **zabbix** to log in as a **Zabbix superuser**. Access to *Configuration* and *Administration* menus will be granted.

For security reasons, it is strongly recommended to change the default password for the Admin account immediately after the first login.

Protection against brute force attacks

In case of five consecutive failed login attempts, Zabbix interface will pause for 30 seconds in order to prevent brute force and dictionary attacks.

The IP address of a failed login attempt will be displayed after a successful login.

Adding user

To view information about users, go to *Administration* → *Users*.

| <input type="checkbox"/> Alias | Name   | Surname       | User role        | Groups                | Is online?                | Login | Frontend access | API access | Debug mode | Status   |
|--------------------------------|--------|---------------|------------------|-----------------------|---------------------------|-------|-----------------|------------|------------|----------|
| <input type="checkbox"/> Admin | Zabbix | Administrator | Super admin role | Zabbix administrators | Yes (2020-10-28 11:38:16) | OK    | System default  | Enabled    | Enabled    | Enabled  |
| <input type="checkbox"/> guest | John   | Snow          | User role        | Guests                | No (2020-07-16 11:06:52)  | OK    | System default  | Enabled    | Disabled   | Disabled |

Displaying 2 of 2 found

To add a new user, click on *Create user*.

In the new user form, make sure to add your user to one of the existing **user groups**, for example 'Zabbix administrators'.

User
Media
Permissions

\* Alias

Name

Surname

\* Groups

Zabbix administrators
X

\* Password

\* Password (once again)

All mandatory input fields are marked with a red asterisk.

By default, new users have no media (notification delivery methods) defined for them. To create one, go to the 'Media' tab and click on *Add*.

## Media

Type

Email

\* Send to

Remove

Add

\* When active

Use if severity

☒ Not classified
☒ Information
☒ Warning
☒ Average
☒ High
☒ Disaster

Enabled

☒

Add

Cancel

In this pop-up, enter an email address for the user.

You can specify a time period when the medium will be active (see [Time period specification](#) page for a description of the format), by default a medium is always active. You can also customize **trigger severity** levels for which the medium will be active, but leave all of them enabled for now.

Click on *Add* to save the medium, then go to the Permissions tab.

Permissions tab has a mandatory field *Role*. The role determines which frontend elements the user can view and which actions he

is allowed to perform. Press **Select** and select one of the roles from the list. For example, select *Admin role* to allow access to all Zabbix frontend sections, except Administration. Later on, you can modify permissions or create more user roles. Upon selecting a role, permissions will appear in the same tab:

UserMediaPermissions

Role

Admin role

Select

User type

Admin

Permissions

Host group

All groups

Permissions

None

Permissions can be assigned for user groups only.

Access to UI elements

Monitoring

Dashboard

Problems

Hosts

Overview

Latest data

Maps

Discovery

Services

Inventory

Overview

Hosts

Reports

Availability report

Triggers top 100

Notifications

Scheduled reports

Configuration

Host groups

Templates

Hosts

Maintenance

Actions

Discovery

Services

Access to modules

No enabled modules found.

Access to API

Enabled

Access to actions

Create and edit dashboards

Create and edit maps

Create and edit maintenance

Add problem comments

Change severity

Acknowledge problems

Close problems

Execute scripts

Manage API tokens

Manage scheduled reports

Add

Cancel

Click **Add** in the user properties form to save the user. The new user appears in the userlist.

| <input type="checkbox"/> | Alias | Name   | Surname       | User role        | Groups                | Is online?                | Login | Frontend access | API access | Debug mode | Status   |
|--------------------------|-------|--------|---------------|------------------|-----------------------|---------------------------|-------|-----------------|------------|------------|----------|
| <input type="checkbox"/> | Admin | Zabbix | Administrator | Super admin role | Zabbix administrators | Yes (2020-10-28 11:42:05) | OK    | System default  | Enabled    | Enabled    | Enabled  |
| <input type="checkbox"/> | guest | John   | Snow          | User role        | Guests                | No (2020-07-16 11:06:52)  | OK    | System default  | Enabled    | Disabled   | Disabled |
| <input type="checkbox"/> | user  |        |               | Admin role       | Zabbix administrators | No                        | OK    | System default  | Enabled    | Enabled    | Enabled  |

Displaying 3 of 3 found

## Adding permissions

By default, a new user has no permissions to access hosts. To grant the user rights, click on the group of the user in the *Groups* column (in this case - 'Zabbix administrators'). In the group properties form, go to the *Permissions* tab.



## ≡ User groups

User groupPermissionsTag filter

Permissions

Host group

All groups

Permissions

None

type here to search

Select

Read-wr

☐ Include subgroups

Add

Update

Delete

Cancel

This user is to have read-only access to *Linux servers* group, so click on *Select* next to the host group selection field.

Host groups

☐ Name

☐ Discovered hosts

☐ Hypervisors

☒ Linux servers

☐ Templates

☐ Templates/Applications

☐ Virtual machines

☐ Zabbix servers

Select

In this popup, mark the checkbox next to 'Linux servers', then click *Select*. *Linux servers* should be displayed in the selection field. Click the 'Read' button to set the permission level and then *Add* to add the group to the list of permissions. In the user group properties form, click *Update*.

### Attention:

In Zabbix, access rights to hosts are assigned to **user groups**, not individual users.

Done! You may try to log in using the credentials of the new user.

## 2 New host

### Overview

In this section you will learn how to set up a new host.

A host in Zabbix is a networked entity (physical, virtual) that you wish to monitor. The definition of what can be a "host" in Zabbix is quite flexible. It can be a physical server, a network switch, a virtual machine or some application.

Adding host

Information about configured hosts in Zabbix is available in *Configuration → Hosts* as well as *Monitoring → Hosts*. There is already one pre-defined host, called "Zabbix server", but we want to learn adding another.

To add a new host, click on *Create host*. This will present us with a host configuration form.

HostIPMITagsMacrosInventoryEncryptionValue mapping

\* Host name

New host

Visible name

New host

Templates

type here to search

\* Groups

Linux servers

X

Zabbix servers

X

type here to search

Interfaces

Type

IP address

DNS name

Agent

127.0.0.1

Add

.....

Description

All mandatory input fields are marked with a red asterisk.

The bare minimum to enter here is:

**Host name**

- Enter a host name. Alphanumerics, spaces, dots, dashes and underscores are allowed.

**Groups**

- Select one or several existing groups by clicking *Select* button or enter a non-existing group name to create a new group.

Note:

All access permissions are assigned to host groups, not individual hosts. That is why a host must belong to at least one group.

**Interfaces: IP address**

- Although not a required field technically, a host interface is necessary for collecting certain metrics. To use Zabbix agent passive checks, specify the agent's IP or DNS in this field. Note that you should also specify Zabbix server's IP or DNS in the Zabbix agent configuration file 'Server' directive. If Zabbix agent and Zabbix server are installed on the same machine, you need to specify the same IP/DNS in both places.

Other options can be left at their defaults for now.

When done, click *Add*. Your new host should be visible in the host list.



Hosts

Create hostImport

Filter

| <input type="checkbox"/> | Name ▲   | Applications | Items | Triggers | Graphs | Discovery | Web | Interface        | Proxy | Templates    | Status  | Availability            | Agent encryption | Info | Tags |
|--------------------------|----------|--------------|-------|----------|--------|-----------|-----|------------------|-------|--------------|---------|-------------------------|------------------|------|------|
| <input type="checkbox"/> | New host | Applications | Items | Triggers | Graphs | Discovery | Web | 127.0.0.1: 10050 |       | New template | Enabled | ZBX   SNMP   JMX   IPMI | NONE             |      |      |

The Availability column contains indicators of host availability per each interface. You have defined a Zabbix agent interface, so you can use the agent availability icon (with "ZBX" on it) to understand the host availability:

-  - host status has not been established; no metric check has happened yet
-  - host is available, a metric check has been successful

- **ZBX** - host is unavailable, a metric check has failed (move your mouse cursor over the icon to see the error message). There might be some error with communication, possibly caused by incorrect interface credentials. Check that Zabbix server is running, and try refreshing the page later as well.

### 3 New item

#### Overview

In this section, you will learn how to set up an item.

Items are the basis of gathering data in Zabbix. Without items, there is no data - because only an item defines a single metric or what kind of data to collect from a host.

#### Adding item

All items are grouped around hosts. That is why to configure a sample item we go to *Configuration* → *Hosts* and find the 'New host' we have created.

Click on the *Items* link in the row of 'New host', and then click on *Create item*. This will present us with an item definition form.

Item
Tags
Preprocessing

\* Name

CPU load

Type

Zabbix agent

\* Key

system.cpu.load

Type of information

Numeric (float)

\* Host interface

127.0.0.1:10050

Units

\* Update interval

1m

Custom intervals

| Type     | Interval   | Period |
|----------|------------|--------|
| Flexible | Scheduling | 50s    |
| Add      |            |        |

\* History storage period

Do not keep history

Storage period

90d

\* Trend storage period

Do not keep trends

Storage period

365d

All mandatory input fields are marked with a red asterisk.

For our sample item, the essential information to enter is:

#### Name

- Enter *CPU load* as the value. This will be the item name displayed in lists and elsewhere.

#### Key

- Manually enter *system.cpu.load* as the value. This is the technical name of an item that identifies the type of information that will be gathered. The particular key is just one of **pre-defined keys** that come with Zabbix agent.

#### Type of information

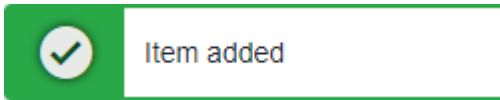
- This attribute defines the format of the expected data. For the *system.cpu.load* key, this field will be automatically set to *Numeric (float)*.

#### Note:

You may also want to reduce the number of days **item history** will be kept, to 7 or 14. This is good practice to relieve the database from keeping lots of historical values.

**Other options** will suit us with their defaults for now.

When done, click **Add**. The new item should appear in the item list, and you should see a success message.



#### Seeing data

With an item defined, you might be curious if it is actually gathering data. For that, go to **Monitoring** → **Latest data**, select 'New host' in the filter and click on **Apply**.

≡ Latest data Filter

| Host                              | Name     | Last check            | Last value | Change | Tags                  |
|-----------------------------------|----------|-----------------------|------------|--------|-----------------------|
| <input type="checkbox"/> New host | CPU load | 05/24/2021 10:40:5... | 1.17       | -0.11  | <a href="#">Graph</a> |

0 selected Display stacked graph Display graph

With that said, it may take up to 60 seconds for the first data to arrive. That, by default, is how often the server reads configuration changes and picks up new items to execute.

If you see no value in the 'Change' column, maybe only one value has been received so far. Wait for 30 seconds for another value to arrive.

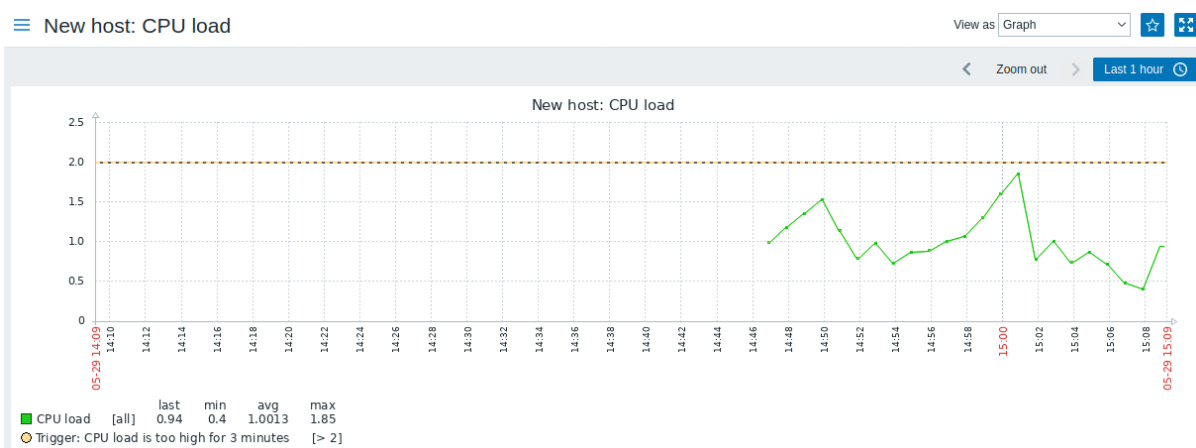
If you do not see the information about the item as in the screenshot, make sure that:

- you have filled out the item 'Key' and 'Type of information' fields exactly as in the screenshot;
- both the agent and the server are running;
- host status is 'Enabled' and its availability icon is green;
- a host is selected in the host filter;
- the item is enabled.

#### Graphs

With the item working for a while, it might be time to see something visual. **Simple graphs** are available for any monitored numeric item without any additional configuration. These graphs are generated on runtime.

To view the graph, go to **Monitoring** → **Latest data** and click on the 'Graph' link next to the item.



## 4 New trigger

### Overview

In this section you will learn how to set up a trigger.

Items only collect data. To automatically evaluate incoming data we need to define triggers. A trigger contains an expression that defines a threshold of what is an acceptable level for the data.

If that level is surpassed by the incoming data, a trigger will "fire" or go into a 'Problem' state - letting us know that something has happened that may require attention. If the level is acceptable again, trigger returns to an 'Ok' state.

Adding trigger

To configure a trigger for our item, go to *Configuration* → *Hosts*, find 'New host' and click on *Triggers* next to it and then on *Create trigger*. This presents us with a trigger definition form.

The screenshot shows the 'Create trigger' form with the following fields and values:

- Name:** CPU load too high on 'New host' for 3 minutes
- Event name:** CPU load too high on 'New host' for 3 minutes
- Operational data:** (empty)
- Severity:** Not classified (selected), Information, Warning, Average, High, Dis
- Expression:** avg(/New host/system.cpu.load, 3m)>2
- OK event generation:** Expression (selected), Recovery expression, None
- PROBLEM event generation mode:** Single (selected), Multiple
- OK event closes:** All problems (selected), All problems if tag values match
- Allow manual close:** ☐
- URL:** (empty)
- Description:** (empty)
- Enabled:** ☒

Buttons: Add, Cancel

For our trigger, the essential information to enter here is:

*Name*

- Enter *CPU load too high on 'New host' for 3 minutes* as the value. This will be the trigger name displayed in lists and elsewhere.

*Expression*

- Enter: avg(/New host/system.cpu.load,3m)>2

This is the trigger expression. Make sure that the expression is entered right, down to the last symbol. The item key here (system.cpu.load) is used to refer to the item. This particular expression basically says that the problem threshold is exceeded when the CPU load average value for 3 minutes is over 2. You can learn more about the [syntax of trigger expressions](#).

When done, click *Add*. The new trigger should appear in the trigger list.

Displaying trigger status

With a trigger defined, you might be interested to see its status.

If the CPU load has exceeded the threshold level you defined in the trigger, the problem will be displayed in *Monitoring* → *Problems*.

| Time     | <input type="checkbox"/> Severity       | Recovery time | Status  | Info | Host ▲   | Problem                                       | Operational data | Duration |
|----------|---|---------------|---------|------|----------|---|------------------|----------|
| 16:23:06 | <input type="checkbox"/> Not classified |               | PROBLEM |      | New host | CPU load too high on "New host" for 3 minutes | 6.6              | 56s      |

The flashing in the status column indicates a recent change of trigger status, one that has taken place in the last 30 minutes.

## 5 Receiving problem notification

### Overview

In this section you will learn how to set up alerting in the form of notifications in Zabbix.

With items collecting data and triggers designed to "fire" upon problem situations, it would also be useful to have some alerting mechanism in place that would notify us about important events even when we are not directly looking at Zabbix frontend.

This is what notifications do. Email being the most popular delivery method for problem notifications, we will learn how to set up an email notification.

### Email settings

Initially there are several predefined notification **delivery methods** in Zabbix. **Email** is one of those.

To configure email settings, go to *Administration* → *Media types* and click on *Email* in the list of pre-defined media types.

## Media types

| <input type="checkbox"/> | Name ▲     | Type    | Status  | Used in actions | Details                         |
|--------------------------|------------|---------|---------|-----------------|---------------------------------|
| <input type="checkbox"/> | Email      | Email   | Enabled |                 | SMTP server: "mail.zabbix.com", |
| <input type="checkbox"/> | Mattermost | Webhook | Enabled |                 |                                 |
| <input type="checkbox"/> | Opsgenie   | Webhook | Enabled |                 |                                 |

This will present us with the email settings definition form.

## Media types

Media type

Message templates

Options

\*

Name

Email

Type

Email

\*

SMTP server

mail.zabbix.com

SMTP server port

25

\*

SMTP helo

zabbix.com

\*

SMTP email

zabbix-info@zabbix.com

Connection security

None

STARTTLS

SSL/TLS

Authentication

None

Username and password

Message format

HTML

Plain text

Description

Enabled

☒

Add

Cancel

All mandatory input fields are marked with a red asterisk.

In the *Media type* tab, set the values of SMTP server, SMTP helo and SMTP email to the appropriate for your environment.

**Note:**

'SMTP email' will be used as the 'From' address for the notifications sent from Zabbix.

Next, it is required to define the content of the problem message. The content is defined by means of a message template, configured in the *Message templates* tab.

Click on *Add* to create a message template, and select *Problem* as the message type.

## Message template

| Message type | Problem |  |
|--------------|---------|--|
|--------------|---------|--|

|         |                       |
|---------|-----------------------|
| Subject | Problem: {EVENT.NAME} |
|---------|-----------------------|

|         |  |
|---------|--|
| Message | Problem started at {EVENT.TIME} on {EVENT.DATE}<br>Problem name: {EVENT.NAME}<br>Host: {HOST.NAME}<br>Severity: {EVENT.SEVERITY}<br>Operational data: {EVENT.OPDATA}<br>Original problem ID: {EVENT.ID}<br>{TRIGGER.URL} |
|---------|--|

Click on *Add* when ready and save the form.

Now you have configured 'Email' as a working media type. The media type must also be linked to users by defining specific delivery addresses (like we did when [configuring a new user](#)), otherwise it will not be used.

New action

Delivering notifications is one of the things **actions** do in Zabbix. Therefore, to set up a notification, go to *Configuration* → *Actions* and click on *Create action*.

≡ Actions

Action

Operations

\* Name

Test action

Conditions

Label

Name

Add

Enabled

☒

\* At least one operation must exist.

Add

Cancel

All mandatory input fields are marked with a red asterisk.

In this form, enter a name for the action.

In the most simple case, if we do not add any more specific **conditions**, the action will be taken upon any trigger change from 'Ok' to 'Problem'.

We still should define what the action should do - and that is done in the *Operations* tab. Click on *Add* in the Operations block, which opens a new operation form.



Operation details

Operation type

Send message

Steps

1

-

1

(0 - infinitely)

Step duration

0

(0 - use action default)

\*

At least one user or user group must be selected.

Send to User groups

User group

Action

Add

Send to Users

User

Action

user (New User)

Remove

Add

Send only to

Email

Custom message

☐

Conditions

Label

Name

Action

Add

Add

Cancel

All mandatory input fields are marked with a red asterisk.

Here, click on *Add* in the *Send to Users* block and select the user ('user') we have defined. Select 'Email' as the value of *Send only to*. When done with this, click on *Add*, and the operation should be added:

### ≡ Actions

Action

Operations

\* Default operation step duration

1h

Pause operations for suppressed problems

☒

Operations

| Steps               | Details  | Start in    | Duration |
|---------------------|--|-------------|----------|
| 1                   | Send message to users: user (New User) via Email | Immediately | Default  |
| <a href="#">Add</a> |  |             |          |

## Operations

\* Default operation step duration 1h

Pause operations for suppressed problems ☒

| Operations | Steps               | Details   | Start in    | Duration |
|------------|---------------------|---|-------------|----------|
|            | 1                   | <b>Send message to users:</b> user (New User) via Email | Immediately | Default  |
|            | <a href="#">Add</a> |   |             |          |

That is all for a simple action configuration, so click *Add* in the action form.

### Receiving notification

Now, with delivering notifications configured it would be fun to actually receive one. To help with that, we might on purpose increase the load on our host - so that our **trigger** "fires" and we receive a problem notification.

Open the console on your host and run:

```
cat /dev/urandom | md5sum
```

You may run one or several of [these processes](#).

Now go to *Monitoring* → *Latest data* and see how the values of 'CPU Load' have increased. Remember, for our trigger to *fire*, the 'CPU Load' value has to go over '2' for 3 minutes running. Once it does:

- in *Monitoring* → *Problems* you should see the trigger with a flashing 'Problem' status
- you should receive a problem notification in your email

#### Attention:

If notifications do not work:

- verify once again that both the email settings and the action have been configured properly
- make sure the user you created has at least read permissions on the host which generated the event, as noted in the *Adding user* step. The user, being part of the 'Zabbix administrators' user group must have at least read access to 'Linux servers' host group that our host belongs to.
- Additionally, you can check out the action log by going to *Reports* → *Action log*.

## 6 New template

### Overview

In this section you will learn how to set up a template.

Previously we learned how to set up an item, a trigger and how to get a problem notification for the host.

While all of these steps offer a great deal of flexibility in themselves, it may appear like a lot of steps to take if needed for, say, a thousand hosts. Some automation would be handy.

This is where templates come to help. Templates allow to group useful items, triggers and other entities so that those can be reused again and again by applying to hosts in a single step.

When a template is linked to a host, the host inherits all entities of the template. So, basically a pre-prepared bunch of checks can be applied very quickly.

### Adding template

To start working with templates, we must first create one. To do that, in *Configuration* → *Templates* click on *Create template*. This will present us with a template configuration form.

The screenshot shows the 'Create template' form in Zabbix. The 'Template' tab is selected. The form contains the following fields:

- \* Template name**: Input field with the value 'New template'.
- Visible name**: Input field with the value 'New template'.
- Templates**: Input field with the placeholder 'type here to search' and a 'Select' button.
- \* Groups**: Input field with a dropdown menu showing 'Templates' and a search field with the placeholder 'type here to search', and a 'Select' button.
- Description**: A large text area for the template description.

At the bottom of the form are two buttons: 'Add' and 'Cancel'.

All mandatory input fields are marked with a red asterisk.

The required parameters to enter here are:

#### Template name

- Enter a template name. Alpha-numericals, spaces and underscores are allowed.

## Groups

- Select one or several groups by clicking *Select* button. The template must belong to a group.

When done, click *Add*. Your new template should be visible in the list of templates.

## ≡ Templates

| <input type="checkbox"/> | Name ▲       | Hosts | Items | Triggers | Graphs | Dashboards | Discovery | Web |
|--------------------------|--------------|-------|-------|----------|--------|------------|-----------|-----|
| <input type="checkbox"/> | New template | Hosts | Items | Triggers | Graphs | Dashboards | Discovery | Web |

As you may see, the template is there, but it holds nothing in it - no items, triggers or other entities.

Adding item to template

To add an item to the template, go to the item list for 'New host'. In *Configuration → Hosts* click on *Items* next to 'New host'.

Then:

- mark the checkbox of the 'CPU Load' item in the list
- click on *Copy* below the list
- select the template to copy item to

Target type: Host groups, Hosts, **Templates**

\* Target:  × Select

All mandatory input fields are marked with a red asterisk.

- click on *Copy*

If you now go to *Configuration → Templates*, 'New template' should have one new item in it.

We will stop at one item only for now, but similarly you can add any other items, triggers or other entities to the template until it's a fairly complete set of entities for given purpose (monitoring OS, monitoring single application).

Linking template to host

With a template ready, it only remains to add it to a host. For that, go to *Configuration → Hosts*, click on 'New host' to open its property form and find the **Templates** field.

Start typing *New template* in the *Templates* field. The name of template we have created should appear in the dropdown list. Scroll down to select. See that it appears in the *Templates* field.

# Host

Host

IPMI

Tags

Macros

Inventory

Encryption

Value mapping

\* Host name

New host

Visible name

New host

Templates

New template X

type here to search

\* Groups

Linux servers X

type here to search

Click *Update* in the form to save the changes. The template is now added to the host, with all entities that it holds.

As you may have guessed, this way it can be applied to any other host as well. Any changes to the items, triggers and other entities at the template level will propagate to the hosts the template is linked to.

Linking pre-defined templates to hosts

As you may have noticed, Zabbix comes with a set of predefined templates for various OS, devices and applications. To get started with monitoring very quickly, you may link the appropriate one of them to a host, but beware that these templates need to be fine-tuned for your environment. Some checks may not be needed, and polling intervals may be way too frequent.

More information about [templates](#) is available.

## 6 Zabbix appliance

**Overview** As an alternative to setting up manually or reusing an existing server for Zabbix, users may [download](#) a Zabbix appliance or a Zabbix appliance installation CD image.

Zabbix appliance and installation CD versions are based on AlmaLinux 8 (x86\_64).

Zabbix appliance installation CD can be used for instant deployment of Zabbix server (MySQL).

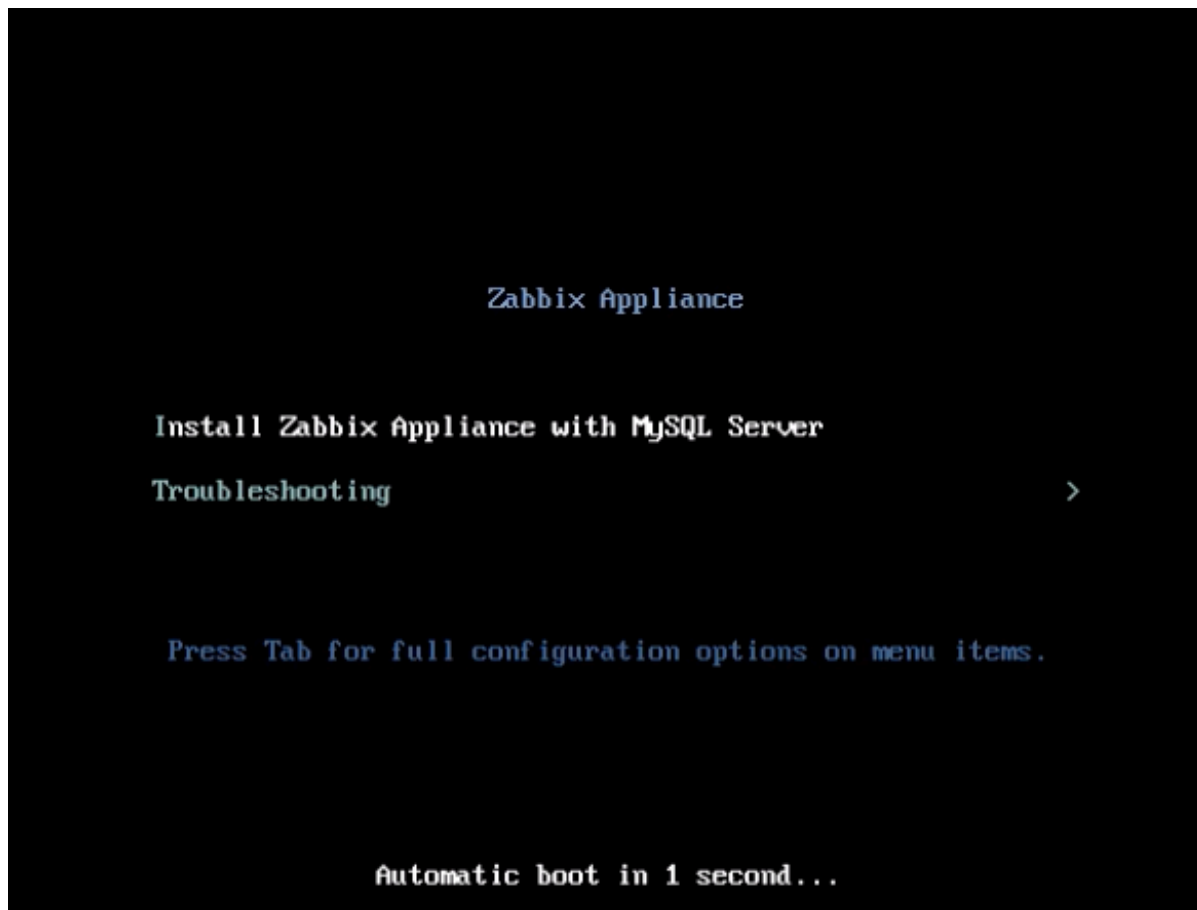
### Attention:

You can use this Appliance to evaluate Zabbix. The Appliance is not intended for serious production use.

System requirements:

- *RAM*: 1.5 GB
- *Disk space*: at least 8 GB should be allocated for the virtual machine.

Zabbix installation CD/DVD boot menu:



Zabbix appliance contains a Zabbix server (configured and running on MySQL) and a frontend.

Zabbix virtual appliance is available in the following formats:

- VMware (.vmx)
- Open virtualization format (.ovf)
- Microsoft Hyper-V 2012 (.vhdx)
- Microsoft Hyper-V 2008 (.vhd)
- KVM, Parallels, QEMU, USB stick, VirtualBox, Xen (.raw)
- KVM, QEMU (.qcow2)

To get started, boot the appliance and point a browser at the IP the appliance has received over DHCP.

**Attention:**

DHCP must be enabled on the host.

To get the IP address from inside the virtual machine run:

```
ip addr show
```

To access Zabbix frontend, go to **http://<host\_ip>** (for access from the host's browser bridged mode should be enabled in the VM network settings).

**Note:**

If the appliance fails to start up in Hyper-V, you may want to press Ctrl+Alt+F2 to switch tty sessions.

**1 Changes to AlmaLinux 8 configuration** The appliance is based on AlmaLinux 8. There are some changes applied to the base AlmaLinux configuration.

### 1.1 Repositories

Official Zabbix **repository** has been added to `/etc/yum.repos.d:`

```
[zabbix]
name=Zabbix Official Repository - $basearch
baseurl=http://repo.zabbix.com/zabbix/6.0/rhel/8/$basearch/
enabled=1
```

```
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-ZABBIX-A14FE591
```

## 1.2 Firewall configuration

The appliance uses iptables firewall with predefined rules:

- Opened SSH port (22 TCP);
- Opened Zabbix agent (10050 TCP) and Zabbix trapper (10051 TCP) ports;
- Opened HTTP (80 TCP) and HTTPS (443 TCP) ports;
- Opened SNMP trap port (162 UDP);
- Opened outgoing connections to NTP port (53 UDP);
- ICMP packets limited to 5 packets per second;
- All other incoming connections are dropped.

## 1.3 Using a static IP address

By default the appliance uses DHCP to obtain the IP address. To specify a static IP address:

- Log in as root user;
- Open `/etc/sysconfig/network-scripts/ifcfg-eth0` file;
- Replace `BOOTPROTO=dhcp` with `BOOTPROTO=none`
- Add the following lines:
  - `IPADDR=<IP address of the appliance>`
  - `PREFIX=<CIDR prefix>`
  - `GATEWAY=<gateway IP address>`
  - `DNS1=<DNS server IP address>`
- Run **systemctl restart network** command.

Consult the official Red Hat [documentation](#) if needed.

## 1.4 Changing time zone

By default the appliance uses UTC for the system clock. To change the time zone, copy the appropriate file from `/usr/share/zoneinfo` to `/etc/localtime`, for example:

```
cp /usr/share/zoneinfo/Europe/Riga /etc/localtime
```

## 2 Zabbix configuration

Zabbix appliance setup has the following passwords and configuration changes:

### 2.1 Credentials (login:password)

System:

- root:zabbix

Zabbix frontend:

- Admin:zabbix

Database:

- root:<random>
- zabbix:<random>

#### Note:

Database passwords are randomly generated during the installation process.

Root password is stored inside the `/root/.my.cnf` file. It is not required to input a password under the "root" account.

To change the database user password, changes have to be made in the following locations:

- MySQL;
- `/etc/zabbix/zabbix_server.conf`;
- `/etc/zabbix/web/zabbix.conf.php`.

#### Note:

Separate users `zabbix_srv` and `zabbix_web` are defined for the server and the frontend respectively.

### 2.2 File locations

- Configuration files are located in **/etc/zabbix**.
- Zabbix server, proxy and agent logfiles are located in **/var/log/zabbix**.

- Zabbix frontend is located in **/usr/share/zabbix**.
- Home directory for the user **zabbix** is **/var/lib/zabbix**.

### 2.3 Changes to Zabbix configuration

- Frontend timezone is set to Europe/Riga (this can be modified in **/etc/php-fpm.d/zabbix.conf**);

**3 Frontend access** By default, access to the frontend is allowed from anywhere.

The frontend can be accessed at `http://<host>`.

This can be customized in **/etc/nginx/conf.d/zabbix.conf**. Nginx has to be restarted after modifying this file. To do so, log in using SSH as **root** user and execute:

```
systemctl restart nginx
```

**4 Firewall** By default, only the ports listed in the **configuration changes** above are open. To open additional ports, modify `"/etc/sysconfig/iptables"` file and reload firewall rules:

```
systemctl reload iptables
```

**5 Upgrading** The Zabbix appliance packages may be upgraded. To do so, run:

```
dnf update zabbix*
```

**6 System Services** Systemd services are available:

```
systemctl list-units zabbix*
```

### 7 Format-specific notes 7.1 VMware

The images in *vmdk* format are usable directly in VMware Player, Server and Workstation products. For use in ESX, ESXi and vSphere they must be converted using **VMware vCenter Converter** (authentication required for download). If you use VMWare vCenter Converter, you may encounter issues with the hybrid network adapter. In that case, you can try specifying the E1000 adapter during the conversion process. Alternatively, after the conversion is complete, you can delete the existing adapter and add an E1000 adapter.

#### 7.2 HDD/flash image (raw)

```
dd if=./zabbix_appliance_5.2.0.raw of=/dev/sdc bs=4k conv=fdatasync
```

Replace `/dev/sdc` with your Flash/HDD disk device.

## 7 Configuration

Please use the sidebar to access content in the Configuration section.

### 1 Configuring a template

#### Overview

Configuring a template requires that you first create a template by defining its general parameters and then you add entities (items, triggers, graphs, etc.) to it.

#### Creating a template

To create a template, do the following:

- Go to *Configuration* → *Templates*
- Click on *Create template*
- Edit template attributes

The **Template** tab contains general template attributes.

All mandatory input fields are marked with a red asterisk.

Template attributes:

| Parameter            | Description   |
|----------------------|---|
| <i>Template name</i> | Unique template name. Alphanumerics, spaces, dots, dashes, and underscores are allowed. However, leading and trailing spaces are disallowed.  |
| <i>Visible name</i>  | If you set this name, it will be the one visible in lists, maps, etc.   |
| <i>Templates</i>     | Link one or more "nested" templates to this template. All entities (items, triggers, graphs, etc.) will be inherited from the linked templates.<br>To link a new template, start typing the template name in the <i>Templates</i> field. A list of matching templates will appear; scroll down to select. Alternatively, you may click on <i>Select</i> next to the <i>Templates</i> field; then, first select the host group by clicking on <i>Select</i> next to the <i>Host groups</i> field; mark the checkbox in front of one or multiple templates from the list displayed below; click on <i>Select</i> . The template(s) that are selected in the <i>Templates</i> field will be linked to the template when the template configuration form is saved or updated.<br>To unlink a template, use one of the two options in the <i>Templates</i> block:<br><i>Unlink</i> - unlink the template, but preserve its items, triggers, and graphs<br><i>Unlink and clear</i> - unlink the template and remove all its items, triggers, and graphs |
| <i>Groups</i>        | Host/template groups the template belongs to.   |
| <i>Description</i>   | Enter the template description.   |

The **Tags** tab allows you to define template-level **tags**. All problems of hosts linked to this template will be tagged with the values entered here.

User macros, {INVENTORY.\*} macros, {HOST.HOST}, {HOST.NAME}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {HOST.PORT} and {HOST.ID} macros are supported in tags.

The **Macros** tab allows you to define template-level **user macros** as a name-value pairs. Note that macro values can be kept as plain text, secret text, or Vault secret. Adding a description is also supported.



|  |        |          |               |
|--|--------|----------|---------------|
| Template   | Tags 1 | Macros 9 | Value mapping |
| <div> <div>Template macros</div> <div>Inherited and template macros</div> </div> |        |          |               |
| Macro  | Value  |          | Description   |
| {TEMPLATE_THRESHOLD1}  | 10M    | T ▾      | description   |
| {TEMPLATE_THRESHOLD2}  | 20M    | T ▾      | description   |
| {TEMPLATE_THRESHOLD3}  | 30M    | T ▾      | description   |
| {TEMPLATE_THRESHOLD4}  | 40M    | T ▾      | description   |
| {TEMPLATE_THRESHOLD5}  | 50M    | T ▾      | description   |

You may also view here macros from linked templates and global macros if you select the *Inherited and template macros* option. That is where all defined user macros for the template are displayed with the value they resolve to as well as their origin.

|   |                 |          |               |
|---|-----------------|----------|---------------|
| Template  | Tags 1          | Macros 9 | Value mapping |
| <div> <div>Template macros</div> <div>Inherited and template macros</div> </div>  |                 |          |               |
| Macro   | Effective value |          |               |
| {\$AGENT.TIMEOUT}   | 3m              | T ▾      |               |
| Timeout after which agent is considered unavailable. Works only for agents reachable from Zabbix server/proxy (passive mode). |                 |          |               |
| {\$CPU.UTIL.CRIT}   | 90              | T ▾      |               |
| description   |                 |          |               |
| {\$IF.ERRORS.WARN}  | 2               | T ▾      |               |
| description   |                 |          |               |
| {\$IFCONTROL}   | 1               | T ▾      |               |

For convenience, links to respective templates and global macro configuration are provided. It is also possible to edit a nested template/global macro on the template level, effectively creating a copy of the macro on the template.

The **Value mapping** tab allows to configure human-friendly representation of item data in **value mappings**.

Buttons:

|                  |  |
|------------------|--|
| Add              | Add the template. The added template should appear in the list.  |
| Update           | Update the properties of an existing template.   |
| Clone            | Create another template based on the properties of the current template, including the entities (items, triggers, etc) inherited from linked templates.  |
| Full clone       | Create another template based on the properties of the current template, including the entities (items, triggers, etc) both inherited from linked templates and directly attached to the current template. |
| Delete           | Delete the template; entities of the template (items, triggers, etc) remain with the linked hosts.   |
| Delete and clear | Delete the template and all its entities from linked hosts.  |
| Cancel           | Cancel the editing of template properties.   |

With a template created, it is time to add some entities to it.

**Attention:**

Items have to be added to a template first. Triggers and graphs cannot be added without the corresponding item.

Adding items, triggers, graphs

There are two ways to add items to the template:

1. To create new items, follow the guidelines for [Creating an item](#).
2. To add existing items to the template:
  - Go to *Configuration → Hosts* (or *Templates*).
  - Click on *Items* in the row of the required host/template.
  - Mark the checkboxes of items you want to add to the template.
  - Click on *Copy* below the item list.
  - Select the template (or group of templates) the items should be copied to and click on *Copy*.All the selected items should be copied to the template.

Adding triggers and graphs is done in a similar fashion (from the list of triggers and graphs respectively), again, keeping in mind that they can only be added if the required items are added first.

Adding dashboards

To add dashboards to a template in *Configuration → Templates*, do the following:

- Click on *Dashboards* in the row of the template
- Configure a dashboard following the guidelines of [configuring dashboards](#)

**Attention:**

The widgets that can be included in a template dashboard are: *Clock*, *Graph (classic)*, *Graph prototype*, *Item value*, *Plain text*, *URL*.

**Note:**

For details on accessing host dashboards that are created from template dashboards, see the [host dashboard](#) section.

Configuring low-level discovery rules

See the [low-level discovery](#) section of the manual.

Adding web scenarios

To add web scenarios to a template in *Configuration → Templates*, do the following:

- Click on *Web* in the row of the template
- Configure a web scenario following the usual method of [configuring web scenarios](#)

## 2 Linking/unlinking

Overview

Linking is a process whereby templates are applied to hosts, whereas unlinking removes the association with the template from a host.

**Attention:**

Templates are linked directly to individual hosts and not to host groups. Simply adding a template to a host group will not link it. Host groups are used only for logical grouping of hosts and templates.

Linking a template

To link a template to the host, do the following:

- Go to *Configuration → Hosts*
- Click on the required host
- Start typing the template name in the *Templates* field. A list of matching templates will appear; scroll down to select.
- Alternatively, you may click on *Select* next to the field and select one or several templates from the list in a popup window
- Click on *Add/Update* in the host attributes form

The host will now have all the entities (items, triggers, graphs, etc) of the template.

**Attention:**

Linking multiple templates to the same host will fail if in those templates there are items with the same item key. And, as triggers and graphs use items, they cannot be linked to a single host from multiple templates either, if using identical item keys.

When entities (items, triggers, graphs etc.) are added from the template:

- previously existing identical entities on the host are updated as entities of the template, and **any existing host-level customizations to the entity are lost**
- entities from the template are added
- any directly linked entities that, prior to template linkage, existed only on the host remain untouched

In the lists, all entities from the template now are prefixed by the template name, indicating that these belong to the particular template. The template name itself (in gray text) is a link allowing to access the list of those entities on the template level.

If some entity (item, trigger, graph etc.) is not prefixed by the template name, it means that it existed on the host before and was not added by the template.

Entity uniqueness criteria

When adding entities (items, triggers, graphs etc.) from a template it is important to know what of those entities already exist on the host and need to be updated and what entities differ. The uniqueness criteria for deciding upon the sameness/difference are:

- for items - the item key
- for triggers - trigger name and expression
- for custom graphs - graph name and its items

Linking templates to several hosts

To update template linkage of many hosts, in *Configuration* → *Hosts* select some hosts by marking their checkboxes, then click on **Mass update** below the list and then select *Link templates*:

**Mass update**

Host IPMI Tags Macros Inventory Encryption Value mapping

Link templates ☒ Link Replace Unlink

type here to search

☐ Clear when unlinking

To link additional templates, start typing the template name in the auto-complete field until a dropdown appears offering the matching templates. Just scroll down to select the template to link.

The *Replace* option will allow to link a new template while unlinking any template that was linked to the hosts before. The *Unlink* option will allow to specify which templates to unlink. The *Clear when unlinking* option will allow to not only unlink any previously linked templates, but also remove all elements inherited from them (items, triggers, etc.).

**Note:**

Zabbix offers a sizable set of predefined templates. You can use these for reference, but beware of using them unchanged in production as they may contain too many items and poll for data too often. If you feel like using them, finetune them to fit you real needs.

Editing linked entities

If you try to edit an item or trigger that was linked from the template, you may realize that many key options are disabled for editing. This makes sense as the idea of templates is that things are edited in one-touch manner on the template level. However,

you still can, for example, enable/disable an item on the individual host and set the update interval, history length and some other parameters.

**Attention:**

Any customizations to the entities implemented on a template-level will override the previous customizations of the entities on a host-level.

If you want to edit the entity fully, you have to edit it on the template level (template level shortcut is displayed in the form name), keeping in mind that these changes will affect all hosts that have this template linked to them.

#### Unlinking a template

To unlink a template from a host, do the following:

- Go to *Configuration* → *Hosts*
- Click on the required host and find the *Templates* field
- Click on *Unlink* or *Unlink and clear* next to the template to unlink
- Click on *Update* in the host attributes form

Choosing the *Unlink* option will simply remove association with the template, while leaving all its entities (items, triggers, graphs etc.) with the host.

Choosing the *Unlink and clear* option will remove both the association with the template and all its entities (items, triggers, graphs etc.).

### 3 Nesting

#### Overview

Nesting is a way of one template encompassing one or more other templates.

As it makes sense to separate out entities on individual templates for various services, applications, etc., you may end up with quite a few templates all of which may need to be linked to quite a few hosts. To simplify the picture, it is possible to link some templates together in a single template.

The benefit of nesting is that you have to link only one template ("nest", parent template) to the host and the host will inherit all entities of the linked templates ("nested", child templates) automatically. For example, if we link templates T1 and T2 to template T3, we supplement T3 with entities from T1 and T2, and not vice versa. If we link template A to templates B and C, we supplement B and C with entities from A.

#### Configuring nested templates

To link templates, you need to take an existing template or a new one, and then:

- Open the **template configuration form**
- Find the *Templates* field
- Click *Select* to open the *Templates* popup window
- In the popup window, choose required templates, then click *Select* to add the templates to the list
- Click *Add* or *Update* in the template configuration form

Thus, all entities of the parent template, as well as all entities of linked templates (such as items, triggers, graphs, etc.) will now appear in the template configuration, except for linked template dashboards, which will, nevertheless, be inherited by hosts.

To unlink any of the linked templates, in the same form use the *Unlink* or *Unlink and clear* buttons and click *Update*.

Choosing the *Unlink* option will simply remove the association with the linked template, while not removing all its entities (items, triggers, graphs, etc.).

Choosing the *Unlink and clear* option will remove both the association with the linked template and all its entities (items, triggers, graphs, etc.).

### 4 Mass update

#### Overview

Sometimes you may want to change some attribute for a number of templates at once. Instead of opening each individual template for editing, you may use the mass update function for that.

#### Using mass update

To mass-update some templates, do the following:

- Mark the checkboxes before the templates you want to update in the **template list**
- Click on *Mass update* below the list
- Navigate to the tab with required attributes (*Template*, *Tags*, *Macros* or *Value mapping*)
- Mark the checkboxes of any attribute to update and enter a new value for them

Mass update

Template

Tags

Macros

Value mapping

Link templates

☒

Link

Replace

Unlink

Select

☐ Clear when unlinking

Host groups

☒

Add

Replace

Remove

Select

Description

☐

Original

Update

Cancel

The following options are available when selecting the respective button for **template** linkage update:

- *Link* - specify which additional templates to link
- *Replace* - specify which templates to link while unlinking any template that was linked to the templates before
- *Unlink* - specify which templates to unlink

To specify the templates to link/unlink start typing the template name in the auto-complete field until a dropdown appears offering the matching templates. Just scroll down to select the required template.

The *Clear when unlinking* option will allow to not only unlink any previously linked templates, but also remove all elements inherited from them (items, triggers, etc.).

The following options are available when selecting the respective button for **host group** update:

- *Add* - allows to specify additional host groups from the existing ones or enter completely new host groups for the templates
- *Replace* - will remove the template from any existing host groups and replace them with the one(s) specified in this field (existing or new host groups)
- *Remove* - will remove specific host groups from templates

These fields are auto-complete - starting to type in them offers a dropdown of matching host groups. If the host group is new, it also appears in the dropdown and it is indicated by *(new)* after the string. Just scroll down to select.

191

## Mass update

Template

Tags

Macros

Value mapping

Tags ☒

Add

Replace

Remove

Name

Value

tag

value

Add

User macros, {INVENTORY.\*} macros, {HOST.HOST}, {HOST.NAME}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {HOST.PORT} and {HOST.ID} macros are supported in tags. Note that tags with the same name but different values are not considered 'duplicates' and can be added to the same template.

## Mass update

Template

Tags

Macros

Value mapping

Macros ☒

Add

Update

Remove

Remove all

Macro

Value

Description

{SMACRO}

value

T v

description

Add

☐ Update existing

The following options are available when selecting the respective button for macros update:

- **Add** - allows to specify additional user macros for the templates. If *Update existing* checkbox is checked, value, type and description for the specified macro name will be updated. If unchecked, if a macro with that name already exist on the template(s), it will not be updated.
- **Update** - will replace values, types and descriptions of macros specified in this list. If *Add missing* checkbox is checked, macro that didn't previously exist on a template will be added as new macro. If unchecked, only macros that already exist on a template will be updated.
- **Remove** - will remove specified macros from templates. If *Except selected* box is checked, all macros except specified in the list will be removed. If unchecked, only macros specified in the list will be removed.
- **Remove all** - will remove all user macros from templates. If *I confirm to remove all macros* checkbox is not checked, a new popup window will open asking to confirm removal of all macros.

## Mass update

Template Tags Macros Value mapping

Value mapping ☒

Add

Update

Rename

Remove

Remove all

Name

Value

Add Add from

☐

Update existing

Buttons with the following options are available for value map update:

- *Add* - add value maps to the templates. If you mark *Update existing*, all properties of the value map with this name will be updated. Otherwise, if a value map with that name already exists, it will not be updated.
- *Update* - update existing value maps. If you mark *Add missing*, a value map that didn't previously exist on a template will be added as a new value map. Otherwise only the value maps that already exist on a template will be updated.
- *Rename* - give new name to an existing value map
- *Remove* - remove the specified value maps from the templates. If you mark *Except selected*, all value maps will be removed **except** the ones that are specified.
- *Remove all* - remove all value maps from the templates. If the *I confirm to remove all value maps* checkbox is not marked, a new popup window will open asking to confirm the removal.

When done with all required changes, click on *Update*. The attributes will be updated accordingly for all the selected templates.

### 1 Hosts and host groups

What is a "host"?

In Zabbix, a "host" refers to any physical or virtual device, application, service, or any other logically-related collection of monitored parameters.

Creating hosts is one of the first monitoring tasks in Zabbix. For example, if you want to monitor some parameters on a server "x", you must first create a host called, say, "Server X" and then you can look to add monitoring items to it.

Hosts are organized into host groups.

Proceed to [creating and configuring a host](#).

#### 1 Configuring a host

Overview

To configure a host in Zabbix frontend, do the following:

- Go to: *Configuration > Hosts* or *Monitoring > Hosts*
- Click on *Create host* to the right (or on the host name to edit an existing host)
- Enter parameters of the host in the form

You can also use the *Clone* and *Full clone* buttons in the form of an existing host to create a new host. Clicking on *Clone* will retain all the host's parameters and template linkage (keeping all entities from those templates). *Full clone* will additionally retain directly attached entities (tags, items, triggers, graphs, low-level discovery rules and web scenarios).

*Note:* When a host is cloned, it will retain all template entities as they are originally on the template. Any changes to those entities made on the existing host level (such as changed item interval, modified regular expression or added prototypes to the low-level discovery rule) will not be cloned to the new host; instead they will be as on the template.

Configuration

The **Host** tab contains general host attributes:

## Host

Host IPMI Tags Macros 2 Inventory ● Encryption Value mapping 1

\* Host name

Visible name

| Templates  | Name              | Action  |
|--|-------------------|---|
|  | Linux OS agent    | <a href="#">Unlink</a> <a href="#">Unlink and clear</a> |
|  | App Zabbix Server | <a href="#">Unlink</a> <a href="#">Unlink and clear</a> |
| <input type="text" value="type here to search"/> |                   |   |

\* Groups

| Interfaces          | Type  | IP address                             | DNS name             |
|---------------------|-------|--|----------------------|
|                     | Agent | <input type="text" value="127.0.0.1"/> | <input type="text"/> |
|                     | SNMP  | <input type="text" value="127.0.0.1"/> | <input type="text"/> |
| <a href="#">Add</a> |       |  |                      |

Description

Monitored by proxy

Enabled ☒

All mandatory input fields are marked with a red asterisk.

| Parameter    | Description  |
|--------------|--|
| Host name    | Enter a unique host name. Alphanumerics, spaces, dots, dashes and underscores are allowed. However, leading and trailing spaces are disallowed.<br><i>Note:</i> With Zabbix agent running on the host you are configuring, the agent <b>configuration file</b> parameter <i>Hostname</i> must have the same value as the host name entered here. The name in the parameter is needed in the processing of <b>active checks</b> . |
| Visible name | Enter a unique visible name for the host. If you set this name, it will be the one visible in lists, maps, etc instead of the technical host name. This attribute has UTF-8 support.   |



| Parameter           | Description  |
|---------------------|--|
| <i>Templates</i>    | <p>Link <b>templates</b> to the host. All entities (items, triggers, graphs, etc) will be inherited from the template.</p> <p>To link a new template, start typing the template name in the <i>Templates</i> field. A list of matching templates will appear; scroll down to select. Alternatively, you may click on <i>Select</i> next to the <i>Templates</i> field; then, first select the host group by clicking on <i>Select</i> next to the <i>Host groups</i> field; mark the checkbox in front of one or multiple templates from the list displayed below; click on <i>Select</i>. The template(s) that are selected in the <i>Templates</i> field will be linked to the host when the host configuration form is saved or updated.</p> <p>To unlink a template, use one of the two options in the <i>Templates</i> block:<br/> <i>Unlink</i> - unlink the template, but preserve its items, triggers and graphs<br/> <i>Unlink and clear</i> - unlink the template and remove all its items, triggers and graphs</p> <p>Listed template names are clickable links leading to the template configuration form.</p> |
| <i>Groups</i>       | <p>Select <b>host groups</b> the host belongs to. A host must belong to at least one host group. A new group can be created and linked to a host by typing in a non-existing group name; the new name will be displayed in a dropdown list as "new" in the brackets; clicking on it, will add it to the selection field.</p>   |
| <i>Interfaces</i>   | <p>Several host interface types are supported for a host: <i>Agent</i>, <i>SNMP</i>, <i>JMX</i> and <i>IPMI</i>.<br/> No interfaces are defined by default. To add a new interface, click on <i>Add</i> in the <i>Interfaces</i> block, select the interface type and enter <i>IP/DNS</i>, <i>Connect to</i> and <i>Port</i> info.<br/> <i>Note</i>: Interfaces that are used in any items cannot be removed and link <i>Remove</i> is grayed out for them.</p> <p>The "IP" or "DNS" from an SNMP interface is also used for <b>SNMP traps</b>.<br/> During matching, only the selected "IP" or "DNS" in the host interface is used.<br/> See <b>Configuring SNMP monitoring</b> for additional details on configuring an SNMP interface (v1, v2 and v3).</p>  |
| <i>IP address</i>   | Host IP address (optional).  |
| <i>DNS name</i>     | Host DNS name (optional).  |
| <i>Connect to</i>   | <p>Clicking the respective button will tell Zabbix server what to use to retrieve data from agents:<br/> <b>IP</b> - Connect to the host IP address (recommended)<br/> <b>DNS</b> - Connect to the host DNS name</p>   |
| <i>Port</i>         | TCP/UDP port number. Default values are: 10050 for Zabbix agent, 161 for SNMP agent, 12345 for JMX and 623 for IPMI.   |
| <i>Default</i>      | Check the radio button to set the default interface.   |
| <i>Description</i>  | Enter the host description.  |
| <i>Monitored by</i> | The host can be monitored either by Zabbix server or one of Zabbix proxies:  |
| <i>proxy</i>        | <p><b>(no proxy)</b> - host is monitored by Zabbix server<br/> <b>Proxy name</b> - host is monitored by Zabbix proxy "Proxy name"</p>  |
| <i>Enabled</i>      | When the checkbox is checked, the host is enabled - ready for monitoring.  |
|                     | <p>When the checkbox is unchecked, the host is disabled - not monitored:<br/> For passive data requests initiated by Zabbix server/proxy (for example, <b>Zabbix agent</b>, <b>SNMP agent</b>, <b>simple checks</b>), monitoring stops as soon as you disable the host.<br/> For Zabbix agent <b>active checks</b>, monitoring stops within the time frame (under 2 minutes) that Zabbix agent receives information about the host having been disabled. During this brief interval, the host will continue to locally collect data for the active checks and try sending it to the server/proxy; however, since the host is marked as <i>Disabled</i>, the server/proxy will reject the data.</p>   |

The **IPMI** tab contains IPMI management attributes.

| Parameter                       | Description  |
|---------------------------------|--|
| <i>Authentication algorithm</i> | Select the authentication algorithm.                   |
| <i>Privilege level</i>          | Select the privilege level.                            |
| <i>Username</i>                 | User name for authentication. User macros may be used. |
| <i>Password</i>                 | Password for authentication. User macros may be used.  |

The **Tags** tab allows you to define host-level **tags**. All problems of this host will be tagged with the values entered here.

Host
IPMI
Tags 1
Macros 2
Inventory ●
Encryption
Value mapping 1

Name

Value

Service

JIRA

Add

User macros, {INVENTORY.\*} macros, {HOST.HOST}, {HOST.NAME}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {HOST.PORT} and {HOST.ID} macros are supported in tags.

The **Macros** tab allows you to define host-level **user macros** as a name-value pairs. Note that macro values can be kept as plain text, secret text or Vault secret. Adding a description is also supported.

Host
IPMI
Tags 1
Macros 2
Inventory ●
Encryption
Value mapping 1

Host macros

Inherited and host macros

Macro

Value

D

{ \$HOST\_MACRO }

1

T ▼

{ \$SNMP\_COMMUNITY }

public

T ▼

Add

You may also view here template-level and global user macros if you select the *Inherited and host macros* option. That is where all defined user macros for the host are displayed with the value they resolve to as well as their origin.

Host
IPMI
Tags 1
Macros 2
Inventory ●
Encryption
Value mapping 1

Host macros

Inherited and host macros

Macro

Effective value

Templa

{ \$AGENT.TIMEOUT }

3m

T ▼

Change

← Templa

Timeout after which agent is considered unavailable. Works only for agents reachable from Zabbix server/proxy (passive mode).

{ \$CPU.UTIL.CRIT }

90

T ▼

Change

← Templa

description

{ \$HOST\_MACRO }

1

T ▼

Remove

For convenience, links to respective templates and global macro configuration are provided. It is also possible to edit a template/global macro on the host level, effectively creating a copy of the macro on the host.

The **Host inventory** tab allows you to manually enter **inventory** information for the host. You can also select to enable *Automatic* inventory population, or disable inventory population for this host.

Host
IPMI
Tags 1
Macros 2
Inventory ●
Encryption
Value mapping 1

Disabled
Manual
Automatic

Type
Zabbix server

Type (Full details)

If inventory is enabled (manual or automatic), a green dot is displayed with the tab name.

## Encryption

The **Encryption** tab allows you to require **encrypted** connections with the host.

| Parameter                    | Description  |
|------------------------------|--|
| <i>Connections to host</i>   | How Zabbix server or proxy connects to Zabbix agent on a host: no encryption (default), using PSK (pre-shared key) or certificate.   |
| <i>Connections from host</i> | Select what type of connections are allowed from the host (i.e. from Zabbix agent and Zabbix sender). Several connection types can be selected at the same time (useful for testing and switching to other connection type). Default is "No encryption".   |
| <i>Issuer</i>                | Allowed issuer of certificate. Certificate is first validated with CA (certificate authority). If it is valid, signed by the CA, then the <i>Issuer</i> field can be used to further restrict allowed CA. This field is intended to be used if your Zabbix installation uses certificates from multiple CAs. If this field is empty then any CA is accepted. |
| <i>Subject</i>               | Allowed subject of certificate. Certificate is first validated with CA. If it is valid, signed by the CA, then the <i>Subject</i> field can be used to allow only one value of <i>Subject</i> string. If this field is empty then any valid certificate signed by the configured CA is accepted.   |
| <i>PSK identity</i>          | Pre-shared key identity string.<br>Do not put sensitive information in the PSK identity, it is transmitted unencrypted over the network to inform a receiver which PSK to use.   |
| <i>PSK</i>                   | Pre-shared key (hex-string). Maximum length: 512 hex-digits (256-byte PSK) if Zabbix uses GnuTLS or OpenSSL library, 64 hex-digits (32-byte PSK) if Zabbix uses mbed TLS (PolarSSL) library. Example: 1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952   |

## Value mapping

The **Value mapping** tab allows to configure human-friendly representation of item data in **value mappings**.

## 2 Configuring a host group

### Overview

Host groups are used for the logical grouping of hosts and assigning user permissions to them.

Each host must have at least one host group assigned. A host may belong to multiple host groups, and each host group may contain multiple hosts.

Note that in Zabbix, all permissions are based on **user groups** and host/**template** groups. So, even if a single user needs access to a single host, it is granted by adding the user to a user group that has permission to access the host group containing that host.

### Configuration

#### Attention:

Only Super admin users can create host groups.

There are two options of creating a host group in Zabbix frontend.

#### Option one:

- Go to: *Configuration* → *Host groups*
- Click on *Create Group* in the upper right corner of the screen
- Enter the group name in the form

## ≡ Host groups

\* Group name

**Option two:** when **configuring a host**, enter a non-existing group name in the *Groups* input field.

Once the host group is created, you can click on the group name in the list under *Configuration → Host groups* to edit the group name, clone the group, or delete the group.

Deleting a host group only deletes the logical group, not the hosts in the group. It is not possible to delete a host group that is the only group for any existing host.

### Creating host subgroups

A host subgroup (or nested host group) is a child of the parent host group that contains it. Nested representation of host groups is supported since Zabbix 3.2.0.

A subgroup is created by using the forward slash '/' in the group name input field to denote its relation to the parent group(s). For example:

- inputting `Europe/Latvia` creates the `Europe/Latvia` subgroup of the parent group `Europe`.
- inputting `Europe/Latvia/Riga/Zabbix servers` creates the respective subgroup within the nested parent groups `Europe`, `Europe/Latvia`, `Europe/Latvia/Riga`.

When creating a subgroup, using leading or trailing slashes, or several slashes in a row is not allowed. Escaping of '/' is not supported.

It is not required to create any parent host group(s) before creating a subgroup. You can choose whether to start by creating a subgroup (for example, `Europe/Latvia`) or any parent host group(s) (in our example, `Europe`). If you start by creating a subgroup, parent host group(s) will **not** be created automatically.

### Permissions to host groups

- When creating a subgroup to an existing parent host group (for example, creating `Europe/Latvia` when `Europe` already exists), **user group** permissions to the subgroup are inherited from the parent.
- When creating a parent host group to an existing subgroup (for example, creating `Europe` when `Europe/Latvia` already exists), no permissions to the parent are set.

When editing any host group, you can also set an additional option, *Apply permissions and tag filters to all subgroups*. Marking this checkbox and clicking on *Update* will apply the same level of permissions and tag filters to all current and future subgroups of the host group being edited. This option is supported since Zabbix 3.4.0.

So, if any user groups have been given varying **permissions** to the subgroups of the host group being edited, marking the checkbox will grant all current and future subgroups the same user permissions and tag-based permissions as the group being edited.

Note that this option is not saved in the database and will override existing permissions. Any changes made through this option can be reverted only manually.

## 3 Inventory

### Overview

You can keep the inventory of networked devices in Zabbix.

There is a special *Inventory* menu in the Zabbix frontend. However, you will not see any data there initially and it is not where you enter data. Building inventory data is done manually when configuring a host or automatically by using some automatic population options.

### Building inventory

#### Manual mode

When **configuring a host**, in the *Inventory* tab you can enter such details as the type of device, serial number, location, responsible person, etc., - the data that will populate inventory information.

If a URL is included in the host inventory information and it starts with 'http' or 'https', it will result in a clickable link in the *Inventory* section.

## Automatic mode

A host's inventory can also be populated automatically. For that to work, when configuring the host's inventory mode in the *Inventory* tab, it must be set to *Automatic*.

Then you can **configure host items** to populate any host inventory field with their value, indicating the destination field with the respective attribute (called *Item will populate host inventory field*) in item configuration.

Items that are especially useful for automated inventory data collection:

- system.hw.chassis[full|type|vendor|model|serial] - default is [full], root permissions needed
- system.hw.cpu[all|cpunum,full|maxfreq|vendor|model|curfreq] - default is [all,full]
- system.hw.devices[pci|usb] - default is [pci]
- system.hw.macaddr[interface,short|full] - default is [all,full], interface is regexp
- system.sw.arch
- system.sw.os[name|short|full] - default is [name]
- system.sw.packages[regexp,manager,short|full] - default is [all,all,full]

## Inventory mode selection

Inventory mode can be selected in the host configuration form.

Inventory mode by default for new hosts is selected based on the *Default host inventory mode* setting in *Administration* → *General* → *Other*.

For hosts added by network discovery or autoregistration actions, it is possible to define a *Set host inventory mode* operation selecting manual or automatic mode. This operation overrides the *Default host inventory mode* setting.

## Inventory overview

The details of all existing inventory data are available in the *Inventory* menu.

In *Inventory* → *Overview* you can get a host count by various fields of the inventory.

In *Inventory* → *Hosts* you can see all hosts that have inventory information. Clicking on the host name will reveal the inventory details in a form.

## ≡ Host inventory

Overview Details

Host name Zabbix server

Agent interfaces

| IP address | DNS name | Connect to | Port  |
|------------|----------|------------|-------|
| 127.0.0.1  |          | IP DNS     | 10050 |

SNMP interfaces

| IP address | DNS name | Connect to | Port |
|------------|----------|------------|------|
| 127.0.0.1  |          | IP DNS     | 161  |

OS Linux version 5.3.0-46-generic (buildd@lcy01-amd64-013) (gcc version 7.5.0 (Ubuntu 7.5.0-3ubuntu1~18.04)) #38~18.04.1-Ubuntu SMP

Monitoring [Web](#) [Latest data](#) [Problems](#) [Graphs](#) [Dashboards](#)

Configuration [Host](#) [Items 148](#) [Triggers 67](#) [Graphs 28](#) [Discovery 4](#) [Web 1](#)

[Cancel](#)

The **Overview** tab shows:

| Parameter  | Description   |
|--|---|
| <i>Host name</i>   | Name of the host.<br>Clicking on the name opens a menu with the scripts defined for the host.<br>Host name is displayed with an orange icon, if the host is in maintenance. |
| <i>Visible name</i>  | Visible name of the host (if defined).  |
| <i>Host (Agent, SNMP, JMX, IPMI) &lt;br&gt; interfaces</i> | This block provides details of the interfaces configured for the host.  |
| <i>OS</i>  | Operating system inventory field of the host (if defined).  |

| Parameter            | Description   |
|----------------------|---|
| <i>Hardware</i>      | Host hardware inventory field (if defined).   |
| <i>Software</i>      | Host software inventory field (if defined).   |
| <i>Description</i>   | Host description.   |
| <i>Monitoring</i>    | Links to monitoring sections with data for this host: <i>Web, Latest data, Problems, Graphs, Dashboards</i> .   |
| <i>Configuration</i> | Links to configuration sections for this host: <i>Host, Items, Triggers, Graphs, Discovery, Web</i> .<br>The number of configured entities is listed after each link. |

The **Details** tab shows all inventory fields that are populated (are not empty).

Inventory macros

There are host inventory macros {INVENTORY.\*} available for use in notifications, for example:

"Server in {INVENTORY.LOCATION1} has a problem, responsible person is {INVENTORY.CONTACT1}, phone number {INVENTORY.POC.PRIMARY.PHONE.A1}."

For more details, see the [Supported macros](#) page.

## 4 Mass update

Overview

Sometimes you may want to change some attribute for a number of hosts at once. Instead of opening each individual host for editing, you may use the mass update function for that.

Using mass update

To mass-update some hosts, do the following:

- Mark the checkboxes before the hosts you want to update in the [host list](#)
- Click on *Mass update* below the list
- Navigate to the tab with required attributes (*Host, IPMI, Tags, Macros, Inventory, Encryption* or *Value mapping*)
- Mark the checkboxes of any attribute to update and enter a new value for them

Mass update

Host

IPMI

Tags

Macros

Inventory

Encryption

Value mapping

Link templates

☒

Link

Replace

Unlink

type here to search

Select

☐ Clear when unlinking

Host groups

☒

Add

Replace

Remove

type here to search

Select

Description

☐ Original

Monitored by proxy

☐ Original

Status

☐ Original

Update

Cancel

The following options are available when selecting the respective button for **template** linkage update:

- *Link* - specify which additional templates to link
- *Replace* - specify which templates to link while unlinking any template that was linked to the hosts before
- *Unlink* - specify which templates to unlink

To specify the templates to link/unlink start typing the template name in the auto-complete field until a dropdown appears offering the matching templates. Just scroll down to select the required template.

The *Clear when unlinking* option will allow to not only unlink any previously linked templates, but also remove all elements inherited from them (items, triggers, etc.).

The following options are available when selecting the respective button for **host group** update:

- *Add* - allows to specify additional host groups from the existing ones or enter completely new host groups for the hosts
- *Replace* - will remove the host from any existing host groups and replace them with the one(s) specified in this field (existing or new host groups)
- *Remove* - will remove specific host groups from hosts

These fields are auto-complete - starting to type in them offers a dropdown of matching host groups. If the host group is new, it also appears in the dropdown and it is indicated by *(new)* after the string. Just scroll down to select.

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## Mass update

Host IPMI **Tags** Macros Inventory Encryption Value mapping

Authentication algorithm ☐ Original

Privilege level ☒ Operator

Username ☐ Original

Password ☐ Original

## Mass update

Host IPMI **Tags** Macros Inventory Encryption Value mapping

Tags ☒ **Add** Replace Remove

Name

Value

tag

value

[Add](#)

User macros, {INVENTORY.\*} macros, {HOST.HOST}, {HOST.NAME}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {HOST.PORT} and {HOST.ID} macros are supported in tags. Note that tags with the same name but different values are not considered 'duplicates' and can be added to the same host.

## Mass update

Host IPMI Tags **Macros** Inventory Encryption Value mapping

Macros ☒ **Add** Update Remove Remove all

Macro

Value

Description

{\${MACRO}}

value

T

description

[Add](#)

☐ Update existing

The following options are available when selecting the respective button for macros update:

- **Add** - allows to specify additional user macros for the hosts. If *Update existing* checkbox is checked, value, type and description for the specified macro name will be updated. If unchecked, if a macro with that name already exist on the host(s), it will not be updated.
- **Update** - will replace values, types and descriptions of macros specified in this list. If *Add missing* checkbox is checked, macro that didn't previously exist on a host will be added as new macro. If unchecked, only macros that already exist on a host will be updated.
- **Remove** - will remove specified macros from hosts. If *Except selected* box is checked, all macros except specified in the list



will be removed. If unchecked, only macros specified in the list will be removed.

- *Remove all* - will remove all user macros from hosts. If *I confirm to remove all macros* checkbox is not checked, a new popup window will open asking to confirm removal of all macros.

## Mass update

Host IPMI Tags Macros Inventory Encryption Value mapping

Inventory mode ☒ Disabled Manual Automatic

Type ☐ Original

Type (Full details) ☐ Original

Name ☐ Original

Alias ☐ Original

To be able to mass update inventory fields, the *Inventory mode* should be set to 'Manual' or 'Automatic'.

## Mass update

Host IPMI Tags Macros Inventory Encryption Value mapping

Connections ☒ Connections to host No encryption PSK Certificate

Connections from host ☒ No encryption

☐ PSK

☐ Certificate

\* PSK identity

\* PSK

## Mass update

Host IPMI Tags Macros Inventory Encryption Value mapping

Value mapping ☒ Add Update Rename Remove Remove all

Name

Value

Add Add from

☐ Update existing

Buttons with the following options are available for value map update:

- *Add* - add value maps to the hosts. If you mark *Update existing*, all properties of the value map with this name will be

updated. Otherwise, if a value map with that name already exists, it will not be updated.

- *Update* - update existing value maps. If you mark *Add missing*, a value map that didn't previously exist on a host will be added as a new value map. Otherwise only the value maps that already exist on a host will be updated.
- *Rename* - give new name to an existing value map
- *Remove* - remove the specified value maps from the hosts. If you mark *Except selected*, all value maps will be removed **except** the ones that are specified.
- *Remove all* - remove all value maps from the hosts. If the *I confirm to remove all value maps* checkbox is not marked, a new popup window will open asking to confirm the removal.

When done with all required changes, click on *Update*. The attributes will be updated accordingly for all the selected hosts.

## 2 Items

### Overview

An item is an individual metric.

Items are used for collecting data. Once you have configured a host, you must add items to get actual data. One way of quickly adding many items is to attach one of the predefined templates to a host. However, for optimized system performance, you may need to fine-tune the templates to have as many items and as frequent monitoring as necessary.

To specify what sort of data to collect from a host, use the **item key**. For example, an item with the key name **system.cpu.load** will collect processor load data, while an item with the key name **net.if.in** will collect incoming traffic information.

Additional parameters can be specified in square brackets after the key name. For example, **system.cpu.load[avg5]** will return the processor load average for the last 5 minutes, while **net.if.in[eth0]** will show incoming traffic in the interface "eth0".

#### Note:

See individual sections of **item types** for all supported item types and item keys.

Proceed to **creating and configuring an item**.

## 1 Creating an item

### Overview

To create an item in Zabbix frontend, do the following:

- Go to: *Configuration* → *Hosts*
- Click on *Items* in the row of the host
- Click on *Create item* in the upper right corner of the screen
- Enter parameters of the item in the form

You can also create an item by opening an existing one, pressing the *Clone* button and then saving under a different name.



### Configuration

The **Item** tab contains general item attributes.

All mandatory input fields are marked with a red asterisk.

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| Parameter                  | Description  |
|----------------------------|--|
| <i>Type of information</i> | <p>Type of data as stored in the database after performing conversions, if any.</p> <p><b>Numeric (unsigned)</b> - 64-bit unsigned integer</p> <p><b>Numeric (float)</b> - 64-bit floating point number</p> <p>This type will allow precision of approximately 15 digits and range from approximately -1.79E+308 to 1.79E+308 (with exception of <b>PostgreSQL 11 and earlier versions</b>).</p> <p>Receiving values in scientific notation is also supported. E.g., 1.23E+7, 1e308, 1.1E-4.</p> <p><b>Character</b> - short text data</p> <p><b>Log</b> - long text data with optional log related properties (timestamp, source, severity, logeventid)</p> <p><b>Text</b> - long text data. See also <b>text data limits</b>.</p> <p>For item keys that return data only in one specific format, matching type of information is selected automatically.</p>   |
| <i>Host interface</i>      | Select the host interface. This field is available when editing an item on the host level.   |
| <i>Units</i>               | <p>If a unit symbol is set, Zabbix will add postprocessing to the received value and display it with the set unit postfix.</p> <p>By default, if the raw value exceeds 1000, it is divided by 1000 and displayed accordingly. For example, if you set <i>bps</i> and receive a value of 881764, it will be displayed as 881.76 Kbps.</p> <p>The <b>JEDEC</b> memory standard is used for processing <b>B</b> (byte), <b>Bps</b> (bytes per second) units, which are divided by 1024. Thus, if units are set to <b>B</b> or <b>Bps</b> Zabbix will display:</p> <p>1 as 1B/1Bps<br/> 1024 as 1KB/1KBps<br/> 1536 as 1.5KB/1.5KBps</p> <p>Special processing is used if the following time-related units are used:</p> <p><b>unixtime</b> - translated to "yyyy.mm.dd hh:mm:ss". To translate correctly, the received value must be a <i>Numeric (unsigned)</i> type of information.</p> <p><b>uptime</b> - translated to "hh:mm:ss" or "N days, hh:mm:ss"</p> <p>For example, if you receive the value as 881764 (seconds), it will be displayed as "10 days, 04:56:04"</p> <p><b>s</b> - translated to "yyy mmm ddd hhh mmm sss ms"; parameter is treated as number of seconds. For example, if you receive the value as 881764 (seconds), it will be displayed as "10d 4h 56m"</p> <p>Only 3 upper major units are shown, like "1m 15d 5h" or "2h 4m 46s". If there are no days to display, only two levels are displayed - "1m 5h" (no minutes, seconds or milliseconds are shown). Will be translated to "&lt; 1 ms" if the value is less than 0.001.</p> <p>Note that if a unit is prefixed with !, then no unit prefixes/processing is applied to item values. See <b>preventing unit conversion</b>.</p> |
| <i>Update interval</i>     | <p>Retrieve a new value for this item every N seconds. Maximum allowed update interval is 86400 seconds (1 day).</p> <p><b>Time suffixes</b> are supported, e.g., 30s, 1m, 2h, 1d.</p> <p><b>User macros</b> are supported.</p> <p>A single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported.</p> <p>Note: The update interval can only be set to '0' if custom intervals exist with a non-zero value. If set to '0', and a custom interval (flexible or scheduled) exists with a non-zero value, the item will be polled during the custom interval duration.</p> <p>Note that the first item poll after the item became active or after update interval change might occur earlier than the configured value.</p> <p>An existing passive item can be polled for value immediately by pushing the <i>Execute now</i> button.</p>   |
| <i>Custom intervals</i>    | <p>You can create custom rules for checking the item:</p> <p><b>Flexible</b> - create an exception to the <i>Update interval</i> (interval with different frequency)</p> <p><b>Scheduling</b> - create a custom polling schedule.</p> <p>For detailed information see <b>Custom intervals</b>.</p> <p><b>Time suffixes</b> are supported in the <i>Interval</i> field, e.g., 30s, 1m, 2h, 1d.</p> <p><b>User macros</b> are supported.</p> <p>A single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported.</p> <p>Scheduling is supported since Zabbix 3.0.0.</p> <p>Note: custom intervals for active checks are supported by Zabbix agent 2 only.</p>   |

| Parameter                             | Description   |
|---------------------------------------|---|
| <i>History storage period</i>         | <p>Select either:</p> <p><b>Do not keep history</b> - item history is not stored. Useful for master items if only dependent items need to keep history.</p> <p>This setting cannot be overridden by global housekeeper <a href="#">settings</a>.</p> <p><b>Storage period</b> - specify the duration of keeping detailed history in the database (1 hour to 25 years). Older data will be removed by the housekeeper. Stored in seconds.</p> <p><a href="#">Time suffixes</a> are supported, e.g., 2h, 1d. <a href="#">User macros</a> are supported.</p> <p>The <i>Storage period</i> value can be overridden globally in <i>Administration</i> → <i>General</i> → <a href="#">Housekeeper</a>.</p> <p>If a global overriding setting exists, an orange  info icon is displayed. If you position your mouse on it, a warning message is displayed, e.g., <i>Overridden by global housekeeper settings (1d)</i>.</p> <p>It is recommended to keep the recorded values for the smallest possible time to reduce the size of value history in the database. Instead of keeping a long history of values, you can keep longer data of trends.</p> <p>See also <a href="#">History and trends</a>.</p> |
| <i>Trend storage period</i>           | <p>Select either:</p> <p><b>Do not keep trends</b> - trends are not stored.</p> <p>This setting cannot be overridden by global housekeeper <a href="#">settings</a>.</p> <p><b>Storage period</b> - specify the duration of keeping aggregated (hourly min, max, avg, count) history in the database (1 day to 25 years). Older data will be removed by the housekeeper. Stored in seconds.</p> <p><a href="#">Time suffixes</a> are supported, e.g., 24h, 1d. <a href="#">User macros</a> are supported.</p> <p>The <i>Storage period</i> value can be overridden globally in <i>Administration</i> → <i>General</i> → <a href="#">Housekeeper</a>.</p> <p>If a global overriding setting exists, an orange  info icon is displayed. If you position your mouse on it, a warning message is displayed, e.g., <i>Overridden by global housekeeper settings (7d)</i>.</p> <p><i>Note:</i> Keeping trends is not available for non-numeric data - character, log and text.</p> <p>See also <a href="#">History and trends</a>.</p>   |
| <i>Value mapping</i>                  | <p>Apply value mapping to this item. <a href="#">Value mapping</a> does not change received values, it is for displaying data only.</p> <p>It works with <i>Numeric(unsigned)</i>, <i>Numeric(float)</i> and <i>Character</i> items.</p> <p>For example, "Windows service states".</p>  |
| <i>Log time format</i>                | <p>Available for items of type <b>Log</b> only. Supported placeholders:</p> <ul style="list-style-type: none"> <li>* <b>y</b>: Year (1970-2038)</li> <li>* <b>M</b>: Month (01-12)</li> <li>* <b>d</b>: Day (01-31)</li> <li>* <b>h</b>: Hour (00-23)</li> <li>* <b>m</b>: Minute (00-59)</li> <li>* <b>s</b>: Second (00-59)</li> </ul> <p>If left blank, the timestamp will be set to 0 in Unix time, representing January 1, 1970.</p> <p>For example, consider the following line from the Zabbix agent log file:</p> <p>" 23480:20100328:154718.045 Zabbix agent started. Zabbix 1.8.2 (revision 11211)."</p> <p>It begins with six character positions for PID, followed by date, time, and the rest of the message. The log time format for this line would be "pppppp:yyyyMMdd:hhmmss".</p> <p>Note that "p" and ":" characters are placeholders and can be any characters except "yMdhms".</p>   |
| <i>Populates host inventory field</i> | <p>You can select a host inventory field that the value of item will populate. This will work if automatic <a href="#">inventory</a> population is enabled for the host.</p> <p>This field is not available if <i>Type of information</i> is set to 'Log'.</p>  |
| <i>Description</i>                    | Enter an item description. <a href="#">User macros</a> are supported.   |
| <i>Enabled</i>                        | Mark the checkbox to enable the item so it will be processed.   |
| <i>Latest data</i>                    | <p>Click on the link to view the latest data for the item.</p> <p>This link is only available when editing an already existing item.</p>  |

**Note:**

Item type specific fields are described on [corresponding pages](#).

**Note:**

When editing an existing **template** level item on a host level, a number of fields are read-only. You can use the link in the form header and go to the template level and edit them there, keeping in mind that the changes on a template level will change the item for all hosts that the template is linked to.

The **Tags** tab allows to define item-level **tags**.

The screenshot shows the Zabbix item configuration interface with the 'Tags' tab selected. The interface has three tabs: 'Item', 'Tags 1', and 'Preprocessing'. The 'Tags 1' tab is active and contains two sub-tabs: 'Item tags' and 'Inherited and item tags'. The 'Item tags' sub-tab is selected, showing a table with two columns: 'Name' and 'Value'. The table contains one entry with 'Application' in the 'Name' column and 'CPU' in the 'Value' column. Below the table is an 'Add' button.

| Name        | Value |
|-------------|-------|
| Application | CPU   |

[Add](#)

Item value preprocessing

The **Preprocessing** tab allows to define **transformation rules** for the received values.

Testing

**Attention:**

To perform item testing, ensure that the system time on the server and the proxy is **synchronized**. In the case when the server time is behind, item testing may return an error message "The task has been expired." Having set different time zones on the server and the proxy, however, won't affect the testing result.

It is possible to test an item and, if configured correctly, get a real value in return. Testing can occur even before an item is saved.

Testing is available for host and template items, item prototypes and low-level discovery rules. Testing is not available for active items.

Item testing is available for the following passive item types:

- Zabbix agent
- SNMP agent (v1, v2, v3)
- IPMI agent
- SSH checks
- Telnet checks
- JMX agent
- Simple checks (except icmping\*, vmware.\* items)
- Zabbix internal
- Calculated items
- External checks
- Database monitor
- HTTP agent
- Script

To test an item, click on the *Test* button at the bottom of the item configuration form. Note that the *Test* button will be disabled for items that cannot be tested (like active checks, excluded simple checks).

Description

Space utilization in % for /

Enabled

☒

Add

Test

Cancel

The item testing form has fields for the required host parameters (host address, port, proxy name/no proxy) and item-specific details (such as SNMPv2 community or SNMPv3 security credentials). These fields are context aware:

- The values are pre-filled when possible, i.e. for items requiring an agent, by taking the information from the selected agent interface of the host
- The values have to be filled manually for template items
- Plain-text macro values are resolved
- Fields where the value (or part of the value) is a secret or Vault macro are empty and have to be entered manually. If any item parameter contains a secret macro value, the following warning message is displayed: "Item contains user-defined macros with secret values. Values of these macros should be entered manually."
- The fields are disabled when not needed in the context of the item type (e.g., the host address field and the proxy field are disabled for calculated items)

To test the item, click on *Get value*. If the value is retrieved successfully, it will fill the *Value* field, moving the current value (if any) to the *Previous value* field while also calculating the *Prev. time* field, i.e., the time difference between the two values (clicks) and trying to detect an EOL sequence and switch to CRLF if detecting "\n\r" in retrieved value.

Test item

×

Get value from host

☒

Host address

192.168.3.205

Port

10050

Proxy

(no proxy)

▼

Get value

Value

33.385793

✎

Time

now

Previous value

✎

Prev. time

End of line sequence

LF

CRLF

Get value and test

Cancel

If the configuration is incorrect, an error message is displayed describing the possible cause.

## Test item



Invalid second parameter.

Get value from host ☒

Host address

Proxy

Value

A successfully retrieved value from host can also be used to test [preprocessing steps](#).

Form buttons

Buttons at the bottom of the form allow to perform several operations.

Add

Add an item. This button is only available for new items.

Update

Update the properties of an item.

Clone

Create another item based on the properties of the current item.

Execute now

Execute a check for a new item value immediately. Supported for **passive** checks only (see [more details](#)).

*Note that when checking for a value immediately, configuration cache is not updated, thus the value will not reflect very recent changes to item configuration.*

Test

Test if item configuration is correct by getting a value.

Clear history and trends

Delete the item history and trends.

Delete

Delete the item.

Cancel

Cancel the editing of item properties.

Text data limits

Text data limits depend on the database backend. Before storing text values in the database they get truncated to match the database value type limit:

| Database            | Type of information |                  |                  |
|---------------------|---------------------|------------------|------------------|
|                     | Character           | Log              | Text             |
| MySQL               | 255 characters      | 65536 bytes      | 65536 bytes      |
| PostgreSQL          | 255 characters      | 65536 characters | 65536 characters |
| Oracle              | 255 characters      | 65536 characters | 65536 characters |
| SQLite              | 255 characters      | 65536 characters | 65536 characters |
| (only Zabbix proxy) |                     |                  |                  |

Custom script limit



Available custom script length depends on the database used:

| Database                          | Limit in characters | Limit in bytes |
|-----------------------------------|---------------------|----------------|
| <b>MySQL</b>                      | 65535               | 65535          |
| <b>Oracle Database</b>            | 2048                | 4000           |
| <b>PostgreSQL</b>                 | 65535               | not limited    |
| <b>SQLite (only Zabbix proxy)</b> | 65535               | not limited    |

## Unsupported items

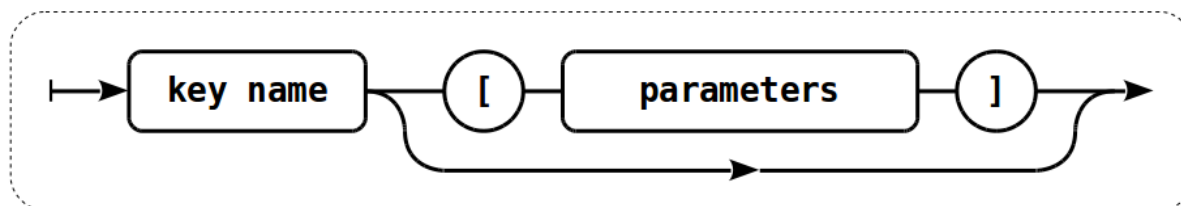
Unsupported items are reported as having a *Not supported* status and are still rechecked at their standard *Update interval*.

An item becomes unsupported if its value cannot be retrieved for some reason (e.g. connection error, no pollers configured to process the item). In addition, items that do not receive historical data remain in the *Not supported* status. This is expected behavior—an item transitions to a *Normal* status only when it receives new, valid historical data.

Like problems, unsupported items are re-evaluated only when new data is received—even if there is no historical data available for that item anymore. In other words, items and triggers change their state solely upon receiving new data. However, if a trigger expression includes a *date and time* and/or *nodata()* function, the trigger will be recalculated every 30 seconds (see *triggers calculation time* for details).

## 1 Item key format

Item key format, including key parameters, must follow syntax rules. The following illustrations depict the supported syntax. Allowed elements and characters at each point can be determined by following the arrows - if some block can be reached through the line, it is allowed, if not - it is not allowed.



To construct a valid item key, one starts with specifying the key name, then there's a choice to either have parameters or not - as depicted by the two lines that could be followed.

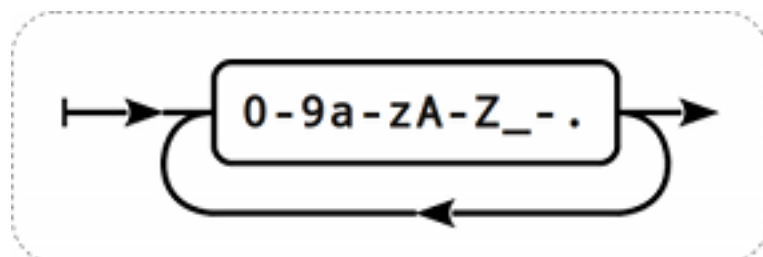
### Key name

The key name itself has a limited range of allowed characters, which just follow each other. Allowed characters are:

0-9a-zA-Z\_-. .

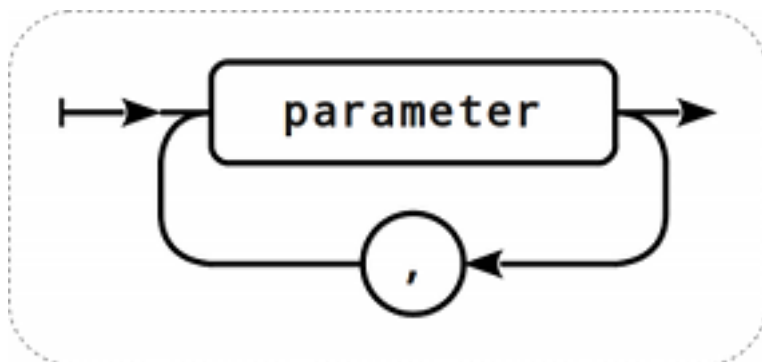
Which means:

- all numbers;
- all lowercase letters;
- all uppercase letters;
- underscore;
- dash;
- dot.

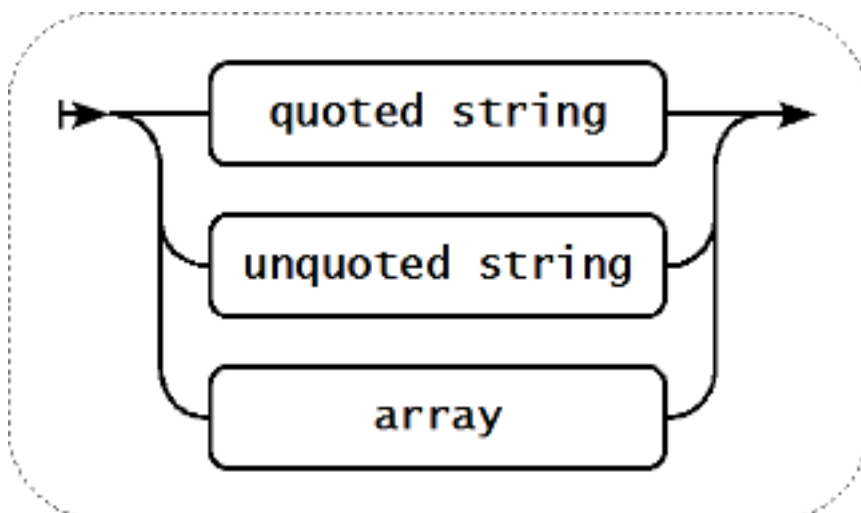


### Key parameters

An item key can have multiple parameters that are comma separated.



Each key parameter can be either a quoted string, an unquoted string or an array.



The parameter can also be left empty, thus using the default value. In that case, the appropriate number of commas must be added if any further parameters are specified. For example, item key **icmping[,,200,,500]** would specify that the interval between individual pings is 200 milliseconds, timeout - 500 milliseconds, and all other parameters are left at their defaults.

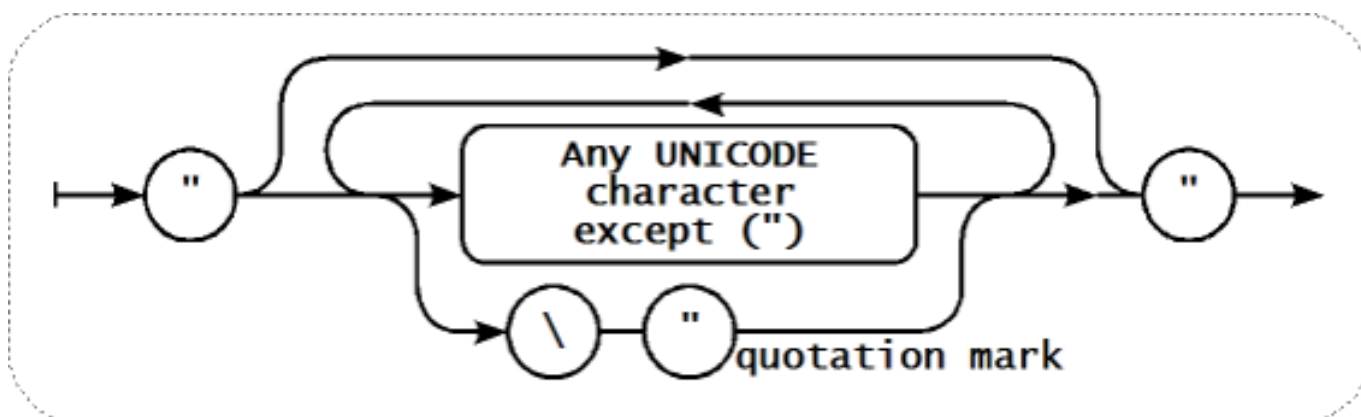
It is possible to include macros in the parameters. Those can be **user macros** or some of the built-in macros. To see what particular built-in macros are supported in item key parameters, search the page **Supported macros** for "item key parameters".

Parameter - quoted string

If the key parameter is a quoted string, any Unicode character is allowed.

If the key parameter string contains comma, this parameter has to be quoted.

If the key parameter string contains quotation mark, this parameter has to be quoted and each quotation mark which is a part of the parameter string has to be escaped with a backslash (\) character.



**Warning:**

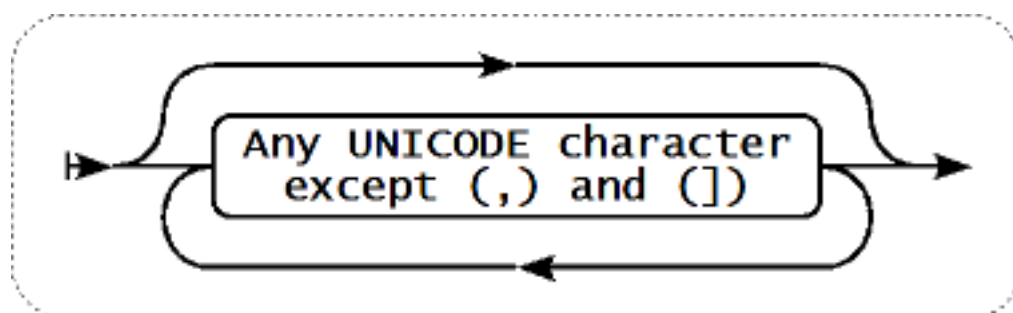
To quote item key parameters, use double quotes only. Single quotes are not supported.

**Attention:**

Multi-level parameter arrays, e.g. [a, [b, [c,d]], e], are not allowed.

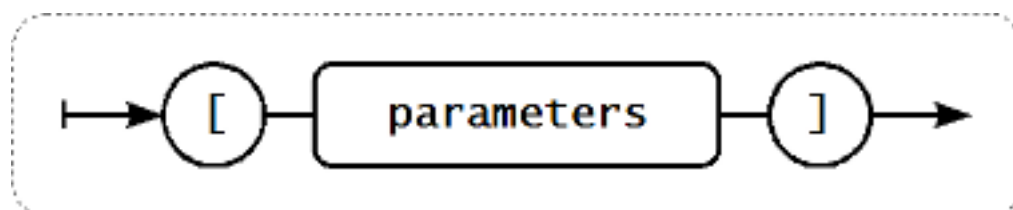
Parameter - unquoted string

If the key parameter is an unquoted string, any Unicode character is allowed except comma and right square bracket (]). Unquoted parameter cannot start with left square bracket ([).



Parameter - array

If the key parameter is an array, it is again enclosed in square brackets, where individual parameters come in line with the rules and syntax of specifying multiple parameters.



## 2 Custom intervals

### Overview

It is possible to create custom rules regarding the times when an item is checked. The two methods for that are *Flexible intervals*, which allow to redefine the default update interval, and *Scheduling*, whereby an item check can be executed at a specific time or sequence of times.

### Flexible intervals

Flexible intervals allow to redefine the default update interval for specific time periods. A flexible interval is defined with *Interval* and *Period* where:

- *Interval* - the update interval for the specified time period
- *Period* - the time period when the flexible interval is active (see the [time periods](#) for detailed description of the *Period* format)

If multiple flexible intervals overlap, the smallest *Interval* value is used for the overlapping period. Note that if the smallest value of overlapping flexible intervals is '0', no polling will take place. Outside the flexible intervals the default update interval is used.

Note that if the flexible interval equals the length of the period, the item will be checked exactly once. If the flexible interval is greater than the period, the item might be checked once or it might not be checked at all (thus such configuration is not advisable). If the flexible interval is less than the period, the item will be checked at least once.

If the flexible interval is set to '0', the item is not polled during the flexible interval period and resumes polling according to the default *Update interval* once the period is over. Examples:

| Interval | Period          | Description   |
|----------|-----------------|---|
| 10       | 1-5,09:00-18:00 | Item will be checked every 10 seconds during working hours.   |
| 0        | 1-7,00:00-7:00  | Item will not be checked during the night.  |
| 0        | 7-7,00:00-24:00 | Item will not be checked on Sundays.  |
| 60       | 1-7,12:00-12:01 | Item will be checked at 12:00 every day. Note that this was used as a workaround for scheduled checks and starting with Zabbix 3.0 it is recommended to use scheduling intervals for such checks. |

### Scheduling intervals

Scheduling intervals are used to check items at specific times. While flexible intervals are designed to redefine the default item update interval, the scheduling intervals are used to specify an independent checking schedule, which is executed in parallel.

A scheduling interval is defined as: md<filter>wd<filter>h<filter>m<filter>s<filter> where:

- **md** - month days
- **wd** - week days
- **h** - hours
- **m** - minutes
- **s** - seconds

`<filter>` is used to specify values for its prefix (days, hours, minutes, seconds) and is defined as: `[<from>[-<to>]] [/<step>] [,<filter>]` where:

- `<from>` and `<to>` define the range of matching values (included). If `<to>` is omitted then the filter matches a `<from>` - `<from>` range. If `<from>` is also omitted then the filter matches all possible values.
- `<step>` defines the skips of the number value through the range. By default `<step>` has the value of 1, which means that all values of the defined range are matched.

While the filter definitions are optional, at least one filter must be used. A filter must either have a range or the `<step>` value defined.

An empty filter matches either '0' if no lower-level filter is defined or all possible values otherwise. For example, if the hour filter is omitted then only '0' hour will match, provided minute and seconds filters are omitted too, otherwise an empty hour filter will match all hour values.

Valid `<from>` and `<to>` values for their respective filter prefix are:

| Prefix | Description | <code>&lt;from&gt;</code> | <code>&lt;to&gt;</code> |
|--------|-------------|---------------------------|-------------------------|
| md     | Month days  | 1-31                      | 1-31                    |
| wd     | Week days   | 1-7                       | 1-7                     |
| h      | Hours       | 0-23                      | 0-23                    |
| m      | Minutes     | 0-59                      | 0-59                    |
| s      | Seconds     | 0-59                      | 0-59                    |

The `<from>` value must be less or equal to `<to>` value. The `<step>` value must be greater or equal to 1 and less or equal to `<to>` - `<from>`.

Single digit month days, hours, minutes and seconds values can be prefixed with 0. For example `md01-31` and `h/02` are valid intervals, but `md01-031` and `wd01-07` are not.

In Zabbix frontend, multiple scheduling intervals are entered in separate rows. In Zabbix API, they are concatenated into a single string with a semicolon ; as a separator.

If a time is matched by several intervals it is executed only once. For example, `wd1h9;h9` will be executed only once on Monday at 9am.

Examples:

| Interval                                  | Will be executed                                    |
|---|---|
| m0-59                                     | every minute  |
| h9-17/2                                   | every 2 hours starting with 9:00 (9:00, 11:00 ...)  |
| m0,30 or m/30                             | hourly at hh:00 and hh:30                           |
| m0,5,10,15,20,25,30,35,40,45,50,55 or m/5 | every five minutes                                  |
| wd1-5h9                                   | every Monday till Friday at 9:00                    |
| wd1-5h9-18                                | every Monday till Friday at 9:00,10:00,...,18:00    |
| h9,10,11 or h9-11                         | every day at 9:00, 10:00 and 11:00                  |
| md1h9m30                                  | every 1st day of each month at 9:30                 |
| md1wd1h9m30                               | every 1st day of each month at 9:30 if it is Monday |
| h9m/30                                    | every day at 9:00, 9:30                             |
| h9m0-59/30                                | every day at 9:00, 9:30                             |
| h9,10m/30                                 | every day at 9:00, 9:30, 10:00, 10:30               |
| h9-10m30                                  | every day at 9:30, 10:30                            |
| h9m10-40/30                               | every day at 9:10, 9:40                             |
| h9,10m10-40/30                            | every day at 9:10, 9:40, 10:10, 10:40               |
| h9-10m10-40/30                            | every day at 9:10, 9:40, 10:10, 10:40               |
| h9m10-40                                  | every day at 9:10, 9:11, 9:12, ... 9:40             |
| h9m10-40/1                                | every day at 9:10, 9:11, 9:12, ... 9:40             |
| h9-12,15                                  | every day at 9:00, 10:00, 11:00, 12:00, 15:00       |

| Interval                                  | Will be executed  |
|---|---|
| h9-12,15m0                                | every day at 9:00, 10:00, 11:00, 12:00, 15:00                 |
| h9-12,15m0s30                             | every day at 9:00:30, 10:00:30, 11:00:30, 12:00:30, 15:00:30  |
| h9-12s30                                  | every day at 9:00:30, 9:01:30, 9:02:30 ... 12:58:30, 12:59:30 |
| h9m/30;h10 (API-specific syntax)          | every day at 9:00, 9:30, 10:00                                |
| h9m/30                                    | every day at 9:00, 9:30, 10:00                                |
| h10 (add this as another row in frontend) |   |

## Aligning time zones for proxies and agent 2

Note that Zabbix proxies and agent 2 use their local time zones when processing scheduling intervals.

For this reason, when scheduling intervals are applied to items monitored by Zabbix proxy or agent 2 active items, it is recommended to set the time zone of the respective proxies or agent 2 the same as Zabbix server, otherwise the **queue** may report item delays incorrectly.

Custom intervals for active checks are supported by Zabbix agent 2 only. Ensure you are using Zabbix agent 2 if you intend to configure custom intervals for active checks.

The time zone for Zabbix proxy or agent 2 can be set using the environment variable TZ in the systemd unit file:

```
[Service]
...
Environment="TZ=Europe/Amsterdam"
```

## 2 Item value preprocessing

### Overview

Preprocessing allows to define transformation rules for the received item values. One or several transformations are possible before saving to the database.

Transformations are executed in the order in which they are defined. Preprocessing is done by Zabbix server or proxy (if items are monitored by proxy).

Note that all values passed to preprocessing are of the string type, conversion to desired value type (as defined in item configuration) is performed at the end of the preprocessing pipeline; conversions, however, may also take place if required by the corresponding preprocessing step. See [preprocessing details](#) for more technical information.

See also: [Usage examples](#)

### Configuration

Preprocessing rules are defined in the **Preprocessing** tab of the item **configuration** form.

### Items

[All hosts](#) / [Zabbix server](#) Enabled ZBX Items 145 Triggers 75 Graphs 28 Discovery rules 3 Web scenarios

[Item](#) [Tags](#) [Preprocessing 2](#)

| Preprocessing steps | Name              | Parameters | Custom on fail           |
|---------------------|-------------------|------------|--------------------------|
| 1:                  | Change per second |            | <input type="checkbox"/> |
| 2:                  | Custom multiplier | 0.01       | <input type="checkbox"/> |

[Add](#)

Type of information Numeric (float)

[Add](#) [Test](#) [Cancel](#)

**Attention:**

An item will become **unsupported** if any of the preprocessing steps fail, unless *Custom on fail* error-handling (available for supported transformations) has been configured to discard the value or to set a specified value.

For log items, log metadata (without value) will always reset item unsupported state and make item supported again, even if the initial error occurred after receiving a log value from agent.

User macros and user macros with context are supported in item value preprocessing parameters, including JavaScript code.

**Note:**

Context is ignored when a macro is replaced with its value. Macro value is inserted in the code as is, it is not possible to add additional escaping before placing the value in the JavaScript code. Please be advised, that this can cause JavaScript errors in some cases.

| Type               |   |
|--------------------|---|
| Transformation     | Description   |
| Text               |   |
| Regular expression | <p>Match the value to the &lt;pattern&gt; regular expression and replace value with &lt;output&gt;. The regular expression supports extraction of maximum 10 captured groups with the \N sequence. Failure to match the input value will make the item unsupported.</p> <p>Parameters:</p> <p><b>pattern</b> - regular expression</p> <p><b>output</b> - output formatting template. An \N (where N=1...9) escape sequence is replaced with the Nth matched group. A \0 escape sequence is replaced with the matched text. Please refer to <a href="#">regular expressions</a> section for some existing examples.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>   |
| Replace            | <p>Find the search string and replace it with another (or nothing). All occurrences of the search string will be replaced.</p> <p>Parameters:</p> <p><b>search string</b> - the string to find and replace, case-sensitive (required)</p> <p><b>replacement</b> - the string to replace the search string with. The replacement string may also be empty effectively allowing to delete the search string when found.</p> <p>It is possible to use escape sequences to search for or replace line breaks, carriage return, tabs and spaces "\n \r \t \s"; backslash can be escaped as "\\" and escape sequences can be escaped as "\\n". Escaping of line breaks, carriage return, tabs is automatically done during low-level discovery.</p>   |
| Trim               | Remove specified characters from the beginning and end of the value.  |
| Right trim         | Remove specified characters from the end of the value.  |
| Left trim          | Remove specified characters from the beginning of the value.  |
| Structured data    |   |
| XML XPath          | <p>Extract value or fragment from XML data using XPath functionality.</p> <p>For this option to work, Zabbix server must be compiled with libxml support.</p> <p>Examples:</p> <p><code>number(/document/item/value)</code> will extract 10 from<br/> <code>&lt;document&gt;&lt;item&gt;&lt;value&gt;10&lt;/value&gt;&lt;/item&gt;&lt;/document&gt;</code></p> <p><code>number(/document/item/@attribute)</code> will extract 10 from <code>&lt;document&gt;&lt;item attribute="10"&gt;&lt;/item&gt;&lt;/document&gt;</code></p> <p><code>/document/item</code> will extract <code>&lt;item&gt;&lt;value&gt;10&lt;/value&gt;&lt;/item&gt;</code> from<br/> <code>&lt;document&gt;&lt;item&gt;&lt;value&gt;10&lt;/value&gt;&lt;/item&gt;&lt;/document&gt;</code></p> <p>Note that namespaces are not supported.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p> |

| Type                     |   |
|--------------------------|---|
| <i>JSON Path</i>         | <p>Extract value or fragment from JSON data using <a href="#">JSONPath functionality</a>.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>  |
| <i>CSV to JSON</i>       | <p>Convert CSV file data into JSON format.</p> <p>For more information, see: <a href="#">CSV to JSON preprocessing</a>.</p>   |
| <i>XML to JSON</i>       | <p>Convert data in XML format to JSON.</p> <p>For more information, see: <a href="#">Serialization rules</a>.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>  |
| Arithmetic               |   |
| <i>Custom multiplier</i> | <p>Multiply the value by the specified integer or floating-point value.</p> <p>Use this option to convert values received in KB, MBps, etc into B, Bps. Otherwise Zabbix cannot correctly set <a href="#">prefixes</a> (K, M, G etc).</p> <p><i>Note</i> that if the item type of information is <i>Numeric (unsigned)</i>, incoming values with a fractional part will be trimmed (i.e. '0.9' will become '0') before the custom multiplier is applied.</p> <p>Supported: scientific notation, for example, 1e+70 (since version 2.2); user macros and LLD macros (since version 4.0); strings that include macros, for example, {#MACRO}e+10, {\$MACRO1}e+{\$MACRO2}(since version 5.2.3)</p> <p>The macros must resolve to an integer or a floating-point number.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>   |
| Change                   |   |
| <i>Simple change</i>     | <p>Calculate the difference between the current and previous value.</p> <p>Evaluated as <b>value-prev_value</b>, where<br/> <i>value</i> - current value; <i>prev_value</i> - previously received value</p> <p>This setting can be useful to measure a constantly growing value. If the current value is smaller than the previous value, Zabbix discards that difference (stores nothing) and waits for another value.</p> <p>Only one change operation per item is allowed.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>  |
| <i>Change per second</i> | <p>Calculate the value change (difference between the current and previous value) speed per second.</p> <p>Evaluated as <b>(value-prev_value)/(time-prev_time)</b>, where<br/> <i>value</i> - current value; <i>prev_value</i> - previously received value; <i>time</i> - current timestamp; <i>prev_time</i> - timestamp of previous value.</p> <p>This setting is useful for calculating the speed per second for a constantly growing value. If the current value is smaller than the previous value, Zabbix discards that difference (stores nothing) and waits for another value. This helps to work correctly with, for instance, a wrapping (overflow) of 32-bit SNMP counters.</p> <p><i>Note:</i> As this calculation may produce floating-point numbers, it is recommended to set the 'Type of information' to <i>Numeric (float)</i>, even if the incoming raw values are integers. This is especially relevant for small numbers where the decimal part matters. If the floating-point values are large and may exceed the 'float' field length in which case the entire value may be lost, it is actually suggested to use <i>Numeric (unsigned)</i> and thus trim only the decimal part.</p> <p>Only one change operation per item is allowed.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p> |
| Numeral                  |   |
| sys-                     |   |
| tems                     |   |

| Type                                     |   |
|--|---|
| <i>Boolean to decimal</i>                | <p>Convert the value from boolean format to decimal. The textual representation is translated into either 0 or 1. Thus, 'TRUE' is stored as 1 and 'FALSE' is stored as 0. All values are matched in a case-insensitive way. Currently recognized values are, for:</p> <p><i>TRUE</i> - true, t, yes, y, on, up, running, enabled, available, ok, master</p> <p><i>FALSE</i> - false, f, no, n, off, down, unused, disabled, unavailable, err, slave</p> <p>Additionally, any non-zero numeric value is considered to be TRUE and zero is considered to be FALSE.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p> |
| <i>Octal to decimal</i>                  | <p>Convert the value from octal format to decimal.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>   |
| <i>Hexadecimal to decimal</i>            | <p>Convert the value from hexadecimal format to decimal.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>   |
| Custom scripts                           |   |
| <i>JavaScript</i>                        | <p>Enter JavaScript code in the block that appears when clicking in the parameter field or on a pencil icon.</p> <p>Note that available JavaScript length depends on the <b>database used</b>.</p> <p>For more information, see: <a href="#">Javascript preprocessing</a>.</p>  |
| Validation                               |   |
| <i>In range</i>                          | <p>Define a range that a value should be in by specifying minimum/maximum values (inclusive). Numeric values are accepted (including any number of digits, optional decimal part and optional exponential part, negative values). User macros and low-level discovery macros can be used. The minimum value should be less than the maximum.</p> <p>At least one value must exist.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>   |
| <i>Matches regular expression</i>        | <p>Specify a regular expression that a value must match.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>   |
| <i>Does not match regular expression</i> | <p>Specify a regular expression that a value must not match.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>   |
| <i>Check for error in JSON</i>           | <p>Check for an application-level error message located at JSONPath. Stop processing if succeeded and the message is not empty; otherwise, continue processing with the value that was before this preprocessing step. Note that these external service errors are reported to the user as is, without adding preprocessing step information.</p> <p>No error will be reported in case of failing to parse invalid JSON.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>   |



---

**Type**

---

|   |  |
|---|--|
| <i>Check for error in XML</i>                     | <p>Check for an application-level error message located at XPath. Stop processing if succeeded and the message is not empty; otherwise, continue processing with the value that was before this preprocessing step. Note that these external service errors are reported to the user as is, without adding preprocessing step information.</p> <p>No error will be reported in case of failing to parse invalid XML.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>  |
| <i>Check for error using a regular expression</i> | <p>Check for an application-level error message using a regular expression. Stop processing if succeeded and the message is not empty; otherwise, continue processing with the value that was before this preprocessing step. Note that these external service errors are reported to the user as is, without adding preprocessing step information.</p> <p>Parameters:</p> <p><b>pattern</b> - regular expression</p> <p><b>output</b> - output formatting template. An \N (where N=1...9) escape sequence is replaced with the Nth matched group. A \0 escape sequence is replaced with the matched text.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to select custom error-handling options: either to discard the value, set a specified value, or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected.</p>   |
| <i>Check for not supported value</i>              | <p>Check if no item value could be retrieved. Normally that would lead to the item becoming unsupported, but you may modify that behavior by specifying the <i>Custom on fail</i> error-handling options: to discard the value, to set a specified value (that can also be used in triggers) or set a specified error message. In case of a failed preprocessing step, the item will not become unsupported if the option to discard the value or set a specified value is selected. Note that for this preprocessing step, the <i>Custom on fail</i> checkbox is grayed out and always marked.</p> <p>This preprocessing step only checks if no item value could be retrieved. It does not check, for example, if the type of the retrieved value (e.g., string) matches the item's type of information (e.g., numeric). If there is a type mismatch, the item may still become unsupported after all preprocessing steps are executed. To check for a type mismatch, you may use, for example, the <i>Custom multiplier</i> preprocessing step; see <a href="#">Preprocessing examples</a>.</p> <p>This step is always executed as the first preprocessing step and is placed above all others after saving changes to the item. It can be used only once.</p> <p>Supported since 5.2.0.</p> |

**Throttling**

|                          |   |
|--------------------------|---|
| <i>Discard unchanged</i> | <p>Discard a value if it has not changed.</p> <p>If a value is discarded, it is not saved in the database and Zabbix server has no knowledge that this value was received. No trigger expressions will be evaluated, as a result, no problems for related triggers will be created/resolved. Functions will work only based on data that is actually saved in the database. As trends are built based on data in the database, if there is no value saved for an hour then there will also be no trends data for that hour.</p> <p>Only one throttling option can be specified for an item.</p> <p>Note that in case of a very small difference (less than 0.000001) between the values of the items monitored by Zabbix proxy, it is possible that discarding will not be performed correctly by the proxy, and the values will be stored in the history as the same value, unless Zabbix server database is <a href="#">upgraded</a>.</p> |
|--------------------------|---|

| Type                                    |  |
|---|--|
| <i>Discard unchanged with heartbeat</i> | <p>Discard a value if it has not changed within the defined time period (in seconds). Positive integer values are supported to specify the seconds (minimum - 1 second). Time suffixes can be used in this field (e.g. 30s, 1m, 2h, 1d). User macros and low-level discovery macros can be used in this field.</p> <p>If a value is discarded, it is not saved in the database and Zabbix server has no knowledge that this value was received. No trigger expressions will be evaluated, as a result, no problems for related triggers will be created/resolved. Functions will work only based on data that is actually saved in the database. As trends are built based on data in the database, if there is no value saved for an hour then there will also be no trends data for that hour.</p> <p>Only one throttling option can be specified for an item.</p> <p>Note that in case of a very small difference (less than 0.000001) between the values of the items monitored by Zabbix proxy, it is possible that discarding will not be performed correctly by the proxy, and the values will be stored in the history as the same value, unless Zabbix server database is <a href="#">upgraded</a>.</p> |
| Prometheus                              |  |
| <i>Prometheus pattern</i>               | <p>Use the following query to extract required data from Prometheus metrics.</p> <p>See <a href="#">Prometheus checks</a> for more details.</p>  |
| <i>Prometheus to JSON</i>               | <p>Convert required Prometheus metrics to JSON.</p> <p>See <a href="#">Prometheus checks</a> for more details.</p>   |

#### Attention:

For change and throttling preprocessing steps Zabbix has to remember the last value to calculate/compare the new value as required. These previous values are handled by the preprocessing manager. If Zabbix server or proxy is restarted or there is any change made to preprocessing steps the last value of the corresponding item is reset, resulting in:

- for *Simple change*, *Change per second* steps - the next value will be ignored because there is no previous value to calculated change from;
- for *Discard unchanged*, *Discard unchanged with heartbeat* steps - the next value will never be discarded, even if it should have been because of discarding rules.

Item's *Type of information* parameter is displayed at the bottom of the tab when at least one preprocessing step is defined. If required, it is possible to change the type of information without leaving the *Preprocessing* tab. See [Creating an item](#) for the detailed parameter description.

#### Note:

If you use a custom multiplier or store value as *Change per second* for items with the type of information set to *Numeric (unsigned)* and the resulting calculated value is actually a float number, the calculated value is still accepted as a correct one by trimming the decimal part and storing the value as an integer.

## Testing

Testing preprocessing steps is useful to make sure that complex preprocessing pipelines yield the results that are expected from them, without waiting for the item value to be received and preprocessed.

Item
Tags
Preprocessing 3

| Preprocessing steps | Name               | Parameter   | Custom on fail           | Actions                                    |
|---------------------|--------------------|---|--------------------------|--|
| 1:                  | Regular expression | <input type="text" value="([0-9]+)"/> <input type="text" value="\1"/> | <input type="checkbox"/> | <a href="#">Test</a> <a href="#">Reset</a> |
| 2:                  | Regular expression | <input type="text" value="([0-9+])"/> <input type="text" value="\1"/> | <input type="checkbox"/> | <a href="#">Test</a> <a href="#">Reset</a> |
| 3:                  | Regular expression | <input type="text" value="([0-9+])"/> <input type="text" value="\1"/> | <input type="checkbox"/> | <a href="#">Test</a> <a href="#">Reset</a> |
| <a href="#">Add</a> |                    |   |                          | <a href="#">Test all steps</a>             |

Type of information

Add
Test
Cancel


It is possible to test:

- against a hypothetical value
- against a real value from a host

Each preprocessing step can be tested individually as well as all steps can be tested together. When you click on the *Test* or *Test all steps* button respectively in the Actions block, a testing window is opened.

Testing hypothetical value

Test item

 cannot perform regular expression "[0-9+]" match for value of type "string": invalid regular expression: missing terminating ] for character class

Get value from host

Value

March 15th

Time

now

Not supported

Previous value


Prev. time

End of line sequence

LF

CRLF

Preprocessing steps

| Name                  | Result  |
|-----------------------|---|
| 1: Regular expression | 15  |
| 2: Regular expression | 1   |
| 3: Regular expression |  |

Test

Cancel

| Parameter                   | Description  |
|-----------------------------|--|
| <i>Get value from host</i>  | If you want to test a hypothetical value, leave this checkbox unmarked.<br>See also: <a href="#">Testing real value</a> .  |
| <i>Value</i>                | Enter the input value to test.<br>Clicking in the parameter field or on the view/edit button will open a text area window for entering the value or code block.  |
| <i>Not supported</i>        | Mark this checkbox to test an unsupported value.<br>This option is useful to test the <i>Check for not supported value</i> preprocessing step.   |
| <i>Time</i>                 | Time of the input value is displayed: <code>now</code> (read-only).  |
| <i>Previous value</i>       | Enter a previous input value to compare to.<br>Only for <i>Change</i> and <i>Throttling</i> preprocessing steps.   |
| <i>Previous time</i>        | Enter the previous input value time to compare to.<br>Only for <i>Change</i> and <i>Throttling</i> preprocessing steps.<br>The default value is based on the 'Update interval' field value of the item (if '1m', then this field is filled with <code>now-1m</code> ). If nothing is specified or the user has no access to the host, the default is <code>now-30s</code> .  |
| <i>Macros</i>               | If any macros are used, they are listed along with their values. The values are editable for testing purposes, but the changes will only be saved within the testing context.  |
| <i>End of line sequence</i> | Select the end of line sequence for multiline input values:<br><b>LF</b> - LF (line feed) sequence<br><b>CRLF</b> - CRLF (carriage-return line-feed) sequence.   |
| <i>Preprocessing steps</i>  | Preprocessing steps are listed; the testing result is displayed for each step after the <i>Test</i> button is clicked.<br>Since Zabbix 6.0.31, test results are truncated to a maximum size of 512KB when sent to the frontend. If a result is truncated, a warning icon is displayed. The warning description is displayed on mouseover. Note that data larger than 512KB is still processed fully by Zabbix server.<br>If the step failed in testing, an error icon is displayed. The error description is displayed on mouseover.<br>In case "Custom on fail" is specified for the step and that action is performed, a new line appears right after the preprocessing test step row, showing what action was done and what outcome it produced (error or value). |

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| Parameter     | Description  |
|---------------|--|
| <i>Result</i> | <p>The final result of testing preprocessing steps is displayed in all cases when all steps are tested together (when you click on the <i>Test all steps</i> button).</p> <p>The type of conversion to the value type of the item is also displayed, for example <i>Result converted to Numeric (unsigned)</i>.</p> <p>Since Zabbix 6.0.31, test results are truncated to a maximum size of 512KB when sent to the frontend. If a result is truncated, a warning icon is displayed. The warning description is displayed on mouseover. Note that data larger than 512KB is still processed fully by Zabbix server.</p> |

Click on *Test* to see the result after each preprocessing step.

Test values are stored between test sessions for either individual steps or all steps, allowing the user to change preprocessing steps or item configuration and then return to the testing window without having to re-enter information. Values are lost on a page refresh though.

The testing is done by Zabbix server. The frontend sends a corresponding request to the server and waits for the result. The request contains the input value and preprocessing steps (with expanded user macros). For *Change* and *Throttling* steps, an optional previous value and time can be specified. The server responds with results for each preprocessing step.

All technical errors or input validation errors are displayed in the error box at the top of the testing window.

#### Testing real value

To test preprocessing against a real value:

- Mark the *Get value from host* checkbox
- Enter or verify host parameters (host address, port, proxy name/no proxy) and item-specific details (such as SNMPv2 community or SNMPv3 security credentials). These fields are context-aware:
  - The values are pre-filled when possible, i.e. for items requiring an agent, by taking the information from the selected agent interface of the host
  - The values have to be filled manually for template items
  - Plain-text macro values are resolved
  - Fields where the value (or part of the value) is a secret or Vault macro are empty and have to be entered manually. If any item parameter contains a secret macro value, the following warning message is displayed: "Item contains user-defined macros with secret values. Values of these macros should be entered manually."
  - The fields are disabled when not needed in the context of the item type (e.g. the host address and the proxy fields are disabled for calculated items)
- Click on *Get value and test* to test the preprocessing

Test item

Get value from host ☒

\* Host address

Port

Proxy

Get value

Value

Time

Not supported

Previous value

Prev. time

End of line sequence

Preprocessing steps

| Name                                | Result   |
|-------------------------------------|----------|
| 1: Discard unchanged with heartbeat | No value |

Result

No value

Get value and test

Cancel

If you have specified a value mapping in the item configuration form ('Show value' field), the item test dialog will show another line after the final result, named 'Result with value map applied'.

Parameters that are specific to getting a real value from a host:

| Parameter  | Description   |
|--|---|
| <i>Get value from host</i>   | Mark this checkbox to get a real value from the host.   |
| <i>Host address</i>  | Enter the host address.<br>This field is automatically filled by the address of the item host interface.                        |
| <i>Port</i>  | Enter the host port.<br>This field is automatically filled by the port of item host interface.                                  |
| <i>Additional fields for SNMP</i>  | See <a href="#">Configuring SNMP monitoring</a> for additional details on configuring an SNMP interface (v1, v2 and v3).        |
| <i>interfaces&lt;br&gt;(SNMP version, SNMP community, Context name, etc)</i> | These fields are automatically filled from the item host interface.   |
| <i>Proxy</i>   | Specify the proxy if the host is monitored by a proxy.<br>This field is automatically filled by the proxy of the host (if any). |

For the rest of the parameters, see [Testing hypothetical value](#) above.

## 1 Usage examples

### Overview

This section presents examples of using preprocessing steps to accomplish some practical tasks.

#### Filtering VMware event log records

This example uses the [Matches regular expression](#) preprocessing step to filter unnecessary events from the VMware event log.

1. On a working VMware Hypervisor host, check that the event log item `vmware.eventlog` is present and working properly. Note that the event log item could already be present on the hypervisor if a **VMware** template has been linked during the host creation.
2. On the VMware Hypervisor host, create a [dependent item](#) of "Log" type and set the event log item as its master.
3. In the *Preprocessing* tab of the dependent item, select the "Matches regular expression" preprocessing step and specify, for example, one of the following parameters:

```
##### Filters all log events:
pattern: .* logged in .*
```

```
##### Filters lines containing usernames after "User":
pattern: \bUser\s+\K\S+
```

#### Attention:

If the regular expression is not matched, then the dependent item becomes unsupported with a corresponding error message. To avoid this, mark the "Custom on fail" checkbox and select an option such as discarding the value or setting a custom one.

Alternatively, you may use the [Regular expression](#) preprocessing step to extract matching groups and control output. For example:

```
##### Extracts and outputs the entire log event containing "logged in":
pattern: .*logged in.*
output: \0
```

```
##### Extracts and outputs usernames following "User":
pattern: User (.*?)(?=\s)
output: \1
```

#### Checking retrieved value type

This example uses the [Custom multiplier](#) preprocessing step to check if the retrieved item value type is numeric.

In the *Preprocessing* tab of an item, select the "Custom multiplier" preprocessing step and set the following parameter:

```
##### Multiplies the retrieved value by 1:
number: 1
```

**Attention:**

If preprocessing fails (e.g., input is not numeric), then the item becomes unsupported with a corresponding error message. To avoid this, mark the "Custom on fail" checkbox and select an option such as discarding the value or setting a custom one.

## 2 Preprocessing details

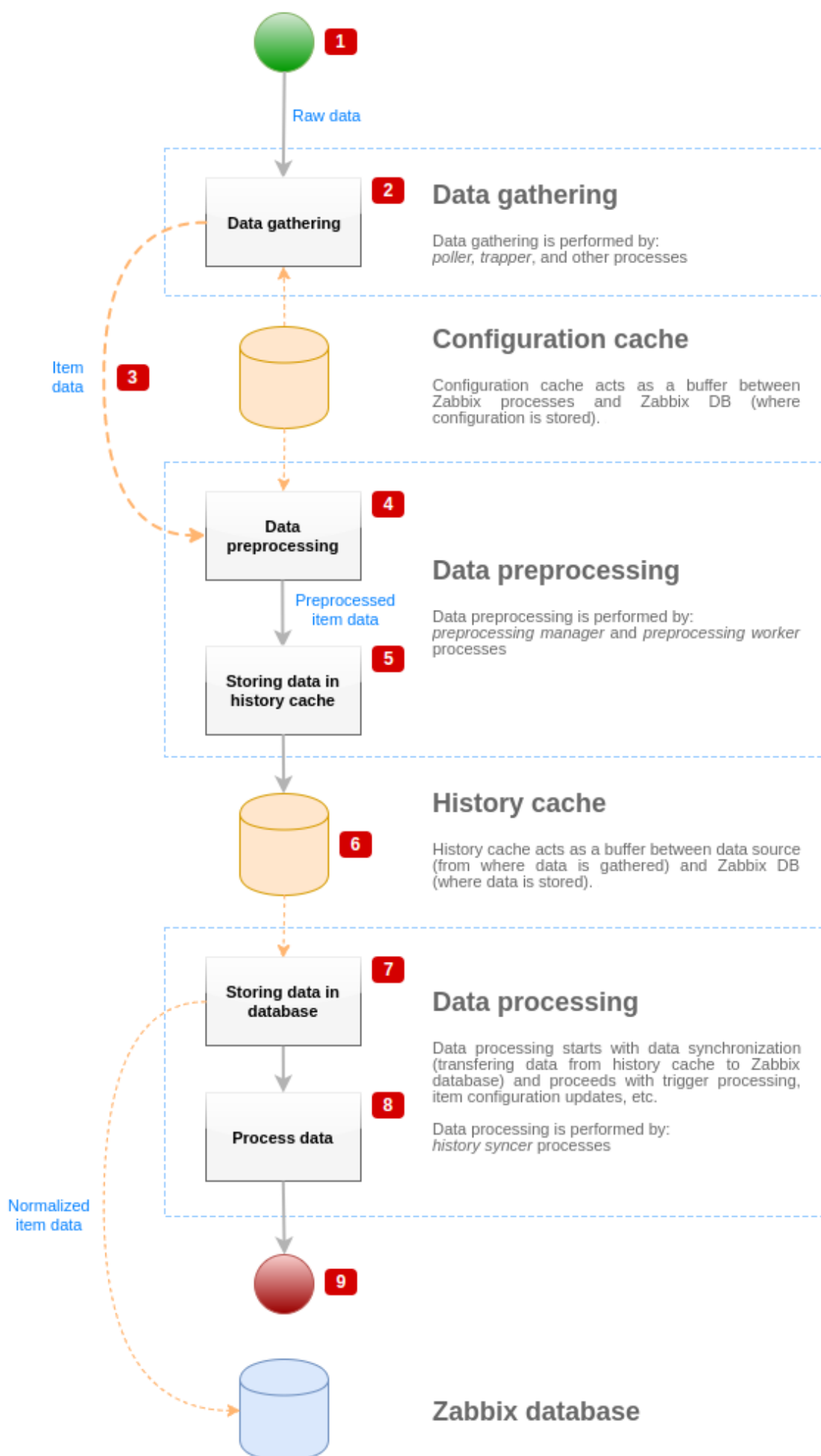
### Overview

This section provides item value preprocessing details. Item value preprocessing allows to define and execute **transformation rules** for the received item values.

Preprocessing is managed by a preprocessing manager process, which was added in Zabbix 3.4, along with preprocessing workers that perform the preprocessing steps. All values (with or without preprocessing) from different data gatherers pass through the preprocessing manager before being added to the history cache. Socket-based IPC communication is used between data gatherers (pollers, trappers, etc) and the preprocessing process. Either Zabbix server or Zabbix proxy (for items monitored by the proxy) is performing preprocessing steps.

### Item value processing

To visualize the data flow from data source to the Zabbix database, we can use the following simplified diagram:



The diagram above shows only processes, objects and actions related to item value processing in a **simplified** form. The diagram does not show conditional direction changes, error handling or loops. Local data cache of preprocessing manager is not shown either because it doesn't affect data flow directly. The aim of this diagram is to show processes involved in item value processing and the way they interact.

- Data gathering starts with raw data from a data source. At this point, data contains only ID, timestamp and value (can be multiple values as well)
- No matter what type of data gatherer is used, the idea is the same for active or passive checks, for trapper items and etc, as it only changes the data format and the communication starter (either data gatherer is waiting for a connection and data, or data gatherer initiates the communication and requests the data). Raw data is validated, item configuration is retrieved from configuration cache (data is enriched with the configuration data).
- Socket-based IPC mechanism is used to pass data from data gatherers to preprocessing manager. At this point data gatherer continue to gather data without waiting for the response from preprocessing manager.
- Data preprocessing is performed. This includes execution of preprocessing steps and dependent item processing.

**Note:**

Item can change its state to NOT SUPPORTED while preprocessing is performed if any of preprocessing steps fail.

- History data from local data cache of preprocessing manager is being flushed into history cache.
- At this point data flow stops until the next synchronization of history cache (when history syncer process performs data synchronization).
- Synchronization process starts with data normalization storing data in Zabbix database. Data normalization performs conversions to desired item type (type defined in item configuration), including truncation of textual data based on pre-defined sizes allowed for those types (HISTORY\_STR\_VALUE\_LEN for string, HISTORY\_TEXT\_VALUE\_LEN for text and HISTORY\_LOG\_VALUE\_LEN for log values). Data is being sent to Zabbix database after normalization is done.

**Note:**

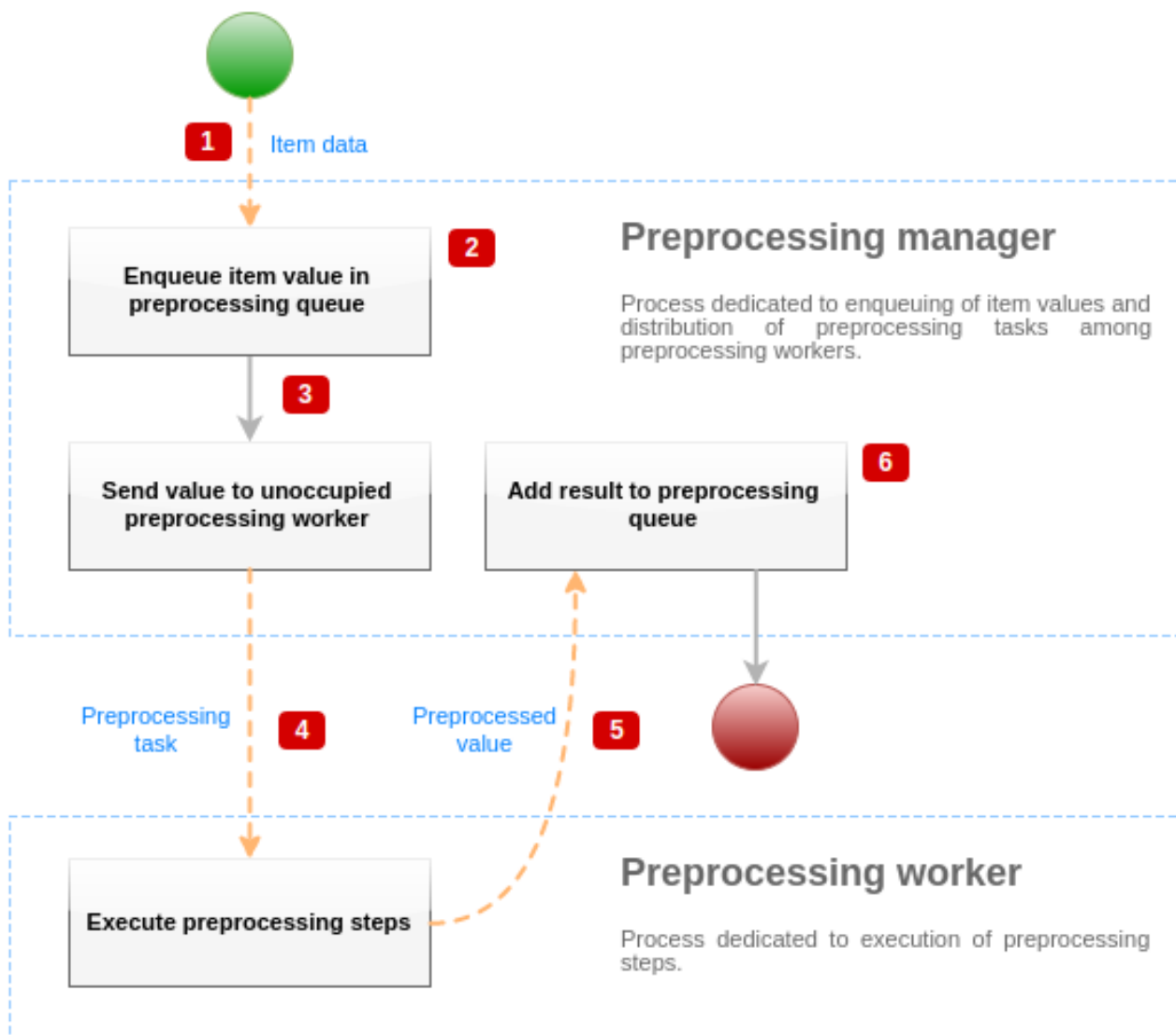
Item can change its state to NOT SUPPORTED if data normalization fails (for example, when textual value cannot be converted to number).

- Gathered data is being processed - triggers are checked, item configuration is updated if item becomes NOT SUPPORTED, etc.
- This is considered the end of data flow from the point of view of item value processing.

Item value preprocessing

To visualize the data preprocessing process, we can use the following simplified diagram:





The diagram above shows only processes, objects and main actions related to item value preprocessing in a **simplified** form. The diagram does not show conditional direction changes, error handling or loops. Only one preprocessing worker is shown on this diagram (multiple preprocessing workers can be used in real-life scenarios), only one item value is being processed and we assume that this item requires to execute at least one preprocessing step. The aim of this diagram is to show the idea behind item value preprocessing pipeline.

- Item data and item value is passed to preprocessing manager using socket-based IPC mechanism.
- Item is placed in the preprocessing queue.

**Note:**

Item can be placed at the end or at the beginning of the preprocessing queue. Zabbix internal items are always placed at the beginning of preprocessing queue, while other item types are enqueued at the end.

- At this point data flow stops until there is at least one unoccupied (that is not executing any tasks) preprocessing worker.
- When preprocessing worker is available, preprocessing task is being sent to it.
- After preprocessing is done (both failed and successful execution of preprocessing steps), preprocessed value is being passed back to preprocessing manager.
- Preprocessing manager converts result to desired format (defined by item value type) and places result in preprocessing queue. If there are dependent items for current item, then dependent items are added to preprocessing queue as well. Dependent items are enqueued in preprocessing queue right after the master item, but only for master items with value set and not in NOT SUPPORTED state.

**Value processing pipeline**

Item value processing is executed in multiple steps (or phases) by multiple processes. This can cause:

- Dependent item can receive values, while THE master value cannot. This can be achieved by using the following use case:

- Master item has value type UINT, (trapper item can be used), dependent item has value type TEXT.
- No preprocessing steps are required for both master and dependent items.
- Textual value (like, "abc") should be passed to master item.
- As there are no preprocessing steps to execute, preprocessing manager checks if master item is not in NOT SUPPORTED state and if value is set (both are true) and enqueues dependent item with the same value as master item (as there are no preprocessing steps).
- When both master and dependent items reach history synchronization phase, master item becomes NOT SUPPORTED, because of the value conversion error (textual data cannot be converted to unsigned integer).

As a result, dependent item receives a value, while master item changes its state to NOT SUPPORTED.

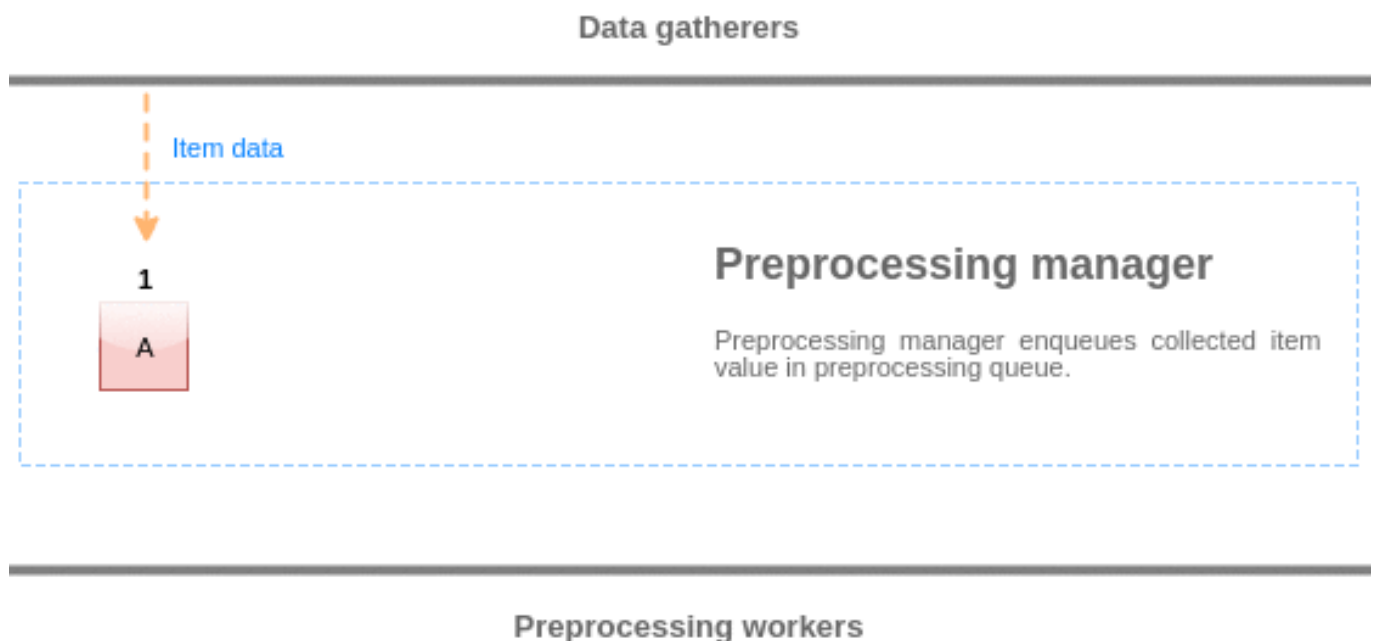
- Dependent item receives value that is not present in master item history. The use case is very similar to the previous one, except for the master item type. For example, if CHAR type is used for master item, then master item value will be truncated at the history synchronization phase, while dependent items will receive their value from the initial (not truncated) value of master item.

#### Preprocessing queue

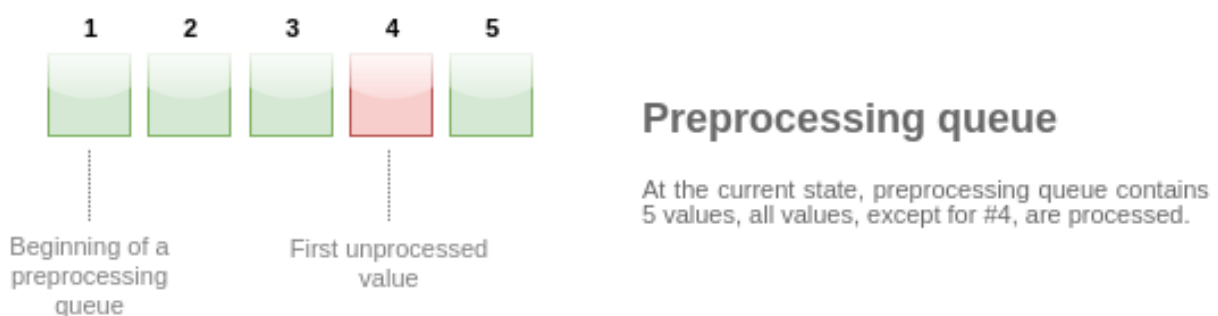
Preprocessing queue is a FIFO data structure that stores values preserving the order in which values are reviewed by preprocessing manager. There are multiple exceptions to FIFO logic:

- Internal items are enqueued at the beginning of the queue
- Dependent items are always enqueued after the master item

To visualize the logic of preprocessing queue, we can use the following diagram:



Values from the preprocessing queue are flushed from the beginning of the queue to the first unprocessed value. So, for example, preprocessing manager will flush values 1, 2 and 3, but will not flush value 5 as value 4 is not processed yet:



Only two values will be left in queue (4 and 5) after flushing, values are added into local data cache of preprocessing manager and then values are transferred from local cache into history cache. Preprocessing manager can flush values from local data cache in

single item mode or in bulk mode (used for dependent items and values received in bulk).

#### Preprocessing workers

Zabbix server configuration file allows users to set count of preprocessing worker processes. StartPreprocessors configuration parameter should be used to set number of pre-forked instances of preprocessing workers. Optimal number of preprocessing workers can be determined by many factors, including the count of "preprocessable" items (items that require to execute any preprocessing steps), count of data gathering processes, average step count for item preprocessing, etc.

But assuming that there is no heavy preprocessing operations like parsing of large XML / JSON chunks, number of preprocessing workers can match total number of data gatherers. This way, there will mostly (except for the cases when data from gatherer comes in bulk) be at least one unoccupied preprocessing worker for collected data.

#### Warning:

Too many data gathering processes (pollers, unreachable pollers, ODBC pollers, HTTP pollers, Java pollers, pingers, trappers, proxypollers) together with IPMI manager, SNMP trapper and preprocessing workers can exhaust the per-process file descriptor limit for the preprocessing manager. This will cause Zabbix server to stop (usually shortly after the start, but sometimes it can take more time). The configuration file should be revised or the limit should be raised to avoid this situation.

### 3 JSONPath functionality

#### Overview

This section provides details of supported JSONPath functionality in item value preprocessing steps.

JSONPath consists of segments separated with dots. A segment can be either a simple word like a JSON value name, \* or a more complex construct enclosed within square brackets []. The separating dot before bracket segment is optional and can be omitted. For example:

| Path   | Description   |
|--|---|
| \$.object.name                                     | Return the object.name contents.  |
| \$.object['name']                                  | Return the object.name contents.  |
| \$.object.[ 'name' ]                               | Return the object.name contents.  |
| \$["object"]['name']                               | Return the object.name contents.  |
| \$.['object'].["name"]                             | Return the object.name contents.  |
| \$.object.history.length()                         | Return the number of object.history array elements.                                 |
| \$[?(@.name == 'Object')].price.first()            | Return the price field of the first object with name 'Object'.                      |
| \$[?(@.name == 'Object')].history.first().length() | Return the number of history array elements of the first object with name 'Object'. |
| \$[?(@.price > 10)].length()                       | Return the number of objects with price being greater than 10.                      |

See also: [Escaping special characters from LLD macro values in JSONPath](#).

#### Supported segments

| Segment                   | Description   |
|---------------------------|---|
| <name>                    | Match object property by name.  |
| *                         | Match all object properties.  |
| ['<name>']                | Match object property by name.  |
| ['<name>', '<name>', ...] | Match object property by any of the listed names.   |
| [<index>]                 | Match array element by the index.   |
| [<number>, <number>, ...] | Match array element by any of the listed indexes.   |
| [*]                       | Match all object properties or array elements.  |
| [<start>:<end>]           | Match array elements by the defined range:<br><start> - the first index to match (including). If not specified matches all array elements from the beginning. If negative specifies starting offset from the end of array.<br><end> - the last index to match (excluding). If not specified matches all array elements to the end. If negative specifies starting offset from the end of array. |

| Segment           | Description   |
|-------------------|---|
| [?(<expression>)] | Match objects/array elements by applying a filter expression. |

To find a matching segment ignoring its ancestry (detached segment) it must be prefixed with '..' , for example \$...name or \$. . ['name'] return values of all 'name' properties.

Matched element names can be extracted by adding a ~ suffix to the JSONPath. It returns the name of the matched object or an index in string format of the matched array item. The output format follows the same rules as other JSONPath queries - definite path results are returned 'as is' and indefinite path results are returned in array. However there is not much point of extracting the name of an element matching a definite path - it's already known.

#### Filter expression

The filter expression is an arithmetical expression in infix notation.

Supported operands:

| Operand                     | Description   | Example        |
|-----------------------------|---|----------------|
| "<text>"                    | Text constant.  | 'value: \'1\'" |
| '<text>'                    |   | "value: '1'"   |
| <number>                    | Numeric constant supporting scientific notation.  | 123            |
| <jsonpath starting with \$> | Value referred to by the JSONPath from the input document root node; only definite paths are supported. | \$.object.name |
| <jsonpath starting with @>  | Value referred to by the JSONPath from the current object/element; only definite paths are supported.   | @.name         |

Supported operators:

| Operator | Type   | Description                  | Result            |
|----------|--------|------------------------------|-------------------|
| -        | binary | Subtraction.                 | Number.           |
| +        | binary | Addition.                    | Number.           |
| /        | binary | Division.                    | Number.           |
| *        | binary | Multiplication.              | Number.           |
| ==       | binary | Is equal to.                 | Boolean (1 or 0). |
| !=       | binary | Is not equal to.             | Boolean (1 or 0). |
|          | binary | Is less than.                | Boolean (1 or 0). |
| <=       | binary | Is less than or equal to.    | Boolean (1 or 0). |
| >        | binary | Is greater than.             | Boolean (1 or 0). |
| >=       | binary | Is greater than or equal to. | Boolean (1 or 0). |
| =~       | binary | Matches regular expression.  | Boolean (1 or 0). |
| !        | unary  | Boolean not.                 | Boolean (1 or 0). |
|          | binary | Boolean or.                  | Boolean (1 or 0). |
| &&       | binary | Boolean and.                 | Boolean (1 or 0). |

#### Functions

Functions can be used at the end of JSONPath. Multiple functions can be chained if the preceding function returns value that is accepted by the following function.

Supported functions:

| Function | Description                              | Input             | Output  |
|----------|--|-------------------|---------|
| avg      | Average value of numbers in input array. | Array of numbers. | Number. |
| min      | Minimum value of numbers in input array. | Array of numbers. | Number. |
| max      | Maximum value of numbers in input array. | Array of numbers. | Number. |
| sum      | Sum of numbers in input array.           | Array of numbers. | Number. |
| length   | Number of elements in input array.       | Array.            | Number. |

| Function           | Description              | Input  | Output   |
|--------------------|--------------------------|--------|--|
| <code>first</code> | The first array element. | Array. | A JSON construct (object, array, value) depending on input array contents. |

Quoted numeric values are accepted by the JSONPath aggregate functions. It means that the values are converted from string type to numeric if aggregation is required.

Incompatible input will cause the function to generate error.

Output value

JSONPaths can be divided in definite and indefinite paths. A definite path can return only null or a single match. An indefinite path can return multiple matches, basically JSONPaths with detached, multiple name/index list, array slice or expression segments. However, when a function is used the JSONPath becomes definite, as functions always output single value.

A definite path returns the object/array/value it's referencing, while indefinite path returns an array of the matched objects/arrays/values.

#### Attention:

The property order in JSONPath query results may not align with the original JSON property order due to internal optimization methods. For example, the JSONPath `$.books[1]["author", "title"]` may return `["title", "author"]`. If preserving the original property order is essential, alternative post-query processing methods should be considered.

Whitespace

Whitespace (space, tab characters) can be freely used in bracket notation segments and expressions, for example, `$[ 'a' ][ 0 ][ ?( $.b == 'c' ) ][ : -1 ].first( )`.

Strings

Strings should be enclosed with single ' or double " quotes. Inside the strings, single or double quotes (depending on which are used to enclose it) and backslashes \ are escaped with the backslash \ character.

Examples

Input data

```
{
  "books": [
    {
      "category": "reference",
      "author": "Nigel Rees",
      "title": "Sayings of the Century",
      "price": 8.95,
      "id": 1
    },
    {
      "category": "fiction",
      "author": "Evelyn Waugh",
      "title": "Sword of Honour",
      "price": 12.99,
      "id": 2
    },
    {
      "category": "fiction",
      "author": "Herman Melville",
      "title": "Moby Dick",
      "isbn": "0-553-21311-3",
      "price": 8.99,
      "id": 3
    },
    {
      "category": "fiction",
      "author": "J. R. R. Tolkien",
      "title": "The Lord of the Rings",

```

```

    "isbn": "0-395-19395-8",
    "price": 22.99,
    "id": 4
  }
],
"services": {
  "delivery": {
    "servicegroup": 1000,
    "description": "Next day delivery in local town",
    "active": true,
    "price": 5
  },
  "bookbinding": {
    "servicegroup": 1001,
    "description": "Printing and assembling book in A5 format",
    "active": true,
    "price": 154.99
  },
  "restoration": {
    "servicegroup": 1002,
    "description": "Various restoration methods",
    "active": false,
    "methods": [
      {
        "description": "Chemical cleaning",
        "price": 46
      },
      {
        "description": "Pressing pages damaged by moisture",
        "price": 24.5
      },
      {
        "description": "Rebinding torn book",
        "price": 99.49
      }
    ]
  }
}
},
"filters": {
  "price": 10,
  "category": "fiction",
  "no filters": "no \"filters\""
},
"closed message": "Store is closed",
"tags": [
  "a",
  "b",
  "c",
  "d",
  "e"
]
}

```

| JSONPath                 | Type     | Result       | Comments |
|--------------------------|----------|--------------|----------|
| \$.filters.price         | definite | 10           |          |
| \$.filters.category      | definite | fiction      |          |
| \$.filters['no filters'] | definite | no "filters" |          |

| JSONPath   | Type       | Result   | Comments   |
|--|------------|--|--|
| \$.filters   | definite   | {<br>"price": 10,<br>"category": "fiction",<br>"no filters": "no \"filters\""<br>} |  |
| \$.books[1].title  | definite   | Sword of Honour  |  |
| \$.books[-1].author  | definite   | J. R. R. Tolkien   |  |
| \$.books.length  | definite   | 4  |  |
| \$.tags[:]   | indefinite | ["a", "b", "c", "d", "e"]  |  |
| \$.tags[2:]  | indefinite | ["c", "d", "e"]  |  |
| \$.tags[:3]  | indefinite | ["a", "b", "c"]  |  |
| \$.tags[1:4]   | indefinite | ["b", "c", "d"]  |  |
| \$.tags[-2:]   | indefinite | ["d", "e"]   |  |
| \$.tags[: -3]  | indefinite | ["a", "b"]   |  |
| \$.tags[: -3].length                                       | definite   | 2  |  |
| \$.books[0, 2].title                                       | indefinite | ["Moby Dick", "Sayings of the Century"]  |  |
| \$.books[1]['author', 'title']                             | indefinite | ["Sword of Honour", "Evelyn Waugh"]  |  |
| \$.id  | indefinite | [1, 2, 3, 4]   |  |
| \$.services..price   | indefinite | [154.99, 5, 46, 24.5, 99.49]   |  |
| \$.books[?(@.id == 4 - 0.4 * 5)].title                     | indefinite | ["Sword of Honour", "The Lord of the Rings"]                                       | This query shows that arithmetical operations can be used in queries. Of course this query can be simplified to \$.books[?(@.id == 2)].title |
| \$.books[?(@.id == 2 \\  \\  @.id == 4)].title             | indefinite | ["Sayings of the Century", "Moby Dick", "The Lord of the Rings"]                   |  |
| \$.books[?(@.id == 2)    (@.id == 4)].title                | indefinite | ["Sayings of the Century", "Moby Dick", "The Lord of the Rings"]                   |  |
| \$.books[?(@.id != 2)].title                               | indefinite | ["Sayings of the Century", "Moby Dick", "The Lord of the Rings"]                   |  |
| \$.books[?(@.id == ~ " of ")].title                        | indefinite | ["Sayings of the Century", "Sword of Honour", "The Lord of the Rings"]             |  |
| \$.books[?(@.price > 12.99)].title                         | indefinite | ["The Lord of the Rings"]  |  |
| \$.books[?(@.author > "Herman Melville")].title            | indefinite | ["Sayings of the Century", "The Lord of the Rings"]                                |  |
| \$.books[?(@.price > \$.filters.price)].title              | indefinite | ["Sword of Honour", "The Lord of the Rings"]                                       |  |
| \$.books[?(@.category == \$.filters.category)].title       | indefinite | ["Sword of Honour", "Moby Dick", "The Lord of the Rings"]                          |  |
| \$.books[?(@.category == "fiction" && @.price < 10)].title | indefinite | ["Moby Dick"]  |  |





When low-level discovery macros are used in JSONPath preprocessing and their values are resolved, the following rules of escaping special characters are applied:

- only backslash (\) and double quote (") characters are considered for escaping;
- if the resolved macro value contains these characters, each of them is escaped with a backslash;
- if they are already escaped with a backslash, it is not considered as escaping and both the backslash and the following special characters are escaped once again.

For example:

| JSONPath                      | LLD macro value | After substitution                     |
|-------------------------------|-----------------|--|
| \$.[?(@.value == "{#MACRO}")] | special "value" | \$.[?(@.value == "special \"value\"")] |
|                               | c:\temp         | \$.[?(@.value == "c:\\temp")]          |
|                               | a\\b            | \$.[?(@.value == "a\\\\b")]            |

When used in the expression the macro that may have special characters should be enclosed in double quotes:

| JSONPath                      | LLD macro value | After substitution                     | Result                         |
|-------------------------------|-----------------|--|--------------------------------|
| \$.[?(@.value == "{#MACRO}")] | special "value" | \$.[?(@.value == "special \"value\"")] | OK                             |
| \$.[?(@.value == {#MACRO})]   |                 | \$.[?(@.value == special \"value\"")]  | <b>Bad JSONPath expression</b> |

When used in the path the macro that may have special characters should be enclosed in square brackets **and** double quotes:

| JSONPath              | LLD macro value | After substitution    | Result                         |
|-----------------------|-----------------|-----------------------|--------------------------------|
| \$.["{#MACRO}"].value | c:\temp         | \$.["c:\\temp"].value | OK                             |
| \$.{#MACRO}.value     |                 | \$.c:\\temp.value     | <b>Bad JSONPath expression</b> |

## 4 JavaScript preprocessing

### Overview

This section provides details of preprocessing by JavaScript.

#### JavaScript preprocessing

JavaScript preprocessing is done by invoking JavaScript function with a single parameter 'value' and user provided function body. The preprocessing step result is the value returned from this function, for example, to perform Fahrenheit to Celsius conversion user must enter:

```
return (value - 32) * 5 / 9
```

in JavaScript preprocessing parameters, which will be wrapped into a JavaScript function by server:

```
function (value)
{
    return (value - 32) * 5 / 9
}
```

The input parameter 'value' is always passed as a string. The return value is automatically coerced to string via ToString() method (if it fails then the error is returned as string value), with a few exceptions:

- returning undefined value will result in an error
- returning null value will cause the input value to be discarded, much like 'Discard value' preprocessing on 'Custom on fail' action.

Errors can be returned by throwing values/objects (normally either strings or Error objects).

For example:

```
if (value == 0)
    throw "Zero input value"
return 1/value
```

Each script has a 10 second execution timeout (depending on the script it might take longer for the timeout to trigger); exceeding it will return error. A 512-megabyte heap limit is enforced (64 megabytes before Zabbix 6.0.19).

The JavaScript preprocessing step bytecode is cached and reused when the step is applied next time. Any changes to the item's preprocessing steps will cause the cached script to be reset and recompiled later.

Consecutive runtime failures (3 in a row) will cause the engine to be reinitialized to mitigate the possibility of one script breaking the execution environment for the next scripts (this action is logged with DebugLevel 4 and higher).

JavaScript preprocessing is implemented with Duktape (<https://duktape.org/>) JavaScript engine.

See also: [Additional JavaScript objects and global functions](#)

Using macros in scripts

It is possible to use user macros in JavaScript code. If a script contains user macros, these macros are resolved by server/proxy before executing specific preprocessing steps. Note that when testing preprocessing steps in the frontend, macro values will not be pulled and need to be entered manually.

**Note:**

Context is ignored when a macro is replaced with its value. Macro value is inserted in the code as is, it is not possible to add additional escaping before placing the value in the JavaScript code. Please be advised, that this can cause JavaScript errors in some cases.

In an example below, if received value exceeds a `{ $THRESHOLD }` macro value, the threshold value (if present) will be returned instead:

```
var threshold = '{ $THRESHOLD }';
return (!isNaN(threshold) && value > threshold) ? threshold : value;
```

## 1 Additional JavaScript objects

### Overview

This section describes Zabbix additions to the JavaScript language implemented with Duktape and supported global JavaScript functions.

#### Built-in objects

##### Zabbix

The Zabbix object provides interaction with the internal Zabbix functionality.

| Method                              | Description   |
|-------------------------------------|---|
| <code>log(loglevel, message)</code> | Writes <code>&lt;message&gt;</code> into Zabbix log using <code>&lt;loglevel&gt;</code> log level (see configuration file <code>DebugLevel</code> parameter). |

Example:

```
Zabbix.log(3, "this is a log entry written with 'Warning' log level")
```

You may use the following aliases:

| Alias                              | Alias to   |
|------------------------------------|--|
| <code>console.log(object)</code>   | <code>Zabbix.log(4, JSON.stringify(object))</code> |
| <code>console.warn(object)</code>  | <code>Zabbix.log(3, JSON.stringify(object))</code> |
| <code>console.error(object)</code> | <code>Zabbix.log(2, JSON.stringify(object))</code> |

**Attention:**

The total size of all logged messages is limited to 8 MB per script execution.

| Method                    | Description  |
|---------------------------|--|
| <code>sleep(delay)</code> | Delay JavaScript execution by <code>delay</code> milliseconds. |

Example (delay execution by 15 seconds):

```
Zabbix.sleep(15000)
```

HttpRequest

**Attention:**

"HttpRequest" is a new name for this object since Zabbix 5.4. Previously it was called "CurlHttpRequest". Method names have also been changed in Zabbix 5.4. The old object/method names are now deprecated and their support will be discontinued after Zabbix 6.0.

This object encapsulates cURL handle allowing to make simple HTTP requests. Errors are thrown as exceptions.

**Attention:**

The initialization of multiple `HttpRequest` objects is limited to 10 per script execution.

| Method  | Description  |
|---|--|
| <code>addHeader(value)</code>                         | Adds HTTP header field. This field is used for all following requests until cleared with the <code>clearHeader()</code> method.<br>The total length of header fields that can be added to a single <code>HttpRequest</code> object is limited to 128 Kbytes (special characters and header names included).  |
| <code>clearHeader()</code>                            | Clears HTTP header. If no header fields are set, <code>HttpRequest</code> will set Content-Type to application/json if the data being posted is JSON-formatted; text/plain otherwise.  |
| <code>connect(url)</code>                             | Sends HTTP CONNECT request to the URL and returns the response.  |
| <code>customRequest(method, url, data)</code>         | Allows to specify any HTTP method in the first parameter. Sends the method request to the URL with optional <code>data</code> payload and returns the response.  |
| <code>delete(url, data)</code>                        | Sends HTTP DELETE request to the URL with optional <code>data</code> payload and returns the response.   |
| <code>getHeaders(&lt;asArray&gt;)</code>              | Returns the object of received HTTP header fields.<br>The <code>asArray</code> parameter may be set to "true" (e.g. <code>getHeaders(true)</code> ), "false" or be undefined. If set to "true" the received HTTP header field values will be returned as arrays; this should be used to retrieve the field values of multiple same-name headers.<br>If not set or set to "false", the received HTTP header field values will be returned as strings. |
| <code>get(url, data)</code>                           | Sends HTTP GET request to the URL with optional <code>data</code> payload and returns the response.  |
| <code>head(url)</code>                                | Sends HTTP HEAD request to the URL and returns the response.   |
| <code>options(url)</code>                             | Sends HTTP OPTIONS request to the URL and returns the response.  |
| <code>patch(url, data)</code>                         | Sends HTTP PATCH request to the URL with optional <code>data</code> payload and returns the response.  |
| <code>put(url, data)</code>                           | Sends HTTP PUT request to the URL with optional <code>data</code> payload and returns the response.  |
| <code>post(url, data)</code>                          | Sends HTTP POST request to the URL with optional <code>data</code> payload and returns the response.   |
| <code>getStatus()</code>                              | Returns the status code of the last HTTP request.  |
| <code>setProxy(proxy)</code>                          | Sets HTTP proxy to "proxy" value. If this parameter is empty then no proxy is used.  |
| <code>setHttpAuth(bitmask, username, password)</code> | Sets enabled HTTP authentication methods (HTTPAUTH_BASIC, HTTPAUTH_DIGEST, HTTPAUTH_NEGOTIATE, HTTPAUTH_NTLM, HTTPAUTH_NONE) in the 'bitmask' parameter.<br>The HTTPAUTH_NONE flag allows to disable HTTP authentication.<br>Examples:<br><code>request.setHttpAuth(HTTPAUTH_NTLM   HTTPAUTH_BASIC, username, password)</code><br><code>'request.setHttpAuth(HTTPAUTH_NONE)</code>   |
| <code>trace(url, data)</code>                         | Sends HTTP TRACE request to the URL with optional <code>data</code> payload and returns the response.  |

Example:

```
try {
  Zabbix.log(4, 'jira webhook script value='+value);

  var result = {
    'tags': {
      'endpoint': 'jira'
    }
  },
```

```

params = JSON.parse(value),
req = new HttpRequest(),
fields = {},
resp;

req.addHeader('Content-Type: application/json');
req.addHeader('Authorization: Basic '+params.authentication);

fields.summary = params.summary;
fields.description = params.description;
fields.project = {"key": params.project_key};
fields.issuetype = {"id": params.issue_id};
resp = req.post('https://jira.example.com/rest/api/2/issue/',
    JSON.stringify({"fields": fields})
);

if (req.getStatus() != 201) {
    throw 'Response code: '+req.getStatus();
}

resp = JSON.parse(resp);
result.tags.issue_id = resp.id;
result.tags.issue_key = resp.key;
} catch (error) {
    Zabbix.log(4, 'jira issue creation failed json : '+JSON.stringify({"fields": fields}));
    Zabbix.log(4, 'jira issue creation failed : '+error);

    result = {};
}

return JSON.stringify(result);

```

## XML

The XML object allows the processing of XML data in the item and low-level discovery preprocessing and webhooks.

### Attention:

In order to use XML object, server/proxy must be compiled with libxml2 support.

| Method                      | Description   |
|-----------------------------|---|
| XML.query(data, expression) | Retrieves node content using XPath. Returns null if node is not found.<br><b>expression</b> - an XPath expression;<br><b>data</b> - XML data as a string. |
| XML.toJson(data)            | Converts data in XML format to JSON.  |
| XML.fromJson(object)        | Converts data in JSON format to XML.  |

Example:

Input:

```

<menu>
  <food type = "breakfast">
    <name>Chocolate</name>
    <price>$5.95</price>
    <description></description>
    <calories>650</calories>
  </food>
</menu>

```

Output:

```

{
  "menu": {

```

```

    "food": {
      "@type": "breakfast",
      "name": "Chocolate",
      "price": "$5.95",
      "description": null,
      "calories": "650"
    }
  }
}

```

#### Serialization rules

XML to JSON conversion will be processed according to the following rules (for JSON to XML conversions reversed rules are applied):

1. XML attributes will be converted to keys that have their names prepended with '@'.

Example:

*Input:*

```

<xml foo="FOO">
  <bar>
    <baz>BAZ</baz>
  </bar>
</xml>

```

*Output:*

```

{
  "xml": {
    "@foo": "FOO",
    "bar": {
      "baz": "BAZ"
    }
  }
}

```

2. Self-closing elements (<foo/>) will be converted as having 'null' value.

Example:

*Input:*

```

<xml>
  <foo/>
</xml>

```

*Output:*

```

{
  "xml": {
    "foo": null
  }
}

```

3. Empty attributes (with "" value) will be converted as having empty string ("") value.

Example:

*Input:*

```

<xml>
  <foo bar="" />
</xml>

```

*Output:*

```

{
  "xml": {
    "foo": {
      "@bar": ""
    }
  }
}

```

```
}  
}
```

4. Multiple child nodes with the same element name will be converted to a single key that has an array of values as its value.

Example:

*Input:*

```
<xml>  
  <foo>BAR</foo>  
  <foo>BAZ</foo>  
  <foo>QUX</foo>  
</xml>
```

*Output:*

```
{  
  "xml": {  
    "foo": ["BAR", "BAZ", "QUX"]  
  }  
}
```

5. If a text element has no attributes and no children, it will be converted as a string.

Example:

*Input:*

```
<xml>  
  <foo>BAZ</foo>  
</xml>
```

*Output:*

```
{  
  "xml": {  
    "foo": "BAZ"  
  }  
}
```

6. If a text element has no children, but has attributes: text content will be converted to an element with the key '#text' and content as a value; attributes will be converted as described in the serialization rule 1.

Example:

*Input:*

```
<xml>  
  <foo bar="BAR">  
    BAZ  
  </foo>  
</xml>
```

*Output:*

```
{  
  "xml": {  
    "foo": {  
      "@bar": "BAR",  
      "#text": "BAZ"  
    }  
  }  
}
```

## Global JavaScript functions

Additional global JavaScript functions have been implemented with Duktape:

- `btoa(data)` - encodes the data to Base64 string;
- `atob(base64_string)` - since version 6.0.31, decodes Base64 string as Uint8Array buffer (in Zabbix 6.0.0 - 6.0.30 returns a decoded string).

```
try {
  b64 = btoa("test string");
  buffer = atob(b64);

  // Note that decoding logic depends on the data format of the buffer.
  decoded = String.fromCharCode.apply(this, [].slice.call(buffer));
}
catch (error) {
  return {'error.name' : error.name, 'error.message' : error.message};
}
```

- md5(data) - calculates the MD5 hash of the data
- sha256(data) - calculates the SHA256 hash of the data
- hmac('<hash type>',key,data) - returns HMAC hash as hex formatted string; MD5 and SHA256 hash types are supported; key and data parameters support binary data. Examples:
  - hmac('md5',key,data)
  - hmac('sha256',key,data)
- sign(hash,key,data) - returns calculated signature (RSA signature with SHA-256) as a string, where:
  - **hash** - only 'sha256' is allowed, otherwise an error is thrown;
  - **key** - the private key. It should correspond to PKCS#1 or PKCS#8 standard. The key can be provided in different forms:
    - with spaces instead of newlines;
    - with escaped or non-escaped '\n's instead of newlines;
    - without any newlines as a single-line string;
    - as a JSON-formatted string.

The key also can be loaded from a user macro/secret macro/vault.

**data** - the data that will be signed. It can be a string (binary data also supported) or buffer (Uint8Array/ArrayBuffer).  
OpenSSL or GnuTLS is used to calculate the signatures. If Zabbix was built without any of these encryption libraries, an error will be thrown ('missing OpenSSL or GnuTLS library'). This function is supported since Zabbix 6.0.15.

## 5 CSV to JSON preprocessing

### Overview

In this preprocessing step it is possible to convert CSV file data into JSON format. It's supported in:

- items (item prototypes)
- low-level discovery rules

### Configuration

To configure a CSV to JSON preprocessing step:

- Go to the Preprocessing tab in **item/discovery rule** configuration
- Click on **Add**
- Select the **CSV to JSON** option

The first parameter allows to set a custom delimiter. Note that if the first line of CSV input starts with "Sep=" and is followed by a single UTF-8 character then that character will be used as the delimiter in case the first parameter is not set. If the first parameter is not set and a delimiter is not retrieved from the "Sep=" line, then a comma is used as a separator.

The second optional parameter allows to set a quotation symbol.

If the *With header row* checkbox is marked, the header line values will be interpreted as column names (see **Header processing** for more information).

If the *Custom on fail* checkbox is marked, the item will not become unsupported in case of a failed preprocessing step. Additionally custom error handling options may be set: discard the value, set a specified value or set a specified error message.

#### Header processing

The CSV file header line can be processed in two different ways:

- If the *With header row* checkbox is marked - header line values are interpreted as column names. In this case the column names must be unique and the data row should not contain more columns than the header row;
- If the *With header row* checkbox is not marked - the header line is interpreted as data. Column names are generated automatically (1,2,3,4...)

CSV file example:

```
Nr,Item name,Key,Qty
1,active agent item,agent.hostname,33
"2","passive agent item","agent.version","44"
3,"active,passive agent items",agent.ping,55
```

#### Note:

A quotation character within a quoted field in the input must be escaped by preceding it with another quotation character.

#### Processing header line

JSON output when a header line is expected:

```
[
  {
    "Nr": "1",
    "Item name": "active agent item",
    "Key": "agent.hostname",
    "Qty": "33"
  },
  {
    "Nr": "2",
    "Item name": "passive agent item",
    "Key": "agent.version",
    "Qty": "44"
  },
  {
    "Nr": "3",
    "Item name": "active,passive agent items",
    "Key": "agent.ping",
    "Qty": "55"
  }
]
```

#### No header line processing

JSON output when a header line is not expected:

```
[
  {
    "1": "Nr",
    "2": "Item name",
    "3": "Key",
    "4": "Qty"
  },
  {
    "1": "1",
    "2": "active agent item",
    "3": "agent.hostname",
    "4": "33"
  },
  {
    "1": "2",
    "2": "passive agent item",
    "3": "agent.version",
    "4": "44"
  },
  {
    "1": "3",
    "2": "active,passive agent items",
    "3": "agent.ping",
    "4": "55"
  }
]
```



```

    "3": "agent.version",
    "4": "44"
  },
  {
    "1": "3",
    "2": "active,passive agent items",
    "3": "agent.ping",
    "4": "55"
  }
]

```

### 3 Item types

#### Overview

Item types cover various methods of acquiring data from your system. Each item type comes with its own set of supported item keys and required parameters.

The following items types are currently offered by Zabbix:

- Zabbix agent checks
- SNMP agent checks
- SNMP traps
- IPMI checks
- Simple checks
  - VMware monitoring
- Log file monitoring
- Calculated items
  - Aggregate calculations
- Zabbix internal checks
- SSH checks
- Telnet checks
- External checks
- Trapper items
- JMX monitoring
- ODBC checks
- Dependent items
- HTTP checks
- Prometheus checks
- Script items

Details for all item types are included in the subpages of this section. Even though item types offer a lot of options for data gathering, there are further options through [user parameters](#) or [loadable modules](#).

Some checks are performed by Zabbix server alone (as agent-less monitoring) while others require Zabbix agent or even Zabbix Java gateway (with JMX monitoring).

#### Attention:

If a particular item type requires a particular interface (like an IPMI check needs an IPMI interface on the host) that interface must exist in the host definition.

Multiple interfaces can be set in the host definition: Zabbix agent, SNMP agent, JMX and IPMI. If an item can use more than one interface, it will search the available host interfaces (in the order: Agent→SNMP→JMX→IPMI) for the first appropriate one to be linked with.

All items that return text (character, log, text types of information) can return whitespace only as well (where applicable) setting the return value to an empty string (supported since 2.0).

### 1 Zabbix agent

#### Overview

These checks use the communication with Zabbix agent for data gathering.

There are [passive](#) and [active](#) agent checks. When configuring an item, you can select the required type:

- *Zabbix agent* - for passive checks
- *Zabbix agent (active)* - for active checks

Supported item keys

The table provides details on the item keys that you can use with Zabbix agent items grouped by the item family.

See also:

- [Items supported by platform](#)
- [Item keys supported by Zabbix agent 2](#)
- [Item keys specific for Windows agent](#)
- [Minimum permission level for Windows agent items](#)

### Mandatory and optional parameters

Parameters without angle brackets are mandatory. Parameters marked with angle brackets < > are optional.

### Usage with command-line utilities

Note that when testing or using item keys with `zabbix_agentd` or `zabbix_get` from the command line you should consider shell syntax too.

For example, if a certain parameter of the key has to be enclosed in double quotes you have to explicitly escape double quotes, otherwise they will be trimmed by the shell as special characters and will not be passed to the Zabbix utility.

Examples:

```
zabbix_agentd -t 'vfs.dir.count[/var/log,,,"file,dir",,0]'
```

```
zabbix_agentd -t vfs.dir.count[/var/log,,,\"file,dir\",,0]
```

Kernel data

| Item key  |              |            |  |
|---|--------------|------------|--|
| Description   | Return value | Parameters | Comments                                 |
| <b>kernel.maxfiles</b>                                |              |            |  |
| Maximum number of opened files supported by OS.       | Integer      |            |  |
| <b>kernel.maxproc</b>                                 |              |            |  |
| Maximum number of processes supported by OS.          | Integer      |            |  |
| <b>kernel.openfiles</b>                               |              |            |  |
| Return the number of currently open file descriptors. | Integer      |            | This item is supported since Zabbix 6.0. |

Log data

See additional information on [log monitoring](#).

| Item key   |              |            |          |
|--|--------------|------------|----------|
| Description  | Return value | Parameters | Comments |
| <b>log</b> [file,<regexp>,<encoding>,<maxlines>,<mode>,<output>,<maxdelay>,<options>,<persistent_dir>] |              |            |          |

Monitoring of  
a log file.

Log

**file** - full path and name of log file  
**regexp** - regular **expression** describing the required pattern  
**encoding** - code page **identifier**  
**maxlines** - maximum number of new lines per second the agent will send to Zabbix server or proxy. This parameter overrides the value of 'MaxLinesPerSecond' in **zabbix\_agentd.conf**  
**mode** (since version 2.0)- possible values: *all* (default), *skip* - skip processing of older data (affects only newly created items).  
**output** (since version 2.2) - an optional output formatting template. The **\0** escape sequence is replaced with the matched part of text (from the first character where match begins until the character where match ends) while an **\N** (where N=1...9) escape sequence is replaced with Nth matched group (or an empty string if the N exceeds the number of captured groups).  
**maxdelay** (since version 3.2) - maximum delay in seconds. Type: float. Values: 0 - (default) never ignore log file lines; > 0.0 - ignore older lines in order to get the most recent lines analyzed within "maxdelay" seconds. Read the **maxdelay** notes before using it!  
**options** (since version 4.4.7) - additional options:  
*mtime-noread* - non-unique records, reread only if the file size changes (ignore modification time change). (This parameter is deprecated since 5.0.2, because now mtime is ignored.)  
**persistent\_dir** (since versions 5.0.18, 5.4.9, only in zabbix\_agentd on Unix systems; not supported in Agent2) - absolute pathname of directory where to store persistent files. See also additional notes on **persistent files**.

The item must be configured as an **active check**.

If file is missing or permissions do not allow access, item turns unsupported.

If output is left empty - the whole line containing the matched text is returned. Note that all global regular expression types except 'Result is TRUE' always return the whole matched line and the output parameter is ignored.

Content extraction using the output parameter takes place on the agent.

Examples:

```
=> log[/var/log/syslog]
=> log[/var/log/syslog,error]
=> log[/home/zabbix/logs/logfile,,,100]
```

*Using output parameter for extracting a number from log record:*

```
=> log[/app1/app.log,"task run [0-9.]+
sec, processed ([0-9.]+) records, [0-9.]+
errors",,,1] → will match a log record
"2015-11-13 10:08:26 task run 6.08 sec,
processed 6080 records, 0 errors" and
send only '6080' to server. Because a
numeric value is being sent, the "Type of
information" for this item can be set to
"Numeric (unsigned)" and the value can
be used in graphs, triggers etc.
```

*Using output parameter for rewriting log record before sending to server:*

```
=> log[/app1/app.log,"([0-9.]+) task run
([0-9.]+) sec, processed ([0-9.]+) records,
([0-9.]+) errors",,,1 RECORDS: \3,
ERRORS: \4, DURATION: \2"] → will match
a log record "2015-11-13 10:08:26 task
run 6.08 sec, processed 6080 records, 0
errors" and send a modified record
"2015-11-13 10:08:26 RECORDS: 6080,
ERRORS: 0, DURATION: 6.08" to server.
```

**log.count**[file,<regexp>,<encoding>,<maxproclines>,<mode>,<maxdelay>,<options>,<persistent\_dir>]

| Item key  |         |  |  |
|---|---------|--|--|
| Count of matched lines in a monitored log file.   | Integer | <p><b>file</b> - full path and name of log file</p> <p><b>regexp</b> - regular <b>expression</b> describing the required pattern</p> <p><b>encoding</b> - code page <b>identifier</b></p> <p><b>maxproclines</b> - maximum number of new lines per second the agent will analyze (cannot exceed 10000). Default value is 10*<code>MaxLinesPerSecond</code> in <code>zabbix_agentd.conf</code>.</p> <p><b>mode</b> - possible values:<br/> <i>all</i> (default), <i>skip</i> - skip processing of older data (affects only newly created items).</p> <p><b>maxdelay</b> - maximum delay in seconds. Type: float. Values: 0 - (default) never ignore log file lines; &gt; 0.0 - ignore older lines in order to get the most recent lines analyzed within "maxdelay" seconds. Read the <b>maxdelay</b> notes before using it!</p> <p><b>options</b> (since version 4.4.7) - additional options:<br/> <i>mtime-noread</i> - non-unique records, reread only if the file size changes (ignore modification time change). (This parameter is deprecated since 5.0.2, because now mtime is ignored.)</p> <p><b>persistent_dir</b> (since versions 5.0.18, 5.4.9, only in <code>zabbix_agentd</code> on Unix systems; not supported in Agent2) - absolute pathname of directory where to store persistent files. See also additional notes on <b>persistent files</b>.</p> | <p>The item must be configured as an <b>active check</b>.</p> <p>Matching lines are counted in the new lines since the last log check by the agent, and thus depend on the item update interval.</p> <p>If the file is missing or permissions do not allow access, item turns unsupported.</p> <p>This item is not supported for Windows Event Log.</p> <p>Supported since Zabbix 3.2.0.</p> |
| <b>logrt</b> [file_regexp,<regexp>,<encoding>,<maxlines>,<mode>,<output>,<maxdelay>,<options>,<persistent_dir>] |         |  |  |

Monitoring of  
a log file that  
is rotated.

Log

**file\_regexp** - absolute path to file, with the file name specified using a regular **expression**. Note that the regular expression applies only to the file name and does not need to match the entire name (e.g., /path/to/agent will match zabbix\_agentd.log)

**regexp** - regular **expression** describing the required content pattern

**encoding** - code page **identifier**

**maxlines** - maximum number of new lines per second the agent will send to Zabbix server or proxy. This parameter overrides the value of 'MaxLinesPerSecond' in **zabbix\_agentd.conf**

**mode** (since version 2.0) - possible values:  
*all* (default), *skip* - skip processing of older data (affects only newly created items).

**output** (since version 2.2) - an optional output formatting template. The **\0** escape sequence is replaced with the matched part of text (from the first character where match begins until the character where match ends) while an **\N** (where N=1...9) escape sequence is replaced with Nth matched group (or an empty string if the N exceeds the number of captured groups).

**maxdelay** (since version 3.2) - maximum delay in seconds. Type: float. Values: 0 - (default) never ignore log file lines; > 0.0 - ignore older lines in order to get the most recent lines analyzed within "maxdelay" seconds. Read the **maxdelay** notes before using it!

**options** (since version 4.0; *mtime-reread*, *mtime-noread* options since 4.4.7) - type of log file rotation and other options. Possible values:  
*rotate* (default),  
*copytruncate* - note that *copytruncate* cannot be used together with *maxdelay*. In this case *maxdelay* must be 0 or not specified; see **copytruncate** notes,  
*mtime-reread* - non-unique records, reread if modification time or size changes (default),  
*mtime-noread* - non-unique records, reread only if the size changes (ignore modification time change).

**persistent\_dir** (since versions 5.0.18, 5.4.9, only in zabbix\_agentd on Unix systems; not supported in Agent2) - absolute pathname of directory where to store persistent files. See also additional notes on **persistent files**.

The item must be configured as an **active check**.

Log rotation is based on the last modification time of files.

Note that logrt is designed to work with one currently active log file, with several other matching inactive files rotated. If, for example, a directory has many active log files, a separate logrt item should be created for each one. Otherwise if one logrt item picks up too many files it may lead to exhausted memory and a crash of monitoring.

If output is left empty - the whole line containing the matched text is returned. Note that all global regular expression types except 'Result is TRUE' always return the whole matched line and the output parameter is ignored.

Content extraction using the output parameter takes place on the agent.

In the **file regexp** parameter, the log directory path and log file regular expression must be separated by the correct directory separator:

- on Windows, the separator must be a backslash (\);
- on other systems, it must be a forward slash (/).

Forward slashes may be tolerated on Windows at other positions, except the one that separates the log directory path and the log file regular expression (see examples below).

Examples for Windows:

```
=> lo-
grt["c:/dir1/dir2/dir3&#92;filename.*.log","pattern_to_m
→ will collect data from log files in
"c:/dir1/dir2/dir3" where the file name
starts with "filename" and ends with any
extension matching ".log"
=> lo-
grt["//example.com/share/dir1/dir2/dir3\filename.*.log",
→ will collect data from log files in the
network share
"//example.com/share/dir1/dir2/dir3"
where the file name starts with "filename"
and ends with any extension matching
".log".
```

Examples for other systems:

```
=> logrt[/home/zabbix/logs/^logfile[0-
9]{1,3}$",,,100] → will match a file like
"logfile1" (will not match ".logfile1")
=> logrt[/home/user/^logfile_.*_[0-
9]{1,3}$","pattern_to_match","UTF-
8",100] → will collect data from files such
"logfile_abc_1" or "logfile__001".
```

Using *output* parameter for extracting a

---

```
logrt.count[file_regexp,<regexp>,<encoding>,<maxproclines>,<mode>,<maxdelay>,<options>,<persistent_dir>]
```

---

Count of  
matched lines  
in a  
monitored log  
file that is  
rotated.

Integer

**file\_regexp** - absolute path to file, with the file name specified using a regular expression. Note that the regular expression applies only to the file name and does not need to match the entire name (e.g., /path/to/agent will match zabbix\_agentd.log)

**regexp** - regular expression describing the required content pattern

**encoding** - code page identifier

**maxproclines** - maximum number of new lines per second the agent will analyze (cannot exceed 10000). Default value is 10\*MaxLinesPerSecond' in

**zabbix\_agentd.conf**.

**mode** - possible values:

*all* (default), *skip* - skip processing of older data (affects only newly created items).

**maxdelay** - maximum delay in seconds.

Type: float. Values: 0 - (default) never ignore log file lines; > 0.0 - ignore older lines in order to get the most recent lines analyzed within "maxdelay" seconds.

Read the **maxdelay** notes before using it!

**options** (since version 4.0; *mtime-reread*, *mtime-noread* options since 4.4.7) -

type of log file rotation and other options.

Possible values:

*rotate* (default),

*copytruncate* - note that *copytruncate* cannot be used together with *maxdelay*.

In this case *maxdelay* must be 0 or not specified; see **copytruncate** notes,

*mtime-reread* - non-unique records, reread if modification time or size changes (default),

*mtime-noread* - non-unique records, reread only if the size changes (ignore modification time change).

**persistent\_dir** (since versions 5.0.18, 5.4.9, only in zabbix\_agentd on Unix systems; not supported in Agent2) - absolute pathname of directory where to store persistent files. See also additional notes on **persistent files**.

The item must be configured as an **active check**.

Matching lines are counted in the new lines since the last log check by the agent, and thus depend on the item update interval.

Log rotation is based on the last modification time of files.

This item is not supported for Windows Event Log.

Supported since Zabbix 3.2.0.

In the **file regexp** parameter, the log directory path and log file regular expression must be separated by the correct directory separator:

- on Windows, the separator must be a backslash (\);

- on other systems, it must be a forward slash (/).

Forward slashes may be tolerated on Windows at other positions, except the one that separates the log directory path and the log file regular expression (see examples below):

Examples for Windows:

=> lo-

grt.count["c:/dir1/dir2/dir3&#92;filename.\*.log","pattern\_to\_match"]  
→ will count the number of matches for the pattern "pattern\_to\_match" in log files located in "c:/dir1/dir2/dir3"

=> lo-

grt.count["//example.com/share/dir1/dir2/dir3\\filename.\*.log","pattern\_to\_match"]  
→ will count the number of matches for the pattern "pattern\_to\_match" in log files on the network share  
"//example.com/share/dir1/dir2/dir3".

Examples for other systems:

=>

logrt.count["/home/zabbix/logs/^logfile[0-9]{1,3}\$",,100] → will count the number of matches for the pattern

"^logfile[0-9]{1,3}\$" in log files in the "/home/zabbix/logs" directory

=> logrt.count["/home/user/^logfile.\_\*[0-9]{1,3}\$","pattern\_to\_match","UTF-8",100] → will count the number of occurrences of the pattern "pattern\_to\_match" in log files located in "/home/user".

---

| Item key  |              |  |                               |
|---|--------------|--|-------------------------------|
| Description   | Return value | Parameters   | Comments                      |
| <b>modbus.get</b> [endpoint,<slave id>,<function>,<address>,<count>,<type>,<endianness>,<offset>] |              |  |                               |
| Reads Modbus data.  | JSON object  | <b>endpoint</b> - endpoint defined as <code>protocol://connection_string</code><br><b>slave id</b> - slave ID<br><b>function</b> - Modbus function<br><b>address</b> - address of first registry, coil or input<br><b>count</b> - number of records to read<br><b>type</b> - type of data<br><b>endianness</b> - endianness configuration<br><b>offset</b> - number of registers, starting from 'address', the results of which will be discarded. | Supported since Zabbix 5.2.0. |
| See a <a href="#">detailed description</a> of parameters.   |              |  |                               |

## Network data

| Item key  |  |   |   |
|---|--|---|---|
| Description   | Return value   | Parameters  | Comments  |
| <b>net.dns</b> [<ip>,<name>,<type>,<timeout>,<count>,<protocol>]        |  |   |   |
| Checks if DNS service is up.  | 0 - DNS is down (server did not respond or DNS resolution failed)<br><br>1 - DNS is up | <b>ip</b> - IP address of DNS server (leave empty for the default DNS server, on Windows supported for Zabbix agent 2, ignored for Zabbix agent)<br><b>name</b> - DNS name to query<br><b>type</b> - record type to be queried (default is <i>SOA</i> )<br><b>timeout</b> (ignored on Windows, unless using Zabbix agent 2 version 6.0.1 or newer) - timeout for the request in seconds (default is 1 second)<br><b>count</b> (ignored on Windows, unless using Zabbix agent 2 version 6.0.1 or newer) - number of tries for the request (default is 2)<br><b>protocol</b> (since version 3.0) - the protocol used to perform DNS queries: <i>udp</i> (default) or <i>tcp</i> | Example:<br>=> <code>net.dns[8.8.8.8,example.com,MX,2,1]</code><br><br>The possible values for type are:<br><i>ANY, A, NS, CNAME, MB, MG, MR, PTR, MD, MF, MX, SOA, NULL, WKS</i> (not supported for Zabbix agent on Windows, Zabbix agent 2 on all OS), <i>HINFO, MINFO, TXT, AAAA, SRV</i><br><br>Internationalized domain names are not supported, please use IDNA encoded names instead.<br><br>SRV record type is supported since Zabbix 1.8.6 (Unix) and 2.0.0 (Windows).<br><br>Naming before Zabbix 2.0 (still supported): <i>net.tcp.dns</i> |
| <b>net.dns.record</b> [<ip>,<name>,<type>,<timeout>,<count>,<protocol>] |  |   |   |

| Item key  |  |  |  |
|---|--|--|--|
| Performs a DNS query.   | Character string with the required type of information | <p><b>ip</b> - IP address of DNS server (leave empty for the default DNS server, ignored on Windows, unless using Zabbix agent 2 version 6.0.1 or newer)</p> <p><b>name</b> - DNS name to query</p> <p><b>type</b> - record type to be queried (default is SOA)</p> <p><b>timeout</b> (ignored on Windows, unless using Zabbix agent 2 version 6.0.1 or newer) - timeout for the request in seconds (default is 1 second)</p> <p><b>count</b> (ignored on Windows, unless using Zabbix agent 2 version 6.0.1 or newer) - number of tries for the request (default is 2)</p> <p><b>protocol</b>(since version 3.0) - the protocol used to perform DNS queries: <i>udp</i> (default) or <i>tcp</i></p> | <p>Example:</p> <pre>=&gt; net.dns.record[8.8.8.8,example.com,MX,2,1]</pre> <p>The possible values for type are: <i>ANY, A, NS, CNAME, MB, MG, MR, PTR, MD, MF, MX, SOA, NULL, WKS</i> (not supported for Zabbix agent on Windows, Zabbix agent 2 on all OS), <i>HINFO, MINFO, TXT, AAAA, SRV</i></p> <p>Internationalized domain names are not supported, please use IDNA encoded names instead.</p> <p>SRV record type is supported since Zabbix 1.8.6 (Unix) and 2.0.0 (Windows).</p> <p>Naming before Zabbix 2.0 (still supported): <i>net.tcp.dns.query</i></p>   |
| <p><b>net.if.collisions</b>[if]</p> <p>Number of out-of-window collisions.</p> <p><b>net.if.discovery</b></p> <p>List of network interfaces.</p> <p>Used for low-level discovery.</p> | <p>Integer</p> <p>JSON object</p>                      | <p><b>if</b> - network interface name</p>  | <p>Supported since Zabbix 2.0.</p> <p>On FreeBSD, OpenBSD and NetBSD supported since Zabbix 2.2.</p> <p>Some Windows versions (for example, Server 2008) might require the latest updates installed to support non-ASCII characters in interface names.</p>  |
| <p><b>net.if.in</b>[if,&lt;mode&gt;]</p> <p>Incoming traffic statistics on network interface.</p>   | Integer  | <p><b>if</b> - network interface name (Unix); network interface full description or IPv4 address; or, if in braces, network interface GUID (Windows)</p> <p><b>mode</b> - possible values:</p> <p><i>bytes</i> - number of bytes (default)</p> <p><i>packets</i> - number of packets</p> <p><i>errors</i> - number of errors</p> <p><i>dropped</i> - number of dropped packets</p> <p><i>overruns (fifo)</i> - the number of FIFO buffer errors</p> <p><i>frame</i> - the number of packet framing errors</p> <p><i>compressed</i> - the number of compressed packets received by the device driver</p> <p><i>multicast</i> - the number of multicast frames received by the device driver</p>       | <p>On Windows, the item gets values from 64-bit counters if available. 64-bit interface statistic counters were introduced in Windows Vista and Windows Server 2008. If 64-bit counters are not available, the agent uses 32-bit counters.</p> <p>Multi-byte interface names on Windows are supported since Zabbix 1.8.6.</p> <p>Examples:</p> <pre>=&gt; net.if.in[eth0,errors] =&gt; net.if.in[eth0]</pre> <p>You may obtain network interface descriptions on Windows with <i>net.if.discovery</i> or <i>net.if.list</i> items.</p> <p>You may use this key with the <i>Change per second</i> preprocessing step in order to get bytes per second statistics.</p> |
| <b>net.if.out</b> [if,<mode>]   |  |  |  |



| Item key   |  |  |  |
|--|--|--|--|
| Outgoing traffic statistics on network interface.  | Integer  | <b>if</b> - network interface name (Unix); network interface full description or IPv4 address; or, if in braces, network interface GUID (Windows)<br><b>mode</b> - possible values:<br><i>bytes</i> - number of bytes (default)<br><i>packets</i> - number of packets<br><i>errors</i> - number of errors<br><i>dropped</i> - number of dropped packets<br><i>overruns (fifo)</i> - the number of FIFO buffer errors<br><i>collisions (colls)</i> - the number of collisions detected on the interface<br><i>carrier</i> - the number of carrier losses detected by the device driver<br><i>compressed</i> - the number of compressed packets transmitted by the device driver | <p>On Windows, the item gets values from 64-bit counters if available. 64-bit interface statistic counters were introduced in Windows Vista and Windows Server 2008. If 64-bit counters are not available, the agent uses 32-bit counters.</p> <p>Multi-byte interface names on Windows are supported since Zabbix agent 1.8.6 version.</p> <p>Examples:<br/> =&gt; net.if.out[eth0,errors]<br/> =&gt; net.if.out[eth0]</p> <p>You may obtain network interface descriptions on Windows with net.if.discovery or net.if.list items.</p> <p>You may use this key with the <i>Change per second</i> preprocessing step in order to get bytes per second statistics.</p>  |
| <b>net.if.total</b> [if,<mode>]<br>Sum of incoming and outgoing traffic statistics on network interface. | Integer  | <b>if</b> - network interface name (Unix); network interface full description or IPv4 address; or, if in braces, network interface GUID (Windows)<br><b>mode</b> - possible values:<br><i>bytes</i> - number of bytes (default)<br><i>packets</i> - number of packets<br><i>errors</i> - number of errors<br><i>dropped</i> - number of dropped packets<br><i>overruns (fifo)</i> - the number of FIFO buffer errors<br><i>compressed</i> - the number of compressed packets transmitted or received by the device driver  | <p>On Windows, the item gets values from 64-bit counters if available. 64-bit interface statistic counters were introduced in Windows Vista and Windows Server 2008. If 64-bit counters are not available, the agent uses 32-bit counters.</p> <p>Examples:<br/> =&gt; net.if.total[eth0,errors]<br/> =&gt; net.if.total[eth0]</p> <p>You may obtain network interface descriptions on Windows with net.if.discovery or net.if.list items.</p> <p>You may use this key with the <i>Change per second</i> preprocessing step in order to get bytes per second statistics.</p> <p>Note that dropped packets are supported only if both net.if.in and net.if.out work for dropped packets on your platform.</p> |
| <b>net.tcp.listen</b> [port]<br>Checks if this TCP port is in LISTEN state.                              | 0 - it is not in LISTEN state<br><br>1 - it is in LISTEN state | <b>port</b> - TCP port number  | <p>Example:<br/> =&gt; net.tcp.listen[80]</p> <p>On Linux supported since Zabbix 1.8.4</p> <p>Since Zabbix 3.0.0, on Linux kernels 2.6.14 and above, information about listening TCP sockets is obtained from the kernel's NETLINK interface, if possible. Otherwise, the information is retrieved from /proc/net/tcp and /proc/net/tcp6 files.</p>  |
| <b>net.tcp.port</b> [<ip>,port]  |  |  |  |

| Item key  |   |  |  |
|---|---|--|--|
| Checks if it is possible to make TCP connection to specified port.    | 0 - cannot connect<br><br>1 - can connect   | <b>ip</b> - IP or DNS name (default is 127.0.0.1)<br><b>port</b> - port number   | <p>Example:<br/>=&gt; net.tcp.port[,80] → can be used to test availability of web server running on port 80.</p> <p>For simple TCP performance testing use net.tcp.service.perf[tcp,&lt;ip&gt;,&lt;port&gt;]</p> <p>Note that these checks may result in additional messages in system daemon logfiles (SMTP and SSH sessions being logged usually).</p>   |
| <b>net.tcp.service</b> [service,<ip>,<port>]                          |   |  |  |
| Checks if service is running and accepting TCP connections.           | 0 - service is down<br><br>1 - service is running   | <b>service</b> - either of:<br><i>ssh, ldap, smtp, ftp, http, pop, nntp, imap, tcp, https, telnet</i> (see <a href="#">details</a> )<br><b>ip</b> - IP or DNS name (default is 127.0.0.1)<br><b>port</b> - port number (by default standard service port number is used) | <p>Example:<br/>=&gt; net.tcp.service[ftp,45] → can be used to test the availability of FTP server on TCP port 45.</p> <p>Note that these checks may result in additional messages in system daemon logfiles (SMTP and SSH sessions being logged usually).</p> <p>Checking of encrypted protocols (like IMAP on port 993 or POP on port 995) is currently not supported. As a workaround, please use net.tcp.port for checks like these.</p> <p>Checking of LDAP and HTTPS on Windows is only supported by Zabbix agent 2.</p> <p>Note that the telnet check looks for a login prompt (':' at the end).</p> <p><i>https</i> and <i>telnet</i> services are supported since Zabbix 2.0.</p> |
| <b>net.tcp.service.perf</b> [service,<ip>,<port>]                     |   |  |  |
| Checks performance of TCP service.                                    | Float<br><br>0 - service is down<br><br>seconds - the number of seconds spent while connecting to the service | <b>service</b> - either of:<br><i>ssh, ldap, smtp, ftp, http, pop, nntp, imap, tcp, https, telnet</i> (see <a href="#">details</a> )<br><b>ip</b> - IP or DNS name (default is 127.0.0.1)<br><b>port</b> - port number (by default standard service port number is used) | <p>Example:<br/>=&gt; net.tcp.service.perf[ssh] → can be used to test the speed of initial response from SSH server.</p> <p>Checking of encrypted protocols (like IMAP on port 993 or POP on port 995) is currently not supported. As a workaround, please use net.tcp.service.perf[tcp,&lt;ip&gt;,&lt;port&gt;] for checks like these.</p> <p>Checking of LDAP and HTTPS on Windows is only supported by Zabbix agent 2.</p> <p>Note that the telnet check looks for a login prompt (':' at the end).</p> <p><i>https</i> and <i>telnet</i> services are supported since Zabbix 2.0.</p>  |
| <b>net.tcp.socket.count</b> [<laddr>,<lport>,<raddr>,<rport>,<state>] |   |  |  |

| Item key  |   |   |  |
|---|---|---|--|
| Return the number of TCP sockets that match parameters.               | Integer   | <b>laddr</b> - local IPv4/6 address or CIDR subnet<br><b>lport</b> - local port number or service name<br><b>raddr</b> - remote IPv4/6 address or CIDR subnet<br><b>rport</b> - remote port number or service name<br><b>state</b> - connection state ( <i>established</i> , <i>syn_sent</i> , <i>syn_recv</i> , <i>fin_wait1</i> , <i>fin_wait2</i> , <i>time_wait</i> , <i>close</i> , <i>close_wait</i> , <i>last_ack</i> , <i>listen</i> , <i>closing</i> ) | <p>This item is supported on Linux only on both Zabbix agent/agent 2. On Zabbix agent 2 it is also supported on 64-bit Windows.</p> <p>Example:<br/> =&gt; net.tcp.socket.count[,80,,,established]<br/> → returns the number of connections to local TCP port 80 in the <i>established</i> state</p> <p>This item is supported since Zabbix 6.0.</p> |
| <b>net.udp.listen</b> [port]  |   |   |  |
| Checks if this UDP port is in LISTEN state.                           | 0 - it is not in LISTEN state<br><br>1 - it is in LISTEN state  | <b>port</b> - UDP port number   | <p>Example:<br/> =&gt; net.udp.listen[68]</p> <p>On Linux supported since Zabbix 1.8.4</p>   |
| <b>net.udp.service</b> [service,<ip>,<port>]                          |   |   |  |
| Checks if service is running and responding to UDP requests.          | 0 - service is down<br><br>1 - service is running   | <b>service</b> - <i>ntp</i> (see <a href="#">details</a> )<br><b>ip</b> - IP or DNS name (default is 127.0.0.1)<br><b>port</b> - port number (by default standard service port number is used)  | <p>Example:<br/> =&gt; net.udp.service[ntp,,45] → can be used to test the availability of NTP service on UDP port 45.</p> <p>This item is supported since Zabbix 3.0.0, but <i>ntp</i> service was available for net.tcp.service[] item in prior versions.</p>   |
| <b>net.udp.service.perf</b> [service,<ip>,<port>]                     |   |   |  |
| Checks performance of UDP service.                                    | Float<br><br>0 - service is down<br><br>seconds - the number of seconds spent waiting for response from the service | <b>service</b> - <i>ntp</i> (see <a href="#">details</a> )<br><b>ip</b> - IP or DNS name (default is 127.0.0.1)<br><b>port</b> - port number (by default standard service port number is used)  | <p>Example:<br/> =&gt; net.udp.service.perf[ntp] → can be used to test response time from NTP service.</p> <p>This item is supported since Zabbix 3.0.0, but <i>ntp</i> service was available for net.tcp.service[] item in prior versions.</p>  |
| <b>net.udp.socket.count</b> [<laddr>,<lport>,<raddr>,<rport>,<state>] |   |   |  |
| Return the number of UDP sockets that match parameters.               | Integer   | <b>laddr</b> - local IPv4/6 address or CIDR subnet<br><b>lport</b> - local port number or service name<br><b>raddr</b> - remote IPv4/6 address or CIDR subnet<br><b>rport</b> - remote port number or service name<br><b>state</b> - connection state ( <i>established</i> , <i>unconn</i> )  | <p>This item is supported on Linux only on both Zabbix agent/agent 2. On Zabbix agent 2 it is also supported on 64-bit Windows.</p> <p>Example:<br/> =&gt; net.udp.socket.count[,,,,established] → returns the number of UDP sockets in the connected state</p> <p>This item is supported since Zabbix 6.0.</p>                                      |

## Process data

| Item key  |              |            |          |
|---|--------------|------------|----------|
| Description   | Return value | Parameters | Comments |
| <b>proc.cpu.util</b> [<name>,<user>,<type>,<cmdline>,<mode>,<zone>] |              |            |          |

| Item key   |       |   |   |
|--|-------|---|---|
| Process CPU utilization percentage.                        | Float | <p><b>name</b> - process name (default is <i>all processes</i>)</p> <p><b>user</b> - user name (default is <i>all users</i>)</p> <p><b>type</b> - CPU utilization type: <i>total</i> (default), <i>user</i>, <i>system</i></p> <p><b>cmdline</b> - filter by command line (it is a regular <i>expression</i>)</p> <p><b>mode</b> - data gathering mode: <i>avg1</i> (default), <i>avg5</i>, <i>avg15</i></p> <p><b>zone</b> - target zone: <i>current</i> (default), <i>all</i>. This parameter is supported on Solaris only.</p> | <p>Examples:</p> <p>=&gt; <code>proc.cpu.util[,root]</code> → CPU utilization of all processes running under the "root" user</p> <p>=&gt; <code>proc.cpu.util[zabbix_server,zabbix]</code> → CPU utilization of all <code>zabbix_server</code> processes running under the <code>zabbix</code> user</p> <p>The returned value is based on single CPU core utilization percentage. For example CPU utilization of a process fully using two cores is 200%.</p> <p>The process CPU utilization data is gathered by a collector which supports the maximum of 1024 unique (by name, user and command line) queries. Queries not accessed during the last 24 hours are removed from the collector.</p> <p><i>Note</i> that when setting the <code>zone</code> parameter to <i>current</i> (or default) in case the agent has been compiled on a Solaris without zone support, but running on a newer Solaris where zones are supported, then the agent will return NOTSUPPORTED (the agent cannot limit results to only the current zone). However, <i>all</i> is supported in this case.</p> <p>This key is supported since Zabbix 3.0.0 and is available on several platforms (see <i>Items supported by platform</i>).</p> |
| <b>proc.mem</b> [<name>,<user>,<mode>,<cmdline>,<memtype>] |       |   |   |

| Item key   |  |   |  |
|--|--|---|--|
| Memory used by process in bytes.                         | Integer - with mode as <i>max, min, sum</i><br><br>Float - with mode as <i>avg</i> | <b>name</b> - process name (default is <i>all processes</i> )<br><b>user</b> - user name (default is <i>all users</i> )<br><b>mode</b> - possible values: <i>avg, max, min, sum</i> (default)<br><b>cmdline</b> - filter by command line (it is a regular <i>expression</i> )<br><b>memtype</b> - <i>type of memory</i> used by process | Examples:<br>=> <code>proc.mem[,root]</code> → memory used by all processes running under the "root" user<br>=> <code>proc.mem[zabbix_server,zabbix]</code> → memory used by all <code>zabbix_server</code> processes running under the <code>zabbix</code> user<br>=> <code>proc.mem[,oracle,max,oracleZABBIX]</code> → memory used by the most memory-hungry process running under <code>oracle</code> having <code>oracleZABBIX</code> in its command line<br><br><i>Note:</i> When several processes use shared memory, the sum of memory used by processes may result in large, unrealistic values.<br><br>See <i>notes</i> on selecting processes with <code>name</code> and <code>cmdline</code> parameters (Linux-specific).<br><br>When this item is invoked from the command line and contains a command line parameter (e.g. using the agent test mode: <code>zabbix_agentd -t proc.mem[, , ,apache2]</code> ), one extra process will be counted, as the agent will count itself.<br><br>The <code>memtype</code> parameter is supported on several <i>platforms</i> since Zabbix 3.0.0. |
| <b>proc.num</b> [<name>,<user>,<state>,<cmdline>,<zone>] |  |   |  |

| Item key                 |         |  |  |
|--------------------------|---------|--|--|
| The number of processes. | Integer | <p><b>name</b> - process name (default is <i>all processes</i>)</p> <p><b>user</b> - user name (default is <i>all users</i>)</p> <p><b>state</b> (<i>disk</i> and <i>trace</i> options since version 3.4.0) - possible values:<br/> <i>all</i> (default),<br/> <i>disk</i> - uninterruptible sleep,<br/> <i>run</i> - running,<br/> <i>sleep</i> - interruptible sleep,<br/> <i>trace</i> - stopped,<br/> <i>zomb</i> - zombie</p> <p><b>cmdline</b> - filter by command line (it is a regular <i>expression</i>)</p> <p><b>zone</b> - target zone: <i>current</i> (default), <i>all</i>. This parameter is supported on Solaris only.</p> | <p>Examples:</p> <p>=&gt; <code>proc.num[mysql]</code> → number of processes running under the mysql user</p> <p>=&gt; <code>proc.num[apache2,www-data]</code> → number of apache2 processes running under the www-data user</p> <p>=&gt; <code>proc.num[oracle,sleep,oracleZABBIX]</code> → number of processes in sleep state running under oracle having oracleZABBIX in its command line</p> <p>See <i>notes</i> on selecting processes with <i>name</i> and <i>cmdline</i> parameters (Linux-specific).</p> <p>On Windows, only the <i>name</i> and <i>user</i> parameters are supported.</p> <p>When this item is invoked from the command line and contains a command line parameter (e.g. using the agent test mode: <code>zabbix_agentd -t proc.num[, , apache2]</code>), one extra process will be counted, as the agent will count itself.</p> <p><i>Note</i> that when setting the <i>zone</i> parameter to <i>current</i> (or default) in case the agent has been compiled on a Solaris without zone support, but running on a newer Solaris where zones are supported, then the agent will return NOTSUPPORTED (the agent cannot limit results to only the current zone). However, <i>all</i> is supported in this case.</p> |

## Sensor data

| Item key                             |              |   |   |
|--------------------------------------|--------------|---|---|
| Description                          | Return value | Parameters  | Comments  |
| <b>sensor</b> [device,sensor,<mode>] |              |   |   |
| Hardware sensor reading.             | Float        | <p><b>device</b> - device name; can be a regular <i>expression</i> if mode is omitted</p> <p><b>sensor</b> - sensor name; can be a regular <i>expression</i> if mode is omitted</p> <p><b>mode</b> - possible values:<br/> <i>avg</i>, <i>max</i>, <i>min</i> (if this parameter is omitted, device and sensor are treated verbatim).</p> | <p>Reads <code>/proc/sys/dev/sensors</code> on Linux 2.4.</p> <p>Example:<br/> =&gt; <code>sensor[w83781d-i2c-0-2d,temp1]</code></p> <p>Prior to Zabbix 1.8.4, the <i>sensor[temp1]</i> format was used.</p> <p>Reads <code>/sys/class/hwmon</code> on Linux 2.6+.</p> <p>See a more detailed description of <i>sensor</i> item on Linux.</p> |

| Item key |  |
|----------|--|
|          | Reads the <i>hw.sensors</i> MIB on OpenBSD.  |
|          | <p>Examples:</p> <p>=&gt; sensor[cpu0,temp0] → temperature of one CPU</p> <p>=&gt; sensor["cpu[0-2]\$,temp,avg] → average temperature of the first three CPU's</p> |
|          | Supported on OpenBSD since Zabbix 1.8.4.   |

## System data

| Item key   |                          |   |   |
|--|--------------------------|---|---|
| Description  | Return value             | Parameters  | Comments  |
| <b>system.boottime</b>   |                          |   |   |
| System boot time.  | Integer (Unix timestamp) |   |   |
| <b>system.cpu.discovery</b>  |                          |   |   |
| List of detected CPUs/CPU cores. Used for low-level discovery.     | JSON object              |   | Supported on all platforms since 2.4.0.   |
| <b>system.cpu.intr</b>   |                          |   |   |
| Device interrupts.   | Integer                  |   |   |
| <b>system.cpu.load</b> [<cpu>,<mode>]                              |                          |   |   |
| <a href="#">CPU load</a> .   | Float                    | <b>cpu</b> - possible values:<br><i>all</i> (default), <i>percpu</i> (since version 2.0; total load divided by online CPU count)<br><b>mode</b> - possible values:<br><i>avg1</i> (one-minute average, default), <i>avg5</i> , <i>avg15</i> | <p>When a collector process is started on Zabbix agent on Windows, the following performance counters are initialized and later used for this item:</p> <p>\System\Processor Queue Length</p> <p>Example:<br/>=&gt; system.cpu.load[,avg5].</p> |
| <b>system.cpu.num</b> [<type>]                                     |                          |   |   |
| Number of CPUs.  | Integer                  | <b>type</b> - possible values:<br><i>online</i> (default), <i>max</i>   | <p>Example:<br/>=&gt; system.cpu.num</p>  |
| <b>system.cpu.switches</b>   |                          |   |   |
| Count of context switches.   | Integer                  |   |   |
| <b>system.cpu.util</b> [<cpu>,<type>,<mode>,<logical_or_physical>] |                          |   |   |

| Item key  |        |   |   |
|---|--------|---|---|
| CPU utilization percentage.                                       | Float  | <p><b>cpu</b> - &lt;CPU number&gt; or <i>all</i> (default)</p> <p><b>type</b> - possible values:<br/> <i>user</i> (default), <i>idle</i>, <i>nice</i>, <i>system</i> (default for Windows), <i>iowait</i>, <i>interrupt</i>, <i>softirq</i>, <i>steal</i>, <i>guest</i> (on Linux kernels 2.6.24 and above), <i>guest_nice</i> (on Linux kernels 2.6.33 and above).</p> <p>See also <a href="#">platform-specific</a> details for this parameter.</p> <p><b>mode</b> - possible values:<br/> <i>avg1</i> (one-minute average, default), <i>avg5</i>, <i>avg15</i></p> <p><b>logical_or_physical</b> (since version 5.0.3; on AIX only) - possible values: <i>logical</i> (default), <i>physical</i>. This parameter is supported on AIX only.</p> | <p>On Windows the value is acquired using the <i>Processor Time</i> performance counter. Note that since Windows 8 its Task Manager shows CPU utilization based on the <i>Processor Utility</i> performance counter, while in previous versions it was the <i>Processor Time</i> counter (see <a href="#">more details</a>).</p> <p>Example:<br/> =&gt; system.cpu.util[0,user,avg5]</p> <p>Old naming: <i>system.cpu.idleX</i>, <i>system.cpu.niceX</i>, <i>system.cpu.systemX</i>, <i>system.cpu.userX</i></p>  |
| <b>system.hostname</b> [<type>, <transform>]<br>System host name. | String | <p><b>type</b> (before version 5.4.7 supported on Windows only) - possible values: <i>netbios</i> (default on Windows), <i>host</i> (default on Linux), <i>shorthost</i> (since version 5.4.7; returns part of the hostname before the first dot, a full string for names without dots).</p> <p><b>transform</b> (since version 5.4.7) - possible values:<br/> <i>none</i> (default), <i>lower</i> (convert to lowercase)</p>   | <p>The value is acquired by either GetComputerName() (for <b>netbios</b>) or gethostname() (for <b>host</b>) functions on Windows and by taking <i>nodename</i> from the uname() system API output on other systems.</p> <p>Examples of returned values:<br/> <i>on Linux:</i><br/> =&gt; system.hostname → linux-w7x1<br/> =&gt; system.hostname → example.com<br/> =&gt; system.hostname[shorthost] → example<br/> <i>on Windows:</i><br/> =&gt; system.hostname → WIN-SERV2008-I6<br/> =&gt; system.hostname[host] → Win-Serv2008-I6LonG<br/> =&gt; system.hostname[host,lower] → win-serv2008-i6long</p> <p>See also a <a href="#">more detailed description</a>.</p> |
| <b>system.hw.chassis</b> [<info>]<br>Chassis information.         | String | <p><b>info</b> - one of <i>full</i> (default), <i>model</i>, <i>serial</i>, <i>type</i> or <i>vendor</i></p>  | <p>Example:<br/> =&gt; system.hw.chassis[full] → Hewlett-Packard HP Pro 3010 Small Form Factor PC CZXXXXXXXX Desktop</p> <p>This key depends on the availability of the <a href="#">SMBIOS</a> table. Will try to read the DMI table from sysfs, if sysfs access fails then try reading directly from memory.</p> <p><b>Root permissions</b> are required because the value is acquired by reading from sysfs or memory.</p> <p>Supported since Zabbix 2.0.</p>   |
| <b>system.hw.cpu</b> [<cpu>, <info>]                              |        |   |   |



| Item key   |   |  |   |
|--|---|--|---|
| CPU information.   | String or integer   | <b>cpu</b> - <CPU number> or <i>all</i> (default)<br><b>info</b> - possible values:<br><i>full</i> (default), <i>curfreq</i> , <i>maxfreq</i> , <i>model</i> or <i>vendor</i>  | <p>Example:<br/> =&gt; system.hw.cpu[0,vendor] → AuthenticAMD</p> <p>Gathers info from /proc/cpuinfo and /sys/devices/system/cpu/[cpunum]/cpufreq/cpuinfo_max</p> <p>If a CPU number and <i>curfreq</i> or <i>maxfreq</i> is specified, a numeric value is returned (Hz).</p> <p>Supported since Zabbix 2.0.</p>  |
| <b>system.hw.devices</b> [<type>]<br>Listing of PCI or USB devices.          | Text  | <b>type</b> (since version 2.0) - <i>pci</i> (default) or <i>usb</i>   | <p>Example:<br/> =&gt; system.hw.devices[pci] → 00:00.0<br/> Host bridge: Advanced Micro Devices [AMD] RS780 Host Bridge<br/> [..]</p> <p>Returns the output of either lspci or lsusb utility (executed without any parameters).</p>  |
| <b>system.hw.macaddr</b> [<interface>,<format>]<br>Listing of MAC addresses. | String  | <b>interface</b> - <i>all</i> (default) or a regular <i>expression</i><br><b>format</b> - <i>full</i> (default) or <i>short</i>  | <p>Lists MAC addresses of the interfaces whose name matches the given <i>interface</i> regular <i>expression</i> (<i>all</i> lists for all interfaces).</p> <p>Example:<br/> =&gt; system.hw.macaddr["eth0\$",full] → [eth0] 00:11:22:33:44:55</p> <p>If <i>format</i> is specified as <i>short</i>, interface names and identical MAC addresses are not listed.</p> <p>Supported since Zabbix 2.0.</p> |
| <b>system.localtime</b> [<type>]<br>System time.                             | Integer - with type as <i>utc</i><br><br>String - with type as <i>local</i> | <b>type</b> (since version 2.0) - possible values:<br><i>utc</i> - (default) the time since the Epoch (00:00:00 UTC, January 1, 1970), measured in seconds.<br><i>local</i> - the time in the 'yyyy-mm-dd,hh:mm:ss.nnn, +hh:mm' format | <p>Must be used as a <i>passive check</i> only.</p> <p>Example:<br/> =&gt; system.localtime[local] → create an item using this key and then use it to display host time in the <i>Clock dashboard widget</i>.</p>   |
| <b>system.run</b> [command,<mode>]   |   |  |   |

| Item key                             |   |   |  |
|--------------------------------------|---|---|--|
| Run specified command on the host.   | Text result of the command<br><br>1 - with mode as <i>nowait</i> (regardless of command result) | <b>command</b> - command for execution<br><b>mode</b> - possible values:<br><i>wait</i> - wait end of execution (default),<br><i>nowait</i> - do not wait | <p>The return value of the item is a standard output together with a standard error produced by the command. <b>Exit code checking</b> is not performed.<br/>See also: <b>Command execution</b></p> <p>To be processed correctly, the return value of the command must be of text data type. An empty result is also allowed.</p> <p>The return value is limited to 16MB (including trailing whitespace that is truncated); <b>database limits</b> also apply.</p> <p>Note that system.run items are disabled by default. Learn how to <b>enable them</b>.</p> <p>Example:<br/>=&gt; system.run[ls -l /] → detailed file list of root directory.</p> |
| <b>system.stat</b> [resource,<type>] |   |   |  |

| Item key                          |                                    |   |   |
|-----------------------------------|------------------------------------|---|---|
| System statistics.                | Integer or float                   | <p><b>ent</b> - number of processor units this partition is entitled to receive (float)</p> <p><b>kthr,&lt;type&gt;</b> - information about kernel thread states:</p> <p><i>r</i> - average number of runnable kernel threads (float)</p> <p><i>b</i> - average number of kernel threads placed in the Virtual Memory Manager wait queue (float)</p> <p><b>memory,&lt;type&gt;</b> - information about the usage of virtual and real memory:</p> <p><i>avm</i> - active virtual pages (integer)</p> <p><i>fre</i> - size of the free list (integer)</p> <p><b>page,&lt;type&gt;</b> - information about page faults and paging activity:</p> <p><i>fi</i> - file page-ins per second (float)</p> <p><i>fo</i> - file page-outs per second (float)</p> <p><i>pi</i> - pages paged in from paging space (float)</p> <p><i>po</i> - pages paged out to paging space (float)</p> <p><i>fr</i> - pages freed (page replacement) (float)</p> <p><i>sr</i> - pages scanned by page-replacement algorithm (float)</p> <p><b>faults,&lt;type&gt;</b> - trap and interrupt rate:</p> <p><i>in</i> - device interrupts (float)</p> <p><i>sy</i> - system calls (float)</p> <p><i>cs</i> - kernel thread context switches (float)</p> <p><b>cpu,&lt;type&gt;</b> - breakdown of percentage usage of processor time:</p> <p><i>us</i> - user time (float)</p> <p><i>sy</i> - system time (float)</p> <p><i>id</i> - idle time (float)</p> <p><i>wa</i> - idle time during which the system had outstanding disk/NFS I/O request(s) (float)</p> <p><i>pc</i> - number of physical processors consumed (float)</p> <p><i>ec</i> - the percentage of entitled capacity consumed (float)</p> <p><i>lbusy</i> - indicates the percentage of logical processor(s) utilization that occurred while executing at the user and system level (float)</p> <p><i>app</i> - indicates the available physical processors in the shared pool (float)</p> <p><b>disk,&lt;type&gt;</b> - disk statistics:</p> <p><i>bps</i> - indicates the amount of data transferred (read or written) to the drive in bytes per second (integer)</p> <p><i>tps</i> - indicates the number of transfers per second that were issued to the physical disk/tape (float)</p> | <p>This item is <b>supported</b> on AIX only.</p> <p>Take note of the following limitations in these items:</p> <p>=&gt; system.stat[cpu,app] - supported only on AIX LPAR of type "Shared"</p> <p>=&gt; system.stat[cpu,ec] - supported on AIX LPAR of type "Shared" and "Dedicated" ("Dedicated" always returns 100 (percent))</p> <p>=&gt; system.stat[cpu,lbusy] - supported only on AIX LPAR of type "Shared"</p> <p>=&gt; system.stat[cpu,pc] - supported on AIX LPAR of type "Shared" and "Dedicated"</p> <p>=&gt; system.stat[ent] - supported on AIX LPAR of type "Shared" and "Dedicated"</p> |
| <b>system.sw.arch</b>             | Software architecture information. | String  | <p>Example:</p> <p>=&gt; system.sw.arch → i686</p> <p>Info is acquired from uname() function.</p> <p>Supported since Zabbix 2.0.</p>  |
| <b>system.sw.os[&lt;info&gt;]</b> |                                    |   |   |

| Item key   |         |  |   |
|--|---------|--|---|
| Operating system information.  | String  | <b>info</b> - possible values:<br><i>full</i> (default), <i>short</i> or <i>name</i>   | Example:<br>=> system.sw.os[short] → Ubuntu 2.6.35-28.50-generic 2.6.35.11<br><br>Info is acquired from (note that not all files and options are present in all distributions):<br>/proc/version ( <i>full</i> )<br>/proc/version_signature ( <i>short</i> )<br>PRETTY_NAME parameter from /etc/os-release on systems supporting it, or /etc/issue.net ( <i>name</i> )<br><br>Supported since Zabbix 2.0.   |
| <b>system.sw.packages</b> [<regexp>,<manager>,<format>]<br>Listing of installed packages.  | Text    | <b>regexp</b> - <i>all</i> (default) or a regular <b>expression</b><br><b>manager</b> - <i>all</i> (default) or a package manager<br><b>format</b> - <i>full</i> (default) or <i>short</i>   | Lists (alphabetically) installed packages whose name matches the given package regular <b>expression</b> ( <i>all</i> lists them all).<br><br>Example:<br>=> system.sw.packages[mini,dpkg,short]<br>→ python-minimal, python2.6-minimal, ubuntu-minimal<br><br>Supported package managers (executed command):<br>dpkg (dpkg --get-selections)<br>pkgtool (ls /var/log/packages)<br>rpm (rpm -qa)<br>pacman (pacman -Q)<br><br>If <b>format</b> is specified as <i>full</i> , packages are grouped by package managers (each manager on a separate line beginning with its name in square brackets).<br>If <b>format</b> is specified as <i>short</i> , packages are not grouped and are listed on a single line.<br><br>Supported since Zabbix 2.0. |
| <b>system.swap.in</b> [<device>,<type>]<br>Swap in (from device into memory) statistics.   | Integer | <b>device</b> - device used for swapping (default is <i>all</i> )<br><b>type</b> - possible values:<br><i>count</i> (number of swapins), <i>sectors</i> (sectors swapped in), <i>pages</i> (pages swapped in).<br>See also <b>platform-specific</b> details for this parameter.    | Example:<br>=> system.swap.in[,pages]<br><br>The source of this information is:<br>/proc/swaps, /proc/partitions, /proc/stat (Linux 2.4)<br>/proc/swaps, /proc/diskstats, /proc/vmstat (Linux 2.6)  |
| <b>system.swap.out</b> [<device>,<type>]<br>Swap out (from memory onto device) statistics. | Integer | <b>device</b> - device used for swapping (default is <i>all</i> )<br><b>type</b> - possible values:<br><i>count</i> (number of swapouts), <i>sectors</i> (sectors swapped out), <i>pages</i> (pages swapped out).<br>See also <b>platform-specific</b> details for this parameter. | Example:<br>=> system.swap.out[,pages]<br><br>The source of this information is:<br>/proc/swaps, /proc/partitions, /proc/stat (Linux 2.4)<br>/proc/swaps, /proc/diskstats, /proc/vmstat (Linux 2.6)   |
| <b>system.swap.size</b> [<device>,<type>]  |         |  |   |

| Item key  |   |   |  |
|---|---|---|--|
| Swap space size in bytes or in percentage from total. | Integer - for bytes<br><br>Float - for percentage | <b>device</b> - device used for swapping (default is <i>all</i> )<br><b>type</b> - possible values:<br><i>free</i> (free swap space, default), <i>pfree</i> (free swap space, in percent), <i>pusd</i> (used swap space, in percent), <i>total</i> (total swap space), <i>used</i> (used swap space)<br>Note that <i>pfree</i> , <i>pusd</i> are not supported on Windows if swap size is 0.<br>See also <b>platform-specific</b> details for this parameter. | Example:<br>=> system.swap.size[,pfree] → free swap space percentage<br><br>If <i>device</i> is not specified Zabbix agent will only take into account swap devices (files), physical memory will be ignored. For example, on Solaris systems <i>swap -s</i> command includes a portion of physical memory and swap devices (unlike <i>swap -l</i> ).<br><br>Note that this key might report incorrect swap space size/percentage on virtualized (VMware ESXi, VirtualBox) Windows platforms. In this case you may use the <code>perf_counter[\700(_Total)\702]</code> key to obtain correct swap space percentage.  |
| <b>system.uname</b>                                   |   |   |  |
| Identification of the system.                         | String  |   | Example of returned value (Unix):<br>FreeBSD localhost 4.2-RELEASE FreeBSD 4.2-RELEASE #0: Mon Nov i386<br><br>Example of returned value (Windows):<br>Windows ZABBIX-WIN 6.0.6001 Microsoft® Windows Server® 2008 Standard Service Pack 1 x86<br><br>On Unix since Zabbix 2.2.0 the value for this item is obtained with <code>uname()</code> system call. Previously it was obtained by invoking " <code>uname -a</code> ". The value of this item might differ from the output of " <code>uname -a</code> " and does not include additional information that " <code>uname -a</code> " prints based on other sources.<br><br>On Windows since Zabbix 3.0 the value for this item is obtained from <code>Win32_OperatingSystem</code> and <code>Win32_Processor</code> WMI classes. Previously it was obtained from volatile Windows APIs and undocumented registry keys. The OS name (including edition) might be translated to the user's display language. On some versions of Windows it contains trademark symbols and extra spaces.<br><br>Note that on Windows the item returns OS architecture, whereas on Unix it returns CPU architecture. |
| <b>system.uptime</b>                                  |   |   |  |
| System uptime in seconds.                             | Integer   |   | In <b>item configuration</b> , use <b>s</b> or <b>uptime</b> units to get readable values.   |
| <b>system.users.num</b>                               |   |   |  |
| Number of users logged in.                            | Integer   |   | <b>who</b> command is used on the agent side to obtain the value.  |

| Item key   |   |   |  |
|--|---|---|--|
| Description  | Return value  | Parameters  | Comments   |
| <b>vfs.dev.discovery</b>   |   |   |  |
| List of block devices and their type.<br>Used for low-level discovery.   | JSON object   |   | This item is supported on Linux platform only.<br><br>Supported since Zabbix 4.4.0.  |
| <b>vfs.dev.read</b> [<device>,<type>,<mode>]   |   |   |  |
| Disk read statistics.  | Integer - with type in <i>sectors, operations, bytes</i><br><br>Float - with type in <i>sps, ops, bps</i><br><br><i>Note</i> : if using an update interval of three hours or more <sup>2</sup> , will always return '0' | <b>device</b> - disk device (default is <i>all</i> <sup>3</sup> )<br><b>type</b> - possible values: <i>sectors, operations, bytes, sps, ops, bps</i><br>Note that 'type' parameter support and defaults depend on the platform. See <a href="#">platform-specific</a> details.<br><i>sps, ops, bps</i> stand for: sectors, operations, bytes per second, respectively.<br><b>mode</b> - possible values: <i>avg1</i> (one-minute average, default), <i>avg5</i> , <i>avg15</i> .<br>This parameter is supported only with type in: <i>sps, ops, bps</i> . | You may use relative device names (for example, <i>sda</i> ) as well as an optional <i>/dev/</i> prefix (for example, <i>/dev/sda</i> ).<br><br>LVM logical volumes are supported.<br><br>Default values of 'type' parameter for different OSes:<br>AIX - operations<br>FreeBSD - bps<br>Linux - sps<br>OpenBSD - operations<br>Solaris - bytes<br><br>Example:<br>=> <code>vfs.dev.read[,operations]</code><br><br><i>sps, ops</i> and <i>bps</i> on supported platforms used to be limited to 8 devices (7 individual and one <i>all</i> ). Since Zabbix 2.0.1 this limit is 1024 devices (1023 individual and one for <i>all</i> ). |
| <b>vfs.dev.write</b> [<device>,<type>,<mode>]  |   |   |  |
| Disk write statistics.   | Integer - with type in <i>sectors, operations, bytes</i><br><br>Float - with type in <i>sps, ops, bps</i><br><br><i>Note</i> : if using an update interval of three hours or more <sup>2</sup> , will always return '0' | <b>device</b> - disk device (default is <i>all</i> <sup>3</sup> )<br><b>type</b> - possible values: <i>sectors, operations, bytes, sps, ops, bps</i><br>Note that 'type' parameter support and defaults depend on the platform. See <a href="#">platform-specific</a> details.<br><i>sps, ops, bps</i> stand for: sectors, operations, bytes per second, respectively.<br><b>mode</b> - possible values: <i>avg1</i> (one-minute average, default), <i>avg5</i> , <i>avg15</i> .<br>This parameter is supported only with type in: <i>sps, ops, bps</i> . | You may use relative device names (for example, <i>sda</i> ) as well as an optional <i>/dev/</i> prefix (for example, <i>/dev/sda</i> ).<br><br>LVM logical volumes are supported.<br><br>Default values of 'type' parameter for different OSes:<br>AIX - operations<br>FreeBSD - bps<br>Linux - sps<br>OpenBSD - operations<br>Solaris - bytes<br><br>Example:<br>=> <code>vfs.dev.write[,operations]</code><br><br><i>sps, ops</i> and <i>bps</i> on supported platforms used to be limited to 8 devices (7 individual and one <i>all</i> ). Since Zabbix 2.0.1 this limit is 1024 (1023 individual and one for <i>all</i> ).        |
| <b>vfs.dir.count</b> [dir,<regex_incl>,<regex_excl>,<types_incl>,<types_excl>,<max_depth>,<min_size>,<max_size>,<min_age>,<max_age>] |   |   |  |

| Item key   |         |   |  |
|--|---------|---|--|
| Directory entry count.   | Integer | <p><b>dir</b> - absolute path to directory</p> <p><b>regex_incl</b> - regular <b>expression</b> describing the name pattern of the entity (file, directory, symbolic link) to include; include all if empty (default value)</p> <p><b>regex_excl</b> - regular <b>expression</b> describing the name pattern of the entity (file, directory, symbolic link) to exclude; don't exclude any if empty (default value)</p> <p><b>types_incl</b> - directory entry types to count, possible values:<br/> <i>file</i> - regular file, <i>dir</i> - subdirectory, <i>sym</i> - symbolic link, <i>sock</i> - socket, <i>bdev</i> - block device, <i>cdev</i> - character device, <i>fifo</i> - FIFO, <i>dev</i> - synonymous with "bdev,cdev", <i>all</i> - all types (default), i.e. "file,dir,sym,sock,bdev,cdev,fifo". Multiple types must be separated with comma and quoted.</p> <p><b>types_excl</b> - directory entry types (see &lt;types_incl&gt;) to NOT count. If some entry type is in both &lt;types_incl&gt; and &lt;types_excl&gt;, directory entries of this type are NOT counted.</p> <p><b>max_depth</b> - maximum depth of subdirectories to traverse. <b>-1</b> (default) - unlimited, <b>0</b> - no descending into subdirectories.</p> <p><b>min_size</b> - minimum size (in bytes) for file to be counted. Smaller files will not be counted. <b>Memory suffixes</b> can be used.</p> <p><b>max_size</b> - maximum size (in bytes) for file to be counted. Larger files will not be counted. <b>Memory suffixes</b> can be used.</p> <p><b>min_age</b> - minimum age (in seconds) of directory entry to be counted. More recent entries will not be counted. <b>Time suffixes</b> can be used.</p> <p><b>max_age</b> - maximum age (in seconds) of directory entry to be counted. Entries so old and older will not be counted (modification time). <b>Time suffixes</b> can be used.</p> <p><b>regex_excl_dir</b> - regular <b>expression</b> describing the name pattern of the directory to exclude. All content of the directory will be excluded (in contrast to <b>regex_excl</b>)</p> | <p>Environment variables, e.g. %APP_HOME%, \$HOME and %TEMP% are not supported.</p> <p>Pseudo-directories "." and ".." are never counted.</p> <p>Symbolic links are never followed for directory traversal.</p> <p>On Windows, directory symlinks are skipped.</p> <p>Both <b>regex_incl</b> and <b>regex_excl</b> are being applied to files and directories when calculating entry count, but are ignored when picking subdirectories to traverse (if <b>regex_incl</b> is "(?i)^.+\.zip\$" and <b>max_depth</b> is not set, then all subdirectories will be traversed, but only files of type zip will be counted).</p> <p>Execution time is limited by the timeout value in agent <b>configuration</b>. Since large directory traversal may take longer than that, no data will be returned and the item will turn unsupported. Partial count will not be returned.</p> <p>When filtering by size, only regular files have meaningful sizes. Under Linux and BSD, directories also have non-zero sizes (a few Kb typically). Devices have zero sizes, e.g. the size of <b>/dev/sda1</b> does not reflect the respective partition size. Therefore, when using &lt;min_size&gt; and &lt;max_size&gt;, it is advisable to specify &lt;types_incl&gt; as "file", to avoid surprises.</p> <p>Examples:<br/> ⇒ <b>vfs.dir.count[/dev]</b> - monitors number of devices in /dev (Linux)<br/> ⇒<br/> <b>vfs.dir.count["C:\Users\ADMINI~1\AppData\Local\Temp"]</b><br/> - monitors number of files in temporary directory (Windows)</p> <p>Supported since Zabbix 4.0.0.</p> |
| <b>vfs.dir.get</b> [dir,<regex_incl>,<regex_excl>,<types_incl>,<types_excl>,<max_depth>,<min_size>,<max_size>,<min_age>,<max_age>] |         |   |  |

| Item key              |      |   |  |
|-----------------------|------|---|--|
| Directory entry list. | JSON | <p><b>dir</b> - absolute path to directory</p> <p><b>regex_incl</b> - regular <b>expression</b> describing the name pattern of the entity (file, directory, symbolic link) to include; include all if empty (default value)</p> <p><b>regex_excl</b> - regular <b>expression</b> describing the name pattern of the entity (file, directory, symbolic link) to exclude; don't exclude any if empty (default value)</p> <p><b>types_incl</b> - directory entry types to list, possible values:<br/> <i>file</i> - regular file, <i>dir</i> - subdirectory, <i>sym</i> - symbolic link, <i>sock</i> - socket, <i>bdev</i> - block device, <i>cdev</i> - character device, <i>fifo</i> - FIFO, <i>dev</i> - synonymous with "bdev,cdev", <i>all</i> - all types (default), i.e. "file,dir,sym,sock,bdev,cdev,fifo". Multiple types must be separated with comma and quoted.</p> <p><b>types_excl</b> - directory entry types (see &lt;types_incl&gt;) to NOT list. If some entry type is in both &lt;types_incl&gt; and &lt;types_excl&gt;, directory entries of this type are NOT listed.</p> <p><b>max_depth</b> - maximum depth of subdirectories to traverse. <b>-1</b> (default) - unlimited, <b>0</b> - no descending into subdirectories.</p> <p><b>min_size</b> - minimum size (in bytes) for file to be listed. Smaller files will not be listed. <b>Memory suffixes</b> can be used.</p> <p><b>max_size</b> - maximum size (in bytes) for file to be listed. Larger files will not be counted. <b>Memory suffixes</b> can be used.</p> <p><b>min_age</b> - minimum age (in seconds) of directory entry to be listed. More recent entries will not be listed. <b>Time suffixes</b> can be used.</p> <p><b>max_age</b> - maximum age (in seconds) of directory entry to be listed. Entries so old and older will not be listed (modification time). <b>Time suffixes</b> can be used.</p> <p><b>regex_excl_dir</b> - regular <b>expression</b> describing the name pattern of the directory to exclude. All content of the directory will be excluded (in contrast to <b>regex_excl</b>)</p> | <p>Environment variables, e.g. %APP_HOME%, \$HOME and %TEMP% are not supported.</p> <p>Pseudo-directories "." and ".." are never listed.</p> <p>Symbolic links are never followed for directory traversal.</p> <p>On Windows, directory symlinks are skipped.</p> <p>Both <b>regex_incl</b> and <b>regex_excl</b> are being applied to files and directories when generating entry list, but are ignored when picking subdirectories to traverse (if <b>regex_incl</b> is "(?i)^.+\.zip\$" and <b>max_depth</b> is not set, then all subdirectories will be traversed, but only files of type zip will be listed).</p> <p>Execution time is limited by timeout value in agent <b>configuration</b>. Since large directory traversal may take longer than that, no data will be returned and the item will turn unsupported. Partial list will not be returned.</p> <p>When filtering by size, only regular files have meaningful sizes. Under Linux and BSD, directories also have non-zero sizes (a few Kb typically). Devices have zero sizes, e.g. the size of <b>/dev/sda1</b> does not reflect the respective partition size. Therefore, when using &lt;<b>min_size</b>&gt; and &lt;<b>max_size</b>&gt;, it is advisable to specify &lt;<b>types_incl</b>&gt; as "file", to avoid surprises.</p> <p>Examples:<br/> ⇒ <b>vfs.dir.get[/dev]</b> - retrieves device list in /dev (Linux)<br/> ⇒<br/> <b>vfs.dir.get["C:\Users\ADMINI~1\AppData\Local\Temp"]</b><br/> - retrieves file list in temporary directory (Windows)</p> <p>Supported since Zabbix 6.0.0.</p> |
|                       |      | <b>vfs.dir.size</b> [dir,<regex_incl>,<regex_excl>,<mode>,<max_depth>,<regex_excl_dir>]   |  |



| Item key  |   |   |  |
|---|---|---|--|
| Directory size<br>(in bytes).   | Integer   | <b>dir</b> - absolute path to directory<br><b>regex_incl</b> - regular <b>expression</b> describing the name pattern of the entity (file, directory, symbolic link) to include; include all if empty (default value)<br><b>regex_excl</b> - regular <b>expression</b> describing the name pattern of the entity (file, directory, symbolic link) to exclude; don't exclude any if empty (default value)<br><b>mode</b> - possible values:<br><i>apparent</i> (default) - gets apparent file sizes rather than disk usage (acts as <code>du -sb dir</code> ), <i>disk</i> - gets disk usage (acts as <code>du -s -B1 dir</code> ). Unlike <code>du</code> command, <code>vfs.dir.size</code> item takes hidden files in account when calculating directory size (acts as <code>du -sb .[^.]* *</code> within dir).<br><b>max_depth</b> - maximum depth of subdirectories to traverse. <b>-1</b> (default) - unlimited, <b>0</b> - no descending into subdirectories.<br><b>regex_excl_dir</b> - regular <b>expression</b> describing the name pattern of the directory to exclude. All content of the directory will be excluded (in contrast to <code>regex_excl</code> ) | Only directories with at least read permission for <i>zabbix</i> user are calculated.<br><br>On Windows any symlink is skipped and hard links are taken into account only once.<br><br>With large directories or slow drives this item may time out due to the Timeout setting in <b>agent</b> and <b>server/proxy</b> configuration files. Increase the timeout values as necessary.<br><br>Examples:<br>⇒ <code>vfs.dir.size[/tmp,log]</code> - calculates size of all files in <code>/tmp</code> which contain 'log'<br>⇒ <code>vfs.dir.size[/tmp,log,^.+\.old\$]</code> - calculates size of all files in <code>/tmp</code> which contain 'log' in their names, excluding files with names ending with '.old'<br><br>The file size limit depends on <b>large file support</b> .<br><br>Supported since Zabbix 3.4.0. |
| <b>vfs.file.cksum</b> [file,<mode>]<br>File checksum, calculated by the UNIX cksum algorithm. | Integer - with mode as <i>crc32</i><br><br>String - with mode as <i>md5</i> , <i>sha256</i> | <b>file</b> - full path to file<br><b>mode</b> - <i>crc32</i> (default), <i>md5</i> , <i>sha256</i>   | Example:<br>⇒ <code>vfs.file.cksum[/etc/passwd]</code><br><br>Example of returned values ( <i>crc32/md5/sha256</i> respectively):<br>675436101<br>9845acf68b73991eb7fd7ee0ded23c44<br>ae67546e4aac995e5c921042d0cf0f1f7147703aa42bfbfbf<br><br>The file size limit depends on <b>large file support</b> .<br><br>The <code>mode</code> parameter is supported since Zabbix 6.0.<br><br>Returns an empty string if the file is empty or contains LF/CR characters only.<br><br>The return value is limited to 16MB (including trailing whitespace that is truncated); <b>database limits</b> also apply.<br><br>Byte order mark (BOM) is excluded from the output.<br><br>Example:<br>⇒ <code>vfs.file.cksum[/etc/passwd]</code>  |
| <b>vfs.file.contents</b> [file,<encoding>]<br>Retrieving contents of a file.                  | Text  | <b>file</b> - full path to file<br><b>encoding</b> - code page <b>identifier</b>  | Returns an empty string if the file is empty or contains LF/CR characters only.<br><br>The return value is limited to 16MB (including trailing whitespace that is truncated); <b>database limits</b> also apply.<br><br>Byte order mark (BOM) is excluded from the output.<br><br>Example:<br>⇒ <code>vfs.file.contents[/etc/passwd]</code>  |
| <b>vfs.file.exists</b> [file,<types_incl>,<types_excl>]                                       |   |   |  |

| Item key   |  |   |   |
|--|--|---|---|
| Checks if file exists.   | 0 - not found<br><br>1 - file of the specified type exists | <b>file</b> - full path to file<br><b>types_incl</b> - list of file types to include, possible values: <i>file</i> (regular file, default (if <i>types_excl</i> is not set)), <i>dir</i> (directory), <i>sym</i> (symbolic link), <i>sock</i> (socket), <i>bdev</i> (block device), <i>cdev</i> (character device), <i>fifo</i> (FIFO), <i>dev</i> (synonymous with "bdev,cdev"), <i>all</i> (all mentioned types, default if <i>types_excl</i> is set).<br><b>types_excl</b> - list of file types to exclude, see <i>types_incl</i> for possible values (by default no types are excluded) | <p>Multiple types must be separated with a comma and the entire set enclosed in quotes "".</p> <p>On Windows the double quotes have to be backslash '\' escaped and the whole item key enclosed in double quotes when using the command line utility for calling <i>zabbix_get.exe</i> or <i>agent2</i>.</p> <p>If the same type is in both &lt;<i>types_incl</i>&gt; and &lt;<i>types_excl</i>&gt;, files of this type are excluded.</p> <p>Examples:<br/>           =&gt; <i>vfs.file.exists[/tmp/application.pid]</i><br/>           =&gt;<br/> <i>vfs.file.exists[/tmp/application.pid,"file,dir,sym"]</i><br/>           =&gt; <i>vfs.file.exists[/tmp/application_dir,dir]</i></p> <p>The file size limit depends on <b>large file support</b>.</p> <p>Note that the item may turn unsupported on Windows if a directory is searched within a non-existing directory, e.g. <i>vfs.file.exists[C:\no\dir,dir]</i> (where 'no' does not exist).</p> |
| <b>vfs.file.get</b> [file]<br>Return information about a file. | JSON object  | <b>file</b> - full path to file   | <p>Supported file types on UNIX-like systems: regular file, directory, symbolic link, socket, block device, character device, FIFO</p> <p>Supported file types on Windows: regular file, directory, symbolic link</p> <p>Example:<br/>           =&gt; <i>vfs.file.get[/etc/passwd]</i> → return a JSON with information about the <i>/etc/passwd</i> file (type, user, permissions, SID, uid etc)</p> <p>The file size limit depends on <b>large file support</b>.</p> <p>Supported since Zabbix 6.0.</p>  |
| <b>vfs.file.md5sum</b> [file]<br>MD5 checksum of file.         | Character string (MD5 hash of the file)                    | <b>file</b> - full path to file   | <p>Example:<br/>           =&gt;<br/> <i>vfs.file.md5sum[/usr/local/etc/zabbix_agentd.conf]</i></p> <p>Example of returned value:<br/>           b5052decb577e0fffd622d6ddc017e82</p> <p>The file size limit depends on <b>large file support</b>.</p>  |
| <b>vfs.file.owner</b> [file,<ownertype>,<resulttype>]          |  |   |   |

| Item key   |  |  |  |
|--|--|--|--|
| Retrieve owner of a file.  | Character string   | <b>file</b> - full path to file<br><b>ownertype</b> - <i>user</i> (default) or <i>group</i> (Unix only)<br><b>resulttype</b> - <i>name</i> (default) or <i>id</i> ; for <i>id</i> - return uid/gid on Unix, SID on Windows   | <p>Example:</p> <pre>=&gt; vfs.file.owner[/tmp/zabbix_server.log] → return file owner of /tmp/zabbix_server.log =&gt; vfs.file.owner[/tmp/zabbix_server.log,,id] → return file owner ID of /tmp/zabbix_server.log</pre> <p>The file size limit depends on <b>large file support</b>.</p> <p>Supported since Zabbix 6.0.</p>  |
| <b>vfs.file.permissions</b> [file]   |  |  |  |
| Return a 4-digit string containing the octal number with Unix permissions.       | String   | <b>file</b> - full path to the file  | <p>Not supported on Windows.</p> <p>Example:</p> <pre>=&gt; vfs.file.permissions[/etc/passwd] → return permissions of /etc/passwd, for example, '0644'</pre> <p>The file size limit depends on <b>large file support</b>.</p> <p>Supported since Zabbix 6.0.</p>   |
| <b>vfs.file.regexp</b> [file,regexp,<encoding>,<start line>,<end line>,<output>] |  |  |  |
| Find string in a file.   | The line containing the matched string, or as specified by the optional output parameter | <b>file</b> - full path to file<br><b>regexp</b> - regular <b>expression</b> describing the required pattern<br><b>encoding</b> - code page <b>identifier</b><br><b>start line</b> - the number of first line to search (first line of file by default).<br><b>end line</b> - the number of last line to search (last line of file by default).<br><b>output</b> - an optional output formatting template. The <b>\0</b> escape sequence is replaced with the matched part of text (from the first character where match begins until the character where match ends) while an <b>\N</b> (where N=1...9) escape sequence is replaced with Nth matched group (or an empty string if the N exceeds the number of captured groups). | <p>Only the first matching line is returned. An empty string is returned if no line matched the expression.</p> <p>Byte order mark (BOM) is excluded from the output.</p> <p>Content extraction using the output parameter takes place on the agent.</p> <p>The <b>start line</b>, <b>end line</b> and output parameters are supported from version 2.2.</p> <p>Examples:</p> <pre>=&gt; vfs.file.regexp[/etc/passwd,zabbix] =&gt; vfs.file.regexp[/path/to/some/file,"([0-9]+)\$","3,5,\1] =&gt; vfs.file.regexp[/etc/passwd,"^zabbix:([0-9]+)","\1] → getting the ID of user zabbix</pre> <p>The file size limit depends on <b>large file support</b>.</p> |
| <b>vfs.file.regmatch</b> [file,regexp,<encoding>,<start line>,<end line>]        |  |  |  |

| Item key   |                                      |   |  |
|--|--------------------------------------|---|--|
| Find string in a file.   | 0 - match not found<br><br>1 - found | <b>file</b> - full path to file<br><b>regexp</b> - regular <b>expression</b> describing the required pattern<br><b>encoding</b> - code page <b>identifier</b><br><b>start line</b> - the number of first line to search (first line of file by default).<br><b>end line</b> - the number of last line to search (last line of file by default). | <p>Byte order mark (BOM) is ignored.</p> <p>The <code>start line</code> and <code>end line</code> parameters are supported from version 2.2.</p> <p>Example:<br/>=&gt;<br/>vfs.file.regmatch[/var/log/app.log,error]</p> <p>The file size limit depends on <b>large file support</b>.</p>  |
| <b>vfs.file.size</b> [file,<mode>]<br>File size (in bytes).  | Integer                              | <b>file</b> - full path to file<br><b>mode</b> - possible values:<br><i>bytes</i> (default) or <i>lines</i> (empty lines are counted, too)  | <p>The file must have read permissions for user <i>zabbix</i>.</p> <p>Example:<br/>=&gt; vfs.file.size[/var/log/syslog]</p> <p>The file size limit depends on <b>large file support</b>.</p> <p>The <code>mode</code> parameter is supported since Zabbix 6.0.</p>   |
| <b>vfs.file.time</b> [file,<mode>]<br>File time information.   | Integer (Unix timestamp)             | <b>file</b> - full path to the file<br><b>mode</b> - possible values:<br><i>modify</i> (default) - last time of modifying file content,<br><i>access</i> - last time of reading file,<br><i>change</i> - last time of changing file properties  | <p>Example:<br/>=&gt; vfs.file.time[/etc/passwd,modify]</p> <p>The file size limit depends on <b>large file support</b>.</p>   |
| <b>vfs.fs.discovery</b><br>List of mounted filesystems and their types. Used for low-level discovery.                                | JSON object                          |   | <p>Supported since Zabbix 2.0.</p>   |
| <b>vfs.fs.get</b><br>List of mounted filesystems, their types, disk space and inode statistics. Can be used for low-level discovery. | JSON object                          |   | <p>The <code>{#FSDRIVETYPE}</code> macro is supported on Windows since Zabbix 3.0.</p> <p>The <code>{#FSLABEL}</code> macro is supported on Windows since Zabbix 6.0.</p> <p>The <code>{#FSLABEL}</code> macro is supported on Windows since Zabbix 6.0.</p> <p>Since Zabbix 6.0.11, this item is capable of reporting file systems with the inode count equal to zero, which can be the case for file systems with dynamic inodes (e.g. btrfs).</p> |
| <b>vfs.fs.inode</b> [fs,<mode>]  |                                      |   |  |

| Item key   |  |  |  |
|--|--|--|--|
| Number or percentage of inodes.  | Integer - for number<br><br>Float - for percentage | <b>fs</b> - filesystem<br><b>mode</b> - possible values:<br><i>total</i> (default), <i>free</i> , <i>used</i> , <i>pfree</i> (free, percentage), <i>pused</i> (used, percentage) | Since Zabbix 6.0.11, this item will not become unsupported in pfree/pused modes if the inode count equals to zero, which can be the case for file systems with dynamic inodes (e.g. btrfs). Instead the pfree/pused values for such file systems will be reported as "100" and "0" respectively.<br><br>Example:<br>=> vfs.fs.inode[/,pfree] |
| <b>vfs.fs.size</b> [fs,<mode>]<br>Disk space in bytes or in percentage from total. | Integer - for bytes<br><br>Float - for percentage  | <b>fs</b> - filesystem<br><b>mode</b> - possible values:<br><i>total</i> (default), <i>free</i> , <i>used</i> , <i>pfree</i> (free, percentage), <i>pused</i> (used, percentage) | If the filesystem is not mounted, returns the size of a local filesystem where the mount point is located.<br><br>Example:<br>=> vfs.fs.size[/tmp,free]<br><br>Reserved space of a file system is taken into account and not included when using the <i>free</i> mode.   |

#### Virtual memory data

| Item key  |   |  |   |
|---|---|--|---|
| Description   | Return value                                      | Parameters   | Comments  |
| <b>vm.memory.size</b> [<mode>]<br>Memory size in bytes or in percentage from total. | Integer - for bytes<br><br>Float - for percentage | <b>mode</b> - possible values:<br><i>total</i> (default), <i>active</i> , <i>anon</i> , <i>buffers</i> , <i>cached</i> , <i>exec</i> , <i>file</i> , <i>free</i> , <i>inactive</i> , <i>pinned</i> , <i>shared</i> , <i>slab</i> , <i>wired</i> , <i>used</i> , <i>pused</i> (used, percentage), <i>available</i> , <i>pavailable</i> (available, percentage)<br>See also <a href="#">platform-specific</a> support and <a href="#">additional details</a> for this parameter. | This item accepts three categories of parameters:<br><br>1) <i>total</i> - total amount of memory;<br>2) platform-specific memory types: <i>active</i> , <i>anon</i> , <i>buffers</i> , <i>cached</i> , <i>exec</i> , <i>file</i> , <i>free</i> , <i>inactive</i> , <i>pinned</i> , <i>shared</i> , <i>slab</i> , <i>wired</i> ;<br>3) user-level estimates on how much memory is used and available: <i>used</i> , <i>pused</i> , <i>available</i> , <i>pavailable</i> . |

#### Web monitoring data

| Item key                                 |              |            |          |
|--|--------------|------------|----------|
| Description                              | Return value | Parameters | Comments |
| <b>web.page.get</b> [host,<path>,<port>] |              |            |          |

| Item key  |   |  |   |
|---|---|--|---|
| Get content of web page.  | Web page source as text (including headers)       | <p><b>host</b> - hostname or URL (as <code>scheme://host:port/path</code>, where only <code>host</code> is mandatory).<br/> Allowed URL schemes: <i>http, https</i><sup>4</sup>.<br/> Missing scheme will be treated as <i>http</i>. If URL is specified <code>path</code> and <code>port</code> must be empty. Specifying user name/password when connecting to servers that require authentication, for example:<br/> <code>http://user:password@www.example.com</code><br/> is only possible with cURL support <sup>4</sup>.<br/> Punycode is supported in hostnames.</p> <p><b>path</b> - path to HTML document (default is /)</p> <p><b>port</b> - port number (default is 80 for HTTP)</p> | <p>This item turns unsupported if the resource specified in <code>host</code> does not exist or is unavailable.</p> <p><code>host</code> can be hostname, domain name, IPv4 or IPv6 address. But for IPv6 address Zabbix agent must be compiled with IPv6 support enabled.</p> <p>Examples:<br/> =&gt;<br/> <code>web.page.get[www.example.com,index.php,80]</code><br/> =&gt;<br/> <code>web.page.get[https://www.example.com]</code><br/> =&gt;<br/> <code>web.page.get[https://blog.example.com/?s=zabbix]</code><br/> =&gt; <code>web.page.get[localhost:80]</code><br/> =&gt; <code>web.page.get[ "::1]/server-status"]</code></p> |
| <b>web.page.perf</b> [host,<path>,<port>]                           | Loading time of full web page (in seconds). Float | <p><b>host</b> - hostname or URL (as <code>scheme://host:port/path</code>, where only <code>host</code> is mandatory).<br/> Allowed URL schemes: <i>http, https</i><sup>4</sup>.<br/> Missing scheme will be treated as <i>http</i>. If URL is specified <code>path</code> and <code>port</code> must be empty. Specifying user name/password when connecting to servers that require authentication, for example:<br/> <code>http://user:password@www.example.com</code><br/> is only possible with cURL support <sup>4</sup>.<br/> Punycode is supported in hostnames.</p> <p><b>path</b> - path to HTML document (default is /)</p> <p><b>port</b> - port number (default is 80 for HTTP)</p> | <p>This item turns unsupported if the resource specified in <code>host</code> does not exist or is unavailable.</p> <p><code>host</code> can be hostname, domain name, IPv4 or IPv6 address. But for IPv6 address Zabbix agent must be compiled with IPv6 support enabled.</p> <p>Examples:<br/> =&gt;<br/> <code>web.page.perf[www.example.com,index.php,80]</code><br/> =&gt;<br/> <code>web.page.perf[https://www.example.com]</code></p>  |
| <b>web.page.regex</b> [host,<path>,<port>,regexp,<length>,<output>] |   |  |   |

| Item key                   |  |  |  |
|----------------------------|--|--|--|
| Find string on a web page. | The matched string, or as specified by the optional output parameter | <p><b>host</b> - hostname or URL (as <code>scheme://host:port/path</code>, where only <code>host</code> is mandatory).<br/>Allowed URL schemes: <code>http</code>, <code>https</code><sup>4</sup>.<br/>Missing scheme will be treated as <code>http</code>. If URL is specified <code>path</code> and <code>port</code> must be empty. Specifying user name/password when connecting to servers that require authentication, for example:<br/><code>http://user:password@www.example.com</code> is only possible with cURL support <sup>4</sup>.<br/><a href="#">Punycode</a> is supported in hostnames.</p> <p><b>path</b> - path to HTML document (default is /)</p> <p><b>port</b> - port number (default is 80 for HTTP)</p> <p><b>regexp</b> - regular <b>expression</b> describing the required pattern</p> <p><b>length</b> - maximum number of characters to return</p> <p><b>output</b> - an optional output formatting template. The <code>\0</code> escape sequence is replaced with the matched part of text (from the first character where match begins until the character where match ends) while an <code>\N</code> (where <code>N=1...9</code>) escape sequence is replaced with Nth matched group (or an empty string if the <code>N</code> exceeds the number of captured groups).</p> | <p>This item turns unsupported if the resource specified in <code>host</code> does not exist or is unavailable.</p> <p><code>host</code> can be hostname, domain name, IPv4 or IPv6 address. But for IPv6 address Zabbix agent must be compiled with IPv6 support enabled.</p> <p>Content extraction using the <code>output</code> parameter takes place on the agent.</p> <p>The <code>output</code> parameter is supported from version 2.2.</p> <p>Examples:<br/>=&gt;<br/><code>web.page.regexp[www.example.com,index.php,80,OK,2]</code><br/>=&gt;<br/><code>web.page.regexp[https://www.example.com,,,OK,2]</code></p> |

## Zabbix metrics

| Item key  |  |            |   |
|---|--|------------|---|
| Description   | Return value                               | Parameters | Comments  |
| <b>agent.hostmetadata</b><br>Agent host metadata.                                 | String                                     |            | <p>Returns the value of HostMetadata or HostMetadataItem parameters, or empty string if none are defined.</p> <p>Supported since Zabbix 6.0.</p>  |
| <b>agent.hostname</b><br>Agent host name.   | String                                     |            | <p>Returns:<br/>As passive check - the name of the first host listed in the Hostname parameter of the agent configuration file;<br/>As active check - the name of the current hostname.</p> |
| <b>agent.ping</b><br>Agent availability check.                                    | Nothing - unavailable<br><br>1 - available |            | <p>Use the <b>nodata()</b> trigger function to check for host unavailability.</p>   |
| <b>agent.variant</b><br>Variant of Zabbix agent (Zabbix agent or Zabbix agent 2). | Integer                                    |            | <p>Examples of returned value:<br/>1 - Zabbix agent<br/>2 - Zabbix agent 2</p>  |
| <b>agent.version</b><br>Version of Zabbix agent.                                  | String                                     |            | <p>Example of returned value:<br/>6.0.3</p>   |

| Item key  |             |   |   |
|---|-------------|---|---|
| <b>zabbix.stats[&lt;ip&gt;,&lt;port&gt;]</b>  |             |   |   |
| Return a set of Zabbix server or proxy internal metrics remotely.                                   | JSON object | <b>ip</b> - IP/DNS/network mask list of servers/proxies to be remotely queried (default is 127.0.0.1)<br><b>port</b> - port of server/proxy to be remotely queried (default is 10051)   | <p>Note that the stats request will only be accepted from the addresses listed in the 'StatsAllowedIP' <a href="#">server/proxy</a> parameter on the target instance.</p> <p>A selected set of internal metrics is returned by this item. For details, see <a href="#">Remote monitoring of Zabbix stats</a>.</p> |
| <b>zabbix.stats[&lt;ip&gt;,&lt;port&gt;,queue,&lt;from&gt;,&lt;to&gt;]</b>                          |             |   |   |
| Return number of monitored items in the queue which are delayed on Zabbix server or proxy remotely. | JSON object | <b>ip</b> - IP/DNS/network mask list of servers/proxies to be remotely queried (default is 127.0.0.1)<br><b>port</b> - port of server/proxy to be remotely queried (default is 10051)<br><b>queue</b> - constant (to be used as is)<br><b>from</b> - delayed by at least (default is 6 seconds)<br><b>to</b> - delayed by at most (default is infinity) | <p>Note that the stats request will only be accepted from the addresses listed in the 'StatsAllowedIP' <a href="#">server/proxy</a> parameter on the target instance.</p>   |

## Footnotes

<sup>1</sup>A Linux-specific note. Zabbix agent must have read-only access to filesystem */proc*. Kernel patches from [www.grsecurity.org](http://www.grsecurity.org) limit access rights of non-privileged users.

<sup>2</sup> `vfs.dev.read[]`, `vfs.dev.write[]`: Zabbix agent will terminate "stale" device connections if the item values are not accessed for more than 3 hours. This may happen if a system has devices with dynamically changing paths or if a device gets manually removed. Note also that these items, if using an update interval of 3 hours or more, will always return '0'.

<sup>3</sup> `vfs.dev.read[]`, `vfs.dev.write[]`: If default *all* is used for the first parameter then the key will return summary statistics, including all block devices like `sda`, `sdb` and their partitions (`sda1`, `sda2`, `sdb3`...) and multiple devices (MD raid) based on those block devices/partitions and logical volumes (LVM) based on those block devices/partitions. In such cases returned values should be considered only as relative value (dynamic in time) but not as absolute values.

<sup>4</sup> SSL (HTTPS) is supported only if agent is compiled with cURL support. Otherwise the item will turn unsupported.

## Encoding settings

To make sure that the acquired data are not corrupted you may specify the correct encoding for processing the check (e.g. 'vfs.file.contents') in the `encoding` parameter. The list of supported encodings (code page identifiers) may be found in documentation for [libiconv](#) (GNU Project) or in Microsoft Windows SDK documentation for "Code Page Identifiers".

If no encoding is specified in the `encoding` parameter the following resolution strategies are applied:

- If encoding is not specified (or is an empty string) it is assumed to be UTF-8, the data is processed "as-is";
- BOM analysis - applicable for items 'vfs.file.contents', 'vfs.file.regexp', 'vfs.file.regmatch'. An attempt is made to determine the correct encoding by using the byte order mark (BOM) at the beginning of the file. If BOM is not present - standard resolution (see above) is applied instead.

## Troubleshooting agent items

- If used with the passive agent, *Timeout* value in server configuration may need to be higher than *Timeout* in the agent configuration file. Otherwise the item may not get any value because the server request to agent timed out first.

## 1 Item keys specific to agent 2

Zabbix agent 2 supports all item keys supported for Zabbix agent on [Unix](#) and [Windows](#). This page provides details on the additional item keys, which you can use with Zabbix agent 2 only, grouped by the plugin they belong to.

See also:

- [Built-in plugins](#)
- [Loadable plugins](#)



**Note:**

Parameters without angle brackets are mandatory. Parameters marked with angle brackets < > are optional.

## Ceph

Key

| Description  | Return value  | Parameters  | Comments |
|--|---|---|----------|
| ceph.df.details[connString,<user>,<apikey>]<br>Cluster's data usage and distribution among pools.                  | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Ceph login credentials. |          |
| ceph.osd.stats[connString,<user>,<apikey>]<br>Aggregated and per OSD statistics.                                   | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Ceph login credentials. |          |
| ceph.osd.discovery[connString,<user>,<apikey>]<br>List of discovered OSDs. Used for <b>low-level discovery</b> .   | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Ceph login credentials. |          |
| ceph.osd.dump[connString,<user>,<apikey>]<br>Usage thresholds and statuses of OSDs.                                | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Ceph login credentials. |          |
| ceph.ping[connString,<user>,<apikey>]<br>Tests whether a connection to Ceph can be established.                    | 0 - connection is broken (if there is any error presented including AUTH and configuration issues)<br><br>1 - connection is successful. | <b>connString</b> - URI or session name.<br><b>user, password</b> - Ceph login credentials. |          |
| ceph.pool.discovery[connString,<user>,<apikey>]<br>List of discovered pools. Used for <b>low-level discovery</b> . | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Ceph login credentials. |          |
| ceph.status[connString,<user>,<apikey>]<br>Overall cluster's status.   | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Ceph login credentials. |          |

## Docker

Key

| Description                        | Return value | Parameters | Comments |
|------------------------------------|--------------|------------|----------|
| docker.container_info[<ID>,<info>] |              |            |          |

| Key  |   |  |  |
|--|---|--|--|
| Low-level information about a container.   | An output of the <a href="#">Container-Inspect</a> API call serialized as JSON                        | <b>ID</b> - ID or name of the container.<br><b>info</b> - the amount of information returned.<br>Supported values: <i>short</i> (default) or <i>full</i> .   | The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail. |
| docker.container_stats[<ID>]<br>Container resource usage statistics.   | An output of the <a href="#">Container-Stats</a> API call and CPU usage percentage serialized as JSON | <b>ID</b> - ID or name of the container.   | The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail. |
| docker.containers<br>A list of containers.   | An output of the <a href="#">ContainerList</a> API call serialized as JSON                            | -  | The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail. |
| docker.containers.discovery[<options>]<br>A list of containers. Used for <a href="#">low-level discovery</a> . | JSON object   | <b>options</b> - specifies whether all or only running containers should be discovered.<br>Supported values:<br><i>true</i> - return all containers;<br><i>false</i> - return only running containers (default). | The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail. |
| docker.data_usage<br>Information about current data usage.   | An output of the <a href="#">System-DataUsage</a> API call serialized as JSON                         | -  | The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail. |
| docker.images<br>A list of images.   | An output of the <a href="#">ImageList</a> API call serialized as JSON                                | -  | The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail. |
| docker.images.discovery<br>A list of images. Used for <a href="#">low-level discovery</a> .                    | JSON object   | -  | The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail. |
| docker.info<br>System information.   | An output of the <a href="#">SystemInfo</a> API call serialized as JSON                               | -  | The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail. |
| docker.ping<br>Test if a Docker daemon is alive or not.  | 1 - connection is alive<br><br>0 - connection is broken   | -  | The Agent2 user ('zabbix') must be added to the 'docker' <a href="#">group</a> for sufficient privileges. Otherwise the check will fail. |

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Key

| Description   | Return value | Parameters   | Comments |
|---|--------------|--|----------|
| ember.get[<uri>,<path>]<br>Returns the result of the required device. | JSON object  | <b>uri</b> - Ember+ device URI. Default: 127.0.0.1:9998<br><b>path</b> - OID path to device. Empty by default, returns root collection data. |          |

## Memcached

---

Key

| Description   | Return value  | Parameters  | Comments |
|---|---|---|----------|
| memcached.ping[connString,<user>,<password>]<br>Test if a connection is alive or not.         | 1 - connection is alive<br><br>0 - connection is broken (if there is any error presented including AUTH and configuration issues) | <b>connString</b> - URI or session name.<br><b>user, password</b> - Memcached login credentials.  |          |
| memcached.stats[connString,<user>,<password>,<type>]<br>Gets the output of the STATS command. | JSON - output is serialized as JSON   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Memcached login credentials.<br><b>type</b> - stat type to be returned: <i>items</i> , <i>sizes</i> , <i>slabs</i> or <i>settings</i> (empty by default, returns general statistics). |          |

## MongoDB

---

Key

| Description   | Return value | Parameters  | Comments |
|---|--------------|---|----------|
| mongodb.collection.stats[connString,<user>,<password>,<database>,collection]<br>Returns a variety of storage statistics for a given collection.   | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials.<br><b>database</b> - database name (default: admin).<br><b>collection</b> — collection name. |          |
| mongodb.collections.discovery[connString,<user>,<password>]<br>Returns a list of discovered collections.<br>Used for <b>low-level discovery</b> . | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials.  |          |
| mongodb.collections.usage[connString,<user>,<password>]<br>Returns usage statistics for collections.  | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials.  |          |
| mongodb.connpool.stats[connString,<user>,<password>]  |              |   |          |

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## Key

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|  |  |   |
|--|--|---|
| Returns information regarding the open outgoing connections from the current database instance to other members of the sharded cluster or replica set. | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials.<br><br>mongodb.db.stats[connString,<user>,<password>,<database>]   |
| Returns statistics reflecting a given database system state.   | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials.<br><b>database</b> - database name (default: admin).<br><br>mongodb.db.discovery[connString,<user>,<password>] |
| Returns a list of discovered databases.  | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials.  |
| Used for <b>low-level discovery</b> .  |  |   |
|  |  | mongodb.jumbo_chunks.count[connString,<user>,<password>]  |
| Returns count of jumbo chunks.   | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials.<br><br>mongodb.oplog.stats[connString,<user>,<password>]   |
| Returns a status of the replica set, using data polled from the oplog.   | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials.<br><br>mongodb.ping[connString,<user>,<password>]  |
| Tests if a connection is alive or not.   | 1 - connection is alive<br><br>0 - connection is broken (if there is any error presented including AUTH and configuration issues). | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials.<br><br>mongodb.rs.config[connString,<user>,<password>]   |
| Returns a current configuration of the replica set.  | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials.<br><br>mongodb.rs.status[connString,<user>,<password>]   |

| Key   |             |  |
|---|-------------|--|
| Returns a replica set status from the point of view of the member where the method is run.<br>mongodb.server.status[connString,<user>,<password>] | JSON object | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials. |
| Returns database state.<br>mongodb.sh.discovery[connString,<user>,<password>]   | JSON object | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials. |
| Returns a list of discovered shards present in the cluster.<br>mongodb.version[connString,<user>,<password>]                                      | JSON object | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials. |
| Returns the database server version.  | String      | <b>connString</b> - URI or session name.<br><b>user, password</b> - MongoDB login credentials. |

## MQTT

| Key  |  |   |   |
|--|--|---|---|
| Description  | Return value   | Parameters  | Comments  |
| mqtt.get[<broker_url>,topic,<username>,<password>]<br>Subscribes to a specific topic or topics (with wildcards) of the provided broker and waits for publications. | Depending on topic content.<br><br>If wildcards are used, returns topic content as JSON. | <b>broker_url</b> - MQTT broker URL (if empty, <i>localhost</i> with port 1883 is used).<br><b>topic</b> - MQTT topic (mandatory).<br>Wildcards (+,#) are supported.<br><b>username,password</b> - authentication credentials (if required) | The item must be configured as an <b>active check</b> ('Zabbix agent (active)' item type).<br><br>TLS encryption certificates can be used by saving them into a default location (e.g. <i>/etc/ssl/certs/</i> directory for Ubuntu). For TLS, use the <i>tls://</i> scheme. |

## MSSQL

| Key   |              |  |  |
|---|--------------|--|--|
| Description   | Return value | Parameters   | Comments   |
| mssql.availability.group.get[URI,<user>,<password>]<br>Returns availability groups. | JSON object  | <b>URI</b> - MSSQL server URI (the only supported schema is <i>sqlserver://</i> ). Embedded credentials will be ignored. Since Zabbix 6.0.36, it is possible to specify an instance name as part of the URI, i.e.: <i>sqlserver://localhost/InstanceName</i> (no port). If port is specified, the instance name is ignored;<br><b>user, password</b> - username, password to send to protected MSSQL server. | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| mssql.custom.query[URI,<user>,<password>,queryName,<args...>]                       |              |  |  |

| Key   |             |  |  |
|---|-------------|--|--|
| Returns the result of a custom query.   | JSON object | <b>URI</b> - MSSQL server URI (the only supported schema is <code>sqlserver://</code> ). Embedded credentials will be ignored. Since Zabbix 6.0.36, it is possible to specify an instance name as part of the URI, i.e.: <code>sqlserver://localhost/InstanceName</code> (no port). If port is specified, the instance name is ignored;<br><b>user, password</b> - username, password to send to protected MSSQL server;<br><b>queryName</b> - name of a custom query configured in <code>Plugins.MSSQL.CustomQueriesDir</code> without the <code>.sql</code> extension;<br><b>args</b> - one or several comma-separated arguments to pass to a query. | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| <code>mssql.db.get</code><br>Returns all available MSSQL databases.   | JSON object |  | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| <code>mssql.job.status.get</code><br>Returns the status of jobs.  | JSON object |  | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| <code>mssql.last.backup.get</code><br>Returns the last backup time for all databases.   | JSON object |  | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| <code>mssql.local.db.get</code><br>Returns databases that are participating in an Always On availability group and replica (primary or secondary) and are located on the server that the connection was established to. | JSON object |  | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| <code>mssql.mirroring.get</code><br>Returns mirroring info.   | JSON object |  | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| <code>mssql.nonlocal.db.get</code>  |             |  |  |

| Key  |                             |  |
|--|-----------------------------|--|
| Returns databases that are participating in an Always On availability group and replica (primary or secondary) located on other servers (the database is not local to the SQL Server instance that the connection was established to). | JSON object                 | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| mssql.perfcounter.get<br>Returns the performance counters.   | JSON object                 | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| mssql.ping<br>Ping the database.<br>Test if connection is correctly configured.  | 1 - alive,<br>0 - not alive | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| mssql.quorum.get<br>Returns the quorum info.   | JSON object                 | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| mssql.quorum.members.get<br>Returns the quorum members.  | JSON object                 | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| mssql.replica.get<br>Returns the replicas.   | JSON object                 | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |
| mssql.version<br>Returns the MSSQL version.  | String                      | Supported since Zabbix 6.0.27. For more information see the <a href="#">MSSQL plugin</a> readme. |

## MySQL

| Key                |              |  |          |
|--------------------|--------------|--|----------|
| Description        | Return value | Parameters   | Comments |
| mysql.custom.query | String       | [connString,<username>,<password>,<queryName>,<args...>] |          |

| Key   |  |   |  |
|---|--|---|--|
| Returns the result of a custom query.   | JSON object  | <b>connString</b> - URI or session name.<br><b>username, password</b> - MySQL login credentials.<br><b>queryName</b> - name of a custom query, must match SQL file name without an extension.<br><b>args</b> - one or several comma-separated arguments to pass to a query. | Supported since Zabbix 6.0.21. For more information see the <a href="#">MySQL plugin</a> readme. |
| mysql.db.discovery[connString,<username>,<password>]                              |  |   |  |
| List of MySQL databases.  | Result of the "show databases"   | <b>connString</b> - URI or session name.<br><b>username, password</b> - MySQL login credentials.  |  |
| Used for <b>low-level discovery</b> .   | SQL query in LLD JSON format.  |   |  |
| mysql.db.size[connString,<username>,<password>,dbName]                            |  |   |  |
| Database size in bytes.   | Result of the "select coalesce(sum(data_length + index_length),0) as size from information_schema.tables where table_schema=?" SQL query for specific database in bytes. | <b>connString</b> - URI or session name.<br><b>username, password</b> - MySQL login credentials.<br><b>dbName</b> - Database name.  |  |
| mysql.get_status_variables[connString,<username>,<password>]                      |  |   |  |
| Values of global status variables.  | Result of the "show global status" SQL query in JSON format.   | <b>connString</b> - URI or session name.<br><b>username, password</b> - MySQL login credentials.  |  |
| mysql.ping[connString,<username>,<password>]                                      |  |   |  |
| Test if a connection is alive or not.   | 1 - connection is alive<br><br>0 - connection is broken (if there is any error presented including AUTH and configuration issues).                                       | <b>connString</b> - URI or session name.<br><b>username, password</b> - MySQL login credentials.  |  |
| mysql.replication.discovery[connString,<username>,<password>]                     |  |   |  |
| List of MySQL replications.   | Result of the "show slave status" SQL query in LLD JSON format.  | <b>connString</b> - URI or session name.<br><b>username, password</b> - MySQL login credentials.  |  |
| Used for <b>low-level discovery</b> .   |  |   |  |
| mysql.replication.get_slave_status[connString,<username>,<password>,<masterHost>] |  |   |  |



| Key                 |   |  |
|---------------------|---|--|
| Replication status. | Result of the "show slave status" SQL query in JSON format. | <b>connString</b> - URI or session name.<br><b>username, password</b> - MySQL login credentials.<br><b>masterHost</b> - Replication master host name. If none found, an error is returned. If this parameter is not specified, all hosts are returned.<br>Note that before Zabbix 6.0.23, the "masterHost" parameter is ignored and always the first master host is returned.<br>mysql.version[connString,<username>,<password>] |
| MySQL version.      | String with MySQL instance version.                         | <b>connString</b> - URI or session name.<br><b>username, password</b> - MySQL login credentials.   |

## Oracle

| Key   |              |   |   |
|---|--------------|---|---|
| Description   | Return value | Parameters  | Comments  |
| oracle.diskgroups.stats[connString,<user>,<password>,<service>,<diskgroup>]     |              |   |   |
| Automatic Storage Management (ASM) disk groups statistics.                      | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.<br><b>diskgroup</b> - name of the ASM disk group to query.   | <b>user</b> parameter allows to append one of the login options as sysdba, as sysoper, or as sysasm in the format user as sysdba (login option is case-insensitive; must not contain a trailing space). |
| oracle.diskgroups.discovery[connString,<user>,<password>,<service>]             |              |   |   |
| List of ASM disk groups. Used for <b>low-level discovery</b> .                  | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.  | <b>user</b> parameter allows to append one of the login options as sysdba, as sysoper, or as sysasm in the format user as sysdba (login option is case-insensitive; must not contain a trailing space). |
| oracle.archive.info[connString,<user>,<password>,<service>,<destination>]       |              |   |   |
| Archive logs statistics.  | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.<br><b>destination</b> - name of the destination to query.  | <b>user</b> parameter allows to append one of the login options as sysdba, as sysoper, or as sysasm in the format user as sysdba (login option is case-insensitive; must not contain a trailing space). |
| oracle.cdb.info[connString,<user>,<password>,<service>,<database>]              |              |   |   |
| Container Databases (CDBs) information.   | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.<br><b>database</b> - name of the database to query.  | <b>user</b> parameter allows to append one of the login options as sysdba, as sysoper, or as sysasm in the format user as sysdba (login option is case-insensitive; must not contain a trailing space). |
| oracle.custom.query[connString,<user>,<password>,<service>,queryName,<args...>] |              |   |   |
| Result of a custom query.   | JSON object  | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.<br><b>queryName</b> — name of a custom query, must match SQL file name without an extension.<br><b>args</b> - one or several comma-separated arguments to pass to a query. | <b>user</b> parameter allows to append one of the login options as sysdba, as sysoper, or as sysasm in the format user as sysdba (login option is case-insensitive; must not contain a trailing space). |
| oracle.datafiles.stats[connString,<user>,<password>,<service>]                  |              |   |   |

| Key  |   |  |   |
|--|---|--|---|
| Data files statistics.   | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.   | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.db.discovery[connString,<user>,<password>,<service>]<br>List of databases.<br>Used for <b>low-level discovery</b> . | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.   | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.fra.stats[connString,<user>,<password>,<service>]<br>Fast Recovery Area (FRA) statistics.                           | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.   | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.instance.info[connString,<user>,<password>,<service>]<br>Instance statistics.                                       | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.   | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.pdb.info[connString,<user>,<password>,<service>,<database>]<br>Pluggable Databases (PDBs) information.              | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.<br><b>database</b> - name of the database to query. | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.pdb.discovery[connString,<user>,<password>,<service>]<br>List of PDBs.<br>Used for <b>low-level discovery</b> .     | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.   | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.pga.stats[connString,<user>,<password>,<service>]<br>Program Global Area (PGA) statistics.                          | JSON object   | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.   | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.ping[connString,<user>,<password>,<service>]<br>Tests whether a connection to Oracle can be established.            | 0 - connection is broken (if there is any error presented including AUTH and configuration issues)<br>1 - connection is successful. | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.   | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.proc.stats[connString,<user>,<password>,<service>]  |   |  |   |

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## Key

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|   |             |   |   |
|---|-------------|---|---|
| Processes statistics.   | JSON object | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.  | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.redolog.info[connString,<user>,<password>,<service>]                 |             |   |   |
| Log file information from the control file.                                 | JSON object | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.  | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.sga.stats[connString,<user>,<password>,<service>]                    |             |   |   |
| System Global Area (SGA) statistics.  | JSON object | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.  | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.sessions.stats[connString,<user>,<password>,<service>,<lockMaxTime>] |             |   |   |
| Sessions statistics.  | JSON object | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.<br><b>lockMaxTime</b> - maximum session lock duration in seconds to count the session as a prolongedly locked. Default: 600 seconds.   | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.sys.metrics[connString,<user>,<password>,<service>,<duration>]       |             |   |   |
| A set of system metric values.  | JSON object | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.<br><b>duration</b> - capturing interval (in seconds) of system metric values. Possible values: <code>60</code> — long duration (default), <code>15</code> — short duration.  | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.sys.params[connString,<user>,<password>,<service>]                   |             |   |   |
| A set of system parameter values.   | JSON object | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.  | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.ts.stats[connString,<user>,<password>,<service>,<tablespace>,<type>] |             |   |   |
| Tablespaces statistics.   | JSON object | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.<br><b>tablespace</b> - name of the tablespace to query. Default (if left empty and <b>type</b> is set):<br>- "TEMP" (if <b>type</b> is set to "TEMPORARY");<br>- "USERS" (if <b>type</b> is set to "PERMANENT").<br><b>type</b> - type of the tablespace to query. Default (if <b>tablespace</b> is set): "PERMANENT". | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.ts.discovery[connString,<user>,<password>,<service>]                 |             |   |   |

| Key   |             |  |   |
|---|-------------|--|---|
| List of tablespaces.<br>Used for <b>low-level discovery</b> .   | JSON object | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.   | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.user.info[connString,<user>,<password>,<service>,<username>]<br>Returns Oracle user information. | JSON object | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.<br><b>username</b> - a username, for which the information is needed. Lowercase usernames are not supported. Default: current user. | <b>user</b> parameter allows to append one of the login options as <code>sysdba</code> , as <code>sysoper</code> , or as <code>sysasm</code> in the format <code>user as sysdba</code> (login option is case-insensitive; must not contain a trailing space). |
| oracle.version[connString,<user>,<password>,<service>]<br>Returns the database server version.          | String      | <b>connString</b> - URI or session name.<br><b>user, password</b> - Oracle login credentials.<br><b>service</b> - Oracle service name.   |   |

## PostgreSQL

| Key  |              |  |          |
|--|--------------|--|----------|
| Description  | Return value | Parameters   | Comments |
| pgsql.autovacuum.count[uri,<username>,<password>,<dbName>]<br>The number of autovacuum workers.  | Integer      | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name. |          |
| pgsql.archive[uri,<username>,<password>,<dbName>]<br>Information about archived files.   | JSON object  | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name. |          |
| pgsql.bgwriter[uri,<username>,<password>,<dbName>]<br>Combined number of checkpoints for the database cluster, broken down by checkpoint type. | JSON object  | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name. |          |
| pgsql.cache.hit[uri,<username>,<password>,<dbName>]<br>PostgreSQL buffer cache hit rate.   | Float        | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name. |          |
| pgsql.connections[uri,<username>,<password>,<dbName>]<br>Connections by type.  | JSON object  | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name. |          |
| pgsql.custom.query[uri,<username>,<password>,queryName,<args...>]  |              |  |          |

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## Key

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|  |             |   |
|--|-------------|---|
| Returns result of a custom query.                            | JSON object | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>queryName</b> - name of a custom query, must match SQL file name without an extension.<br><b>args</b> - one or several comma-separated arguments to pass to a query. |
| pgsql.dbstat[uri,<username>,<password>,<dbName>]             |             |   |
| Collects statistics per database.                            | JSON object | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.  |
| Used for <b>low-level discovery</b> .                        |             | <b>dbName</b> - Database name.  |
| pgsql.dbstat.sum[uri,<username>,<password>,<dbName>]         |             |   |
| Summarized data for all databases in a cluster.              | JSON object | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name.  |
| pgsql.db.age[uri,<username>,<password>,<dbName>]             |             |   |
| Age of the oldest FrozenXID of the database.                 | Integer     | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name.  |
| pgsql.db.bloating_tables[uri,<username>,<password>,<dbName>] |             |   |
| The number of bloating tables per database.                  | Integer     | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name.  |
| pgsql.db.discovery[uri,<username>,<password>,<dbName>]       |             |   |
| List of the PostgreSQL databases.                            | JSON object | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.  |
| Used for <b>low-level discovery</b> .                        |             | <b>dbName</b> - Database name.  |
| pgsql.db.size[uri,<username>,<password>,<dbName>]            |             |   |
| Database size in bytes.                                      | Integer     | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name.  |
| pgsql.locks[uri,<username>,<password>,<dbName>]              |             |   |
| Information about granted locks per database.                | JSON object | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name.  |
| Used for <b>low-level discovery</b> .                        |             |   |
| pgsql.oldest.xid[uri,<username>,<password>,<dbName>]         |             |   |
| Age of the oldest XID.                                       | Integer     | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name.  |
| pgsql.ping[uri,<username>,<password>,<dbName>]               |             |   |

| Key  |  |  |   |
|--|--|--|---|
| Tests whether a connection is alive or not.  | 1 - connection is alive<br><br>0 - connection is broken (if there is any error presented including AUTH and configuration issues). | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name.   |   |
| pgsql.queries[uri,<username>,<password>,<dbName>,timePeriod]<br>Measures query execution time.                       | JSON object  | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name.<br><b>timePeriod</b> - execution time limit for count of slow queries (must be a positive integer). | This item is supported since Zabbix 6.0.3 |
| pgsql.replication.count[uri,<username>,<password>]<br>The number of standby servers.                                 | Integer  | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.   |   |
| pgsql.replication.process[uri,<username>,<password>]<br>Flush lag, write lag and replay lag per each sender process. | JSON object  | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.   |   |
| pgsql.replication.process.discovery[uri,<username>,<password>]<br>Replication process name discovery.                | JSON object  | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.   |   |
| pgsql.replication.recovery_role[uri,<username>,<password>]<br>Recovery status.                                       | 0 - master mode<br>1 - recovery is still in progress (standby mode)  | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.   |   |
| pgsql.replication.status[uri,<username>,<password>]<br>The status of replication.                                    | 0 - streaming is down<br>1 - streaming is up<br>2 - master mode  | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.   |   |
| pgsql.replication_lag.b[uri,<username>,<password>]<br>Replication lag in bytes.                                      | Integer  | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.   |   |
| pgsql.replication_lag.sec[uri,<username>,<password>]<br>Replication lag in seconds.                                  | Integer  | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.   |   |
| pgsql.uptime[uri,<username>,<password>,<dbName>]<br>PostgreSQL uptime in milliseconds.                               | Float  | <b>uri</b> - URI or session name.<br><b>username, password</b> - PostgreSQL credentials.<br><b>dbName</b> - Database name.   |   |

| Key  |             |   |
|--|-------------|---|
| pgsql.version[uri,<username>,<password>,<dbName>]  |             |   |
| Returns  | String      | <b>uri</b> - URI or session name.                   |
| PostgreSQL version.                                |             | <b>username, password</b> - PostgreSQL credentials. |
|  |             | <b>dbName</b> - Database name.                      |
| pgsql.wal.stat[uri,<username>,<password>,<dbName>] |             |   |
| WAL statistics.                                    | JSON object | <b>uri</b> - URI or session name.                   |
|  |             | <b>username, password</b> - PostgreSQL credentials. |
|  |             | <b>dbName</b> - Database name.                      |

## Redis

| Key   |   |  |          |
|---|---|--|----------|
| Description   | Return value  | Parameters   | Comments |
| redis.config[connString,<password>,<pattern>]                                 |   |  |          |
| Gets the configuration parameters of a Redis instance that match the pattern. | JSON - if a glob-style pattern was used<br><br>single value - if a pattern did not contain any wildcard character                 | <b>connString</b> - URI or session name.<br><b>password</b> - Redis password.<br><b>pattern</b> - glob-style pattern (* by default).                                   |          |
| redis.info[connString,<password>,<section>]                                   |   |  |          |
| Gets the output of the INFO command.  | JSON - output is serialized as JSON   | <b>connString</b> - URI or session name.<br><b>password</b> - Redis password.<br><b>section</b> - <a href="#">section</a> of information ( <i>default</i> by default). |          |
| redis.ping[connString,<password>]   |   |  |          |
| Test if a connection is alive or not.   | 1 - connection is alive<br><br>0 - connection is broken (if there is any error presented including AUTH and configuration issues) | <b>connString</b> - URI or session name.<br><b>password</b> - Redis password.  |          |
| redis.slowlog.count[connString,<password>]                                    |   |  |          |
| The number of slow log entries since Redis was started.                       | Integer   | <b>connString</b> - URI or session name.<br><b>password</b> - Redis password.  |          |

## S.M.A.R.T.

| Key                       |              |            |          |
|---------------------------|--------------|------------|----------|
| Description               | Return value | Parameters | Comments |
| smart.attribute.discovery |              |            |          |

| Key   |             |  |
|---|-------------|--|
| Returns a list of S.M.A.R.T. device attributes.         | JSON object | The following macros and their values are returned: {#NAME}, {#DISKTYPE}, {#ID}, {#ATTRNAME}, {#THRESH}. HDD, SSD and NVME drive types are supported. Drives can be alone or combined in a RAID. {#NAME} will have an add-on in case of RAID, e.g: {"{#NAME}": "/dev/sda cciss,2"}   |
| smart.disk.discovery                                    |             |  |
| Returns a list of S.M.A.R.T. devices.                   | JSON object | The following macros and their values are returned: {#NAME}, {#DISKTYPE}, {#MODEL}, {#SN}, {#PATH}, {#ATTRIBUTES}, {#RAIDTYPE}. HDD, SSD and NVME drive types are supported. If a drive does not belong to a RAID, {#RAIDTYPE} will be empty. {#NAME} will have an add-on in case of RAID, e.g: {"{#NAME}": "/dev/sda cciss,2"}  |
| smart.disk.get[<path>,<raid_type>]                      |             |  |
| Returns all available properties of S.M.A.R.T. devices. | JSON object | <p><b>path</b> (since Zabbix 6.0.4) - disk path, the {#PATH} macro may be used as a value</p> <p><b>raid_type</b> (since Zabbix 6.0.4) - RAID type, the {#RAID} macro may be used as a value</p> <p>HDD, SSD and NVME drive types are supported. Drives can be alone or combined in a RAID.</p> <p>The data includes smartctl version and call arguments, and additional fields:</p> <p><i>disk_name</i> - holds the name with the required add-ons for RAID discovery, e.g: {"disk_name": "/dev/sda cciss,2"}</p> <p><i>disk_type</i> - holds the disk type HDD, SSD, or NVME, e.g: {"disk_type": "ssd"}</p> <p>If no parameters are specified, the item will return information about all disks.</p> |

## Systemd

| Key   |              |  |   |
|---|--------------|--|---|
| Description   | Return value | Parameters   | Comments  |
| systemd.unit.get[unit name,<interface>]             |              |  |   |
| Returns all properties of a systemd unit.           | JSON object  | <p><b>unit name</b> - unit name (you may want to use the {#UNIT.NAME} macro in item prototype to discover the name)</p> <p><b>interface</b> - unit interface type, possible values: <i>Unit</i> (default), <i>Service</i>, <i>Socket</i>, <i>Device</i>, <i>Mount</i>, <i>Automount</i>, <i>Swap</i>, <i>Target</i>, <i>Path</i></p> | <p>This item is supported on Linux platform only.</p> <p>LoadState, ActiveState and UnitFileState for Unit interface are returned as text and integer:</p> <p>"ActiveState":{"state":1,"text":"active"}</p> |
| systemd.unit.info[unit name,<property>,<interface>] |              |  |   |



| Key  |             |   |  |
|--|-------------|---|--|
| Systemd unit information.  | String      | <b>unit name</b> - unit name (you may want to use the {#UNIT.NAME} macro in item prototype to discover the name)<br><b>property</b> - unit property (e.g. ActiveState (default), LoadState, Description)<br><b>interface</b> - unit interface type (e.g. Unit (default), Socket, Service) | <p>This item allows to retrieve a specific property from specific type of interface as described in <a href="#">dbus API</a>.</p> <p>This item is supported on Linux platform only.</p> <p>Examples:</p> <pre>=&gt; systemd.unit.info["{#UNIT.NAME}"] - collect active state (active, reloading, inactive, failed, activating, deactivating) info on discovered systemd units =&gt; sys- temd.unit.info["{#UNIT.NAME}",LoadState] - collect load state info on discovered systemd units =&gt; systemd.unit.info[mysql.service,Id] - retrieve service technical name (mysql.service) =&gt; sys- temd.unit.info[mysql.service,Description] - retrieve service description (MySQL Server) =&gt; sys- temd.unit.info[mysql.service,ActiveEnterTimestamp] - retrieve the last time the service entered the active state (1562565036283903) =&gt; sys- temd.unit.info[dbus.socket,NConnections,Socket] - collect the number of connections from this socket unit</pre> <p>This item is supported on Linux platform only.</p> |
| systemd.unit.discovery[<type>]<br>List of systemd units and their details. Used for <b>low-level discovery</b> . | JSON object | <b>type</b> - possible values: <i>all, automount, device, mount, path, service</i> (default), <i>socket, swap, target</i>   | This item is supported on Linux platform only.   |

## Web certificate

| Key  |              |            |          |
|--|--------------|------------|----------|
| Description                                    | Return value | Parameters | Comments |
| web.certificate.get[hostname,<port>,<address>] |              |            |          |

| Key   |             |   |  |
|---|-------------|---|--|
| Validates certificates and returns certificate details. | JSON object | <p><b>hostname</b> - can be either IP or DNS. May contain the URL scheme (<i>https</i> only), path (it will be ignored), and port. If a port is provided in both the first and the second parameters, their values must match. If address (the 3rd parameter) is specified, the hostname is only used for SNI and hostname verification.</p> <p><b>port</b> - port number (default is 443 for HTTPS).</p> <p><b>address</b> - can be either IP or DNS. If specified, it will be used for connection, and hostname (the 1st parameter) will be used for SNI, and host verification. In case, the 1st parameter is an IP and the 3rd parameter is DNS, the 1st parameter will be used for connection, and the 3rd parameter will be used for SNI and host verification.</p> | <p>This item turns unsupported if the resource specified in <code>host</code> does not exist or is unavailable or if TLS handshake fails with any error except an invalid certificate.</p> <p>Currently, AIA (Authority Information Access) X.509 extension, CRLs and OCSP (including OCSP stapling), Certificate Transparency, and custom CA trust store are not supported.</p> |

## 2 Windows-specific item keys

### Item keys

The table provides details on the item keys that you can use with Zabbix Windows agent only.

See also: [Minimum permission level for Windows agent items](#)

| Key   |              |            |          |
|---|--------------|------------|----------|
| Description   | Return value | Parameters | Comments |
| eventlog[name,<regexp>,<severity>,<source>,<eventid>,<maxlines>,<mode>] |              |            |          |

|   |   |  |   |
|---|---|--|---|
| Event log monitoring.   | Log   | <p><b>name</b> - name of event log</p> <p><b>regexp</b> - regular expression describing the required pattern</p> <p><b>severity</b> - regular expression describing severity (case-insensitive). This parameter accepts a regular expression based on the following values: "Information", "Warning", "Error", "Critical", "Verbose" (since Zabbix 2.2.0 running on Windows Vista or newer)</p> <p><b>source</b> - regular expression describing source identifier (case-insensitive; regular expression is supported since Zabbix 2.2.0)</p> <p><b>eventid</b> - regular expression describing the event identifier(s)</p> <p><b>maxlines</b> - maximum number of new lines per second the agent will send to Zabbix server or proxy. This parameter overrides the value of 'MaxLinesPerSecond' in <code>zabbix_agentd.conf</code></p> <p><b>mode</b> - possible values:<br/> <i>all</i> (default), <i>skip</i> - skip processing of older data (affects only newly created items).</p> | <p>The item must be configured as an <b>active check</b>.</p> <p>Examples:<br/> =&gt; eventlog[Application]<br/> =&gt; eventlog[Security,"Failure Audit",,"^(529 680)\$]<br/> =&gt; eventlog[System,"Warning Error"]<br/> =&gt; eventlog[System,,,,^1\$]<br/> =&gt; eventlog[System,,,,@TWOSHORT] - here a <b>custom regular expression</b> named TWOSHORT is referenced (defined as a <i>Result is TRUE</i> type, the expression itself being <code>^1\$\ ^70\$</code>).</p> <p>Note that the agent is unable to send in events from the "Forwarded events" log.</p> <p>The <code>mode</code> parameter is supported since Zabbix 2.0.0.<br/> "Windows Eventing 6.0" is supported since Zabbix 2.2.0.</p> <p>Note that selecting a non-Log <b>type of information</b> for this item will lead to the loss of local timestamp, as well as log severity and source information.</p> <p>See also additional information on <b>log monitoring</b>.</p> |
| net.if.list<br>Network interface list (includes interface type, status, IPv4 address, description). | Text  |  | <p>Supported since Zabbix agent version 1.8.1. Multi-byte interface names supported since Zabbix agent version 1.8.6. Disabled interfaces are not listed.</p> <p>Note that enabling/disabling some components may change their ordering in the Windows interface name.</p> <p>Some Windows versions (for example, Server 2008) might require the latest updates installed to support non-ASCII characters in interface names.</p>   |
| perf_counter[counter,<interval>]<br>Value of any Windows performance counter.                       | Integer, float, string or text (depending on the request) | <p><b>counter</b> - path to the counter</p> <p><b>interval</b> - last N seconds for storing the average value.</p> <p>The <code>interval</code> must be between 1 and 900 seconds (included) and the default value is 1.</p>   | <p>Performance Monitor can be used to obtain list of available counters. Until version 1.6 this parameter will return correct value only for counters that require just one sample (like \System\Threads). It will not work as expected for counters that require more than one sample - like CPU utilization. Since 1.6, <code>interval</code> is used, so the check returns an average value for last "interval" seconds every time.</p> <p>See also: <b>Windows performance counters</b>.</p>  |
| perf_counter_en[counter,<interval>]   |   |  |   |

| Key   |   |  |  |
|---|---|--|--|
| Value of any Windows performance counter in English.  | Integer, float, string or text (depending on the request) | <b>counter</b> - path to the counter in English<br><b>interval</b> - last N seconds for storing the average value.<br>The <code>interval</code> must be between 1 and 900 seconds (included) and the default value is 1. | This item is only supported on <b>Windows Server 2008/Vista</b> and above.<br><br>You can find the list of English strings by viewing the following registry key:<br>HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Perflib\009.<br><br>Supported since Zabbix agent versions 4.0.13 and 4.2.7. |
| perf_instance.discovery[object]<br>List of object instances of Windows performance counters.<br>Used for <b>low-level discovery</b> .   | JSON object   | <b>object</b> - object name (localized)  | Supported since Zabbix agent version 5.0.1.  |
| perf_instance_en.discovery[object]<br>List of object instances of Windows performance counters, discovered using object names in English. Used for <b>low-level discovery</b> . | JSON object   | <b>object</b> - object name (in English)   | Supported since Zabbix agent version 5.0.1.  |
| proc_info[process,<attribute>,<type>]   |   |  |  |

| Key  |             |   |  |
|--|-------------|---|--|
| Various information about specific process(es).  | Float       | <p><b>process</b> - process name</p> <p><b>attribute</b> - requested process attribute</p> <p><b>type</b> - representation type (meaningful when more than one process with the same name exists)</p> | <p>The following attributes are supported:</p> <p><i>vmsize</i> (default) - size of process virtual memory in Kbytes</p> <p><i>wkset</i> - size of process working set (amount of physical memory used by process) in Kbytes</p> <p><i>pf</i> - number of page faults</p> <p><i>ktime</i> - process kernel time in milliseconds</p> <p><i>utime</i> - process user time in milliseconds</p> <p><i>io_read_b</i> - number of bytes read by process during I/O operations</p> <p><i>io_read_op</i> - number of read operation performed by process</p> <p><i>io_write_b</i> - number of bytes written by process during I/O operations</p> <p><i>io_write_op</i> - number of write operation performed by process</p> <p><i>io_other_b</i> - number of bytes transferred by process during operations other than read and write operations</p> <p><i>io_other_op</i> - number of I/O operations performed by process, other than read and write operations</p> <p><i>gdiobj</i> - number of GDI objects used by process</p> <p><i>userobj</i> - number of USER objects used by process</p> <p>Valid types are:</p> <p><i>avg</i> (default) - average value for all processes named &lt;process&gt;</p> <p><i>min</i> - minimum value among all processes named &lt;process&gt;</p> <p><i>max</i> - maximum value among all processes named &lt;process&gt;</p> <p><i>sum</i> - sum of values for all processes named &lt;process&gt;</p> <p>Examples:</p> <p>=&gt; <code>proc_info[iexplore.exe,wkset,sum]</code> - to get the amount of physical memory taken by all Internet Explorer processes</p> <p>=&gt; <code>proc_info[iexplore.exe,pf,avg]</code> - to get the average number of page faults for Internet Explorer processes</p> <p>Note that on a 64-bit system, a 64-bit Zabbix agent is required for this item to work correctly.</p> <p>Supported since Zabbix agent version 3.0.</p> |
| service.discovery                                |             |   |  |
| List of Windows services.                        | JSON object |   |  |
| Used for low-level discovery.                    |             |   |  |
| <code>service.info[service,&lt;param&gt;]</code> |             |   |  |

| Key   |   |   |  |
|---|---|---|--|
| Information about a service.                          | <p>Integer - with <code>param</code> as <i>state, startup</i></p> <p>String - with <code>param</code> as <i>displayname, path, user</i></p> <p>Text - with <code>param</code> as <i>description</i></p> <p>Specifically for <i>state</i>:<br/> 0 - running,<br/> 1 - paused,<br/> 2 - start pending,<br/> 3 - pause pending,<br/> 4 - continue pending,<br/> 5 - stop pending,<br/> 6 - stopped,<br/> 7 - unknown,<br/> 255 - no such service</p> <p>Specifically for <i>startup</i>:<br/> 0 - automatic,<br/> 1 - automatic delayed,<br/> 2 - manual,<br/> 3 - disabled,<br/> 4 - unknown,<br/> 5 - automatic trigger start,<br/> 6 - automatic delayed trigger start,<br/> 7 - manual trigger start</p> | <p><b>service</b> - a real service name or its display name as seen in MMC Services snap-in</p> <p><b>param</b> - <i>state</i> (default), <i>displayname</i>, <i>path</i>, <i>user</i>, <i>startup</i> or <i>description</i></p>  | <p>Examples:</p> <p>=&gt; <code>service.info[SNMPTRAP]</code> - state of the SNMPTRAP service</p> <p>=&gt; <code>service.info[SNMP Trap]</code> - state of the same service, but with display name specified</p> <p>=&gt; <code>service.info[EventLog,startup]</code> - startup type of the EventLog service</p> <p>Items <code>service.info[service,state]</code> and <code>service.info[service]</code> will return the same information.</p> <p>Note that only with <code>param</code> as <i>state</i> this item returns a value for non-existing services (255).</p> <p>This item is supported since Zabbix 3.0.0. It should be used instead of the deprecated <code>service_state[service]</code> item.</p> |
| Listing of services.                                  | <p>0 - if empty</p> <p>Text - list of services separated by a newline</p>   | <p><b>type</b> - <i>all</i> (default), <i>automatic</i>, <i>manual</i> or <i>disabled</i></p> <p><b>state</b> - <i>all</i> (default), <i>stopped</i>, <i>started</i>, <i>start_pending</i>, <i>stop_pending</i>, <i>running</i>, <i>continue_pending</i>, <i>pause_pending</i> or <i>paused</i></p> <p><b>exclude</b> - services to exclude from the result. Excluded services should be listed in double quotes, separated by comma, without spaces.</p> | <p>Examples:</p> <p>=&gt; <code>services[,started]</code> - list of started services</p> <p>=&gt; <code>services[automatic, stopped]</code> - list of stopped services, that should be run</p> <p>=&gt; <code>services[automatic, stopped, "service1,service2,service3"]</code> - list of stopped services, that should be run, excluding services with names <code>service1</code>, <code>service2</code> and <code>service3</code></p> <p>The <code>exclude</code> parameter is supported since Zabbix 1.8.1.</p>  |
| <code>wmi.get[&lt;namespace&gt;,&lt;query&gt;]</code> |   |   |  |

| Key  |   |  |  |
|--|---|--|--|
| Execute WMI query and return the first selected object.  | Integer, float, string or text (depending on the request) | <b>namespace</b> - WMI namespace<br><b>query</b> - WMI query returning a single object   | WMI queries are performed with <a href="#">WQL</a> .<br><br>Example:<br>=> wmi.get[root\cimv2,select status from Win32_DiskDrive where Name like '%PHYSICALDRIVE0%'] - returns the status of the first physical disk<br><br>This key is supported since Zabbix 2.2.0.  |
| wmi.getall[<namespace>,<query>]<br>Execute WMI query and return the whole response.<br><br>Can be used for <a href="#">low-level discovery</a> . | JSON object   | <b>namespace</b> - WMI namespace<br><b>query</b> - WMI query   | WMI queries are performed with <a href="#">WQL</a> .<br><br>Example:<br>=> wmi.getall[root\cimv2,select * from Win32_DiskDrive where Name like '%PHYSICALDRIVE%'] - returns status information of physical disks<br><br>JSONPath <a href="#">preprocessing</a> can be used to point to more specific values in the returned JSON.<br><br>This key is supported since Zabbix 4.4.0.   |
| vm.vmemory.size[<type>]<br>Virtual memory size in bytes or in percentage from total.   | Integer - for bytes<br><br>Float - for percentage         | <b>type</b> - possible values:<br><i>available</i> (available virtual memory), <i>pavailable</i> (available virtual memory, in percent), <i>pused</i> (used virtual memory, in percent), <i>total</i> (total virtual memory, default), <i>used</i> (used virtual memory) | Example:<br>=> vm.vmemory.size[pavailable] → available virtual memory, in percentage<br><br>Monitoring of virtual memory statistics is based on:<br>* Total virtual memory on Windows (total physical + page file size);<br>* The maximum amount of memory Zabbix agent can commit;<br>* The current committed memory limit for the system or Zabbix agent, whichever is smaller.<br><br>This key is supported since Zabbix 3.0.7 and 3.2.3. |

## Monitoring Windows services

This tutorial provides step-by-step instructions for setting up the monitoring of Windows services. It is assumed that Zabbix server and agent are configured and operational.

### Step 1

Get the service name.

You can get the service name by going to the MMC Services snap-in and bringing up the properties of the service. In the *General* tab you should see a field called "Service name". The value that follows is the name you will use when setting up an item for monitoring. For example, if you wanted to monitor the "workstation" service, then your service might be: **lanmanworkstation**.

### Step 2

[Configure an item](#) for monitoring the service.

The item `service.info[service,<param>]` retrieves information about a particular service. Depending on the information you need, specify the `param` option which accepts the following values: *displayname*, *state*, *path*, *user*, *startup* or *description*. The default value is *state* if `param` is not specified (`service.info[service]`).

The type of return value depends on chosen `param`: integer for *state* and *startup*; character string for *displayname*, *path* and *user*; text for *description*.

Example:

- Key: `service.info[lanmanworkstation]`
- Type of information: Numeric (unsigned)

The item `service.info[lanmanworkstation]` will retrieve information about the state of the service as a numerical value. To map a numerical value to a text representation in the frontend ("0" as "Running", "1" as "Paused", etc.), you can configure **value mapping** on the host on which the item is configured. To do this, either **link the template *Windows services by Zabbix agent*** or ***Windows services by Zabbix agent active*** to the host, or configure on the host a new value map that is based on the *Windows service state* value map configured on the mentioned templates.

Note that both of the mentioned templates have a discovery rule configured that will discover services automatically. If you do not want this, you can **disable the discovery rule** on the host level once the template has been linked to the host.

Discovery of Windows services

**Low-level discovery** provides a way to automatically create items, triggers, and graphs for different entities on a computer. Zabbix can automatically start monitoring Windows services on your machine, without the need to know the exact name of a service or create items for each service manually. A filter can be used to generate real items, triggers, and graphs only for services of interest.

## 2 SNMP agent

Overview

You may want to use SNMP monitoring on devices such as printers, network switches, routers or UPS that usually are SNMP-enabled and on which it would be impractical to attempt setting up complete operating systems and Zabbix agents.

To be able to retrieve data provided by SNMP agents on these devices, Zabbix server must be **initially configured** with SNMP support by specifying the `--with-net-snmp` flag.

SNMP checks are performed over the UDP protocol only.

Zabbix server and proxy daemons query SNMP devices for multiple values in a single request. This affects all kinds of SNMP items (regular SNMP items, SNMP items with dynamic indexes, and SNMP low-level discovery) and should make SNMP processing much more efficient. See the **bulk processing** section for technical details on how it works internally. Bulk requests can also be disabled for devices that cannot handle them properly using the "Use bulk requests" setting for each interface.

Zabbix server and proxy daemons log lines similar to the following if they receive an incorrect SNMP response:

SNMP response from host "gateway" does not contain all of the requested variable bindings

While they do not cover all the problematic cases, they are useful for identifying individual SNMP devices for which bulk requests should be disabled.

Zabbix server/proxy will always retry at least one time after an unsuccessful query attempt: either through the SNMP library's retrying mechanism or through the internal **bulk processing** mechanism.

### Warning:

If monitoring SNMPv3 devices, make sure that `msgAuthoritativeEngineID` (also known as `snmpEngineID` or "Engine ID") is never shared by two devices. According to [RFC 2571](#) (section 3.1.1.1) it must be unique for each device.

### Warning:

RFC3414 requires the SNMPv3 devices to persist their engineBoots. Some devices do not do that, which results in their SNMP messages being discarded as outdated after being restarted. In such situation, SNMP cache needs to be manually cleared on a server/proxy (by using `-R snmp_cache_reload`) or the server/proxy needs to be restarted.

Configuring SNMP monitoring

To start monitoring a device through SNMP, the following steps have to be performed:

Step 1

Find out the SNMP string (or OID) of the item you want to monitor.

To get a list of SNMP strings, use the **snmpwalk** command (part of [net-snmp](#) software which you should have installed as part of the Zabbix installation) or equivalent tool:

```
snmpwalk -v 2c -c public <host IP> .
```



As '2c' here stands for SNMP version, you may also substitute it with '1', to indicate SNMP Version 1 on the device.

This should give you a list of SNMP strings and their last value. If it doesn't then it is possible that the SNMP 'community' is different from the standard 'public' in which case you will need to find out what it is.

You can then go through the list until you find the string you want to monitor, e.g. if you wanted to monitor the bytes coming in to your switch on port 3 you would use the IF-MIB::ifHCInOctets.3 string from this line:

```
IF-MIB::ifHCInOctets.3 = Counter64: 3409739121
```

You may now use the **snmpget** command to find out the numeric OID for 'IF-MIB::ifHCInOctets.3':

```
snmpget -v 2c -c public -On <host IP> IF-MIB::ifHCInOctets.3
```

Note that the last number in the string is the port number you are looking to monitor. See also: [Dynamic indexes](#).

This should give you something like the following:

```
.1.3.6.1.2.1.31.1.1.1.6.3 = Counter64: 3472126941
```

Again, the last number in the OID is the port number.

**Note:**

Some of the most used SNMP OIDs are **translated automatically to a numeric representation** by Zabbix.

In the last example above value type is "Counter64", which internally corresponds to ASN\_COUNTER64 type. The full list of supported types is ASN\_COUNTER, ASN\_COUNTER64, ASN\_INTEGER, ASN\_UNSIGNED64, ASN\_INTEGER64, ASN\_FLOAT, ASN\_DOUBLE, ASN\_TIMETICKS, ASN\_GAUGE, ASN\_IPADDRESS, ASN\_OCTET\_STR and ASN\_OBJECT\_ID. These types roughly correspond to "Counter32", "Counter64", "UInteger32", "INTEGER", "Float", "Double", "Timeticks", "Gauge32", "IpAddress", "OCTET STRING", "OBJECT IDENTIFIER" in **snmpget** output, but might also be shown as "STRING", "Hex-STRING", "OID" and other, depending on the presence of a display hint.

Step 2

Create a **host** corresponding to a device.

| Host   | Templates  | IPMI     | Tags | Macros | Inventory | Encryption | Value mapping |      |            |          |       |           |  |      |           |  |
|--|------------|----------|------|--------|-----------|------------|---------------|------|------------|----------|-------|-----------|--|------|-----------|--|
| <div><div>* Host name</div><div>SNMP device host</div></div>   |            |          |      |        |           |            |               |      |            |          |       |           |  |      |           |  |
| <div><div>Visible name</div><div>SNMP device host</div></div>  |            |          |      |        |           |            |               |      |            |          |       |           |  |      |           |  |
| <div><div>* Groups</div><div>Discovered hosts X</div><div>type here to search</div></div>  |            |          |      |        |           |            |               |      |            |          |       |           |  |      |           |  |
| <div><div>Interfaces</div><table><thead><tr><th>Type</th><th>IP address</th><th>DNS name</th></tr></thead><tbody><tr><td>Agent</td><td>127.0.0.1</td><td></td></tr><tr><td>SNMP</td><td>127.0.0.1</td><td></td></tr></tbody></table></div> |            |          |      |        |           |            |               | Type | IP address | DNS name | Agent | 127.0.0.1 |  | SNMP | 127.0.0.1 |  |
| Type   | IP address | DNS name |      |        |           |            |               |      |            |          |       |           |  |      |           |  |
| Agent  | 127.0.0.1  |          |      |        |           |            |               |      |            |          |       |           |  |      |           |  |
| SNMP   | 127.0.0.1  |          |      |        |           |            |               |      |            |          |       |           |  |      |           |  |
| <div><div>* SNMP version</div><div>SNMPv2</div></div>  |            |          |      |        |           |            |               |      |            |          |       |           |  |      |           |  |
| <div><div>* SNMP community</div><div>{SNMP_COMMUNITY}</div></div>  |            |          |      |        |           |            |               |      |            |          |       |           |  |      |           |  |
| <div><div><input checked="" type="checkbox"/> Use bulk requests</div></div>  |            |          |      |        |           |            |               |      |            |          |       |           |  |      |           |  |

Add an SNMP interface for the host:

- Enter the IP address/DNS name and port number

- Select the *SNMP version* from the dropdown
- Add interface credentials depending on the selected SNMP version:
  - SNMPv1, v2 require only the community (usually 'public')
  - SNMPv3 requires more specific options (see below)
- Leave the *Use bulk requests* checkbox marked to allow bulk processing of SNMP requests

| SNMPv3 parameter                 | Description  |
|----------------------------------|--|
| <i>Context name</i>              | Enter context name to identify item on SNMP subnet.<br><i>Context name</i> is supported for SNMPv3 items since Zabbix 2.2.<br>User macros are resolved in this field.  |
| <i>Security name</i>             | Enter security name.<br>User macros are resolved in this field.  |
| <i>Security level</i>            | Select security level:<br><b>noAuthNoPriv</b> - no authentication nor privacy protocols are used<br><b>AuthNoPriv</b> - authentication protocol is used, privacy protocol is not<br><b>AuthPriv</b> - both authentication and privacy protocols are used   |
| <i>Authentication protocol</i>   | Select authentication protocol - <i>MD5</i> , <i>SHA1</i> , <i>SHA224</i> , <i>SHA256</i> , <i>SHA384</i> or <i>SHA512</i> .   |
| <i>Authentication passphrase</i> | Enter authentication passphrase.<br>User macros are resolved in this field.  |
| <i>Privacy protocol</i>          | Select privacy protocol - <i>DES</i> , <i>AES128</i> , <i>AES192</i> , <i>AES256</i> , <i>AES192C</i> (Cisco) or <i>AES256C</i> (Cisco).<br>Note that:<br>- on some older systems net-snmp may not support AES256;<br>- on some newer systems (for example, RHEL9) support of DES may be dropped for the net-snmp package. |
| <i>Privacy passphrase</i>        | Enter privacy passphrase.<br>User macros are resolved in this field.   |

In case of wrong SNMPv3 credentials (security name, authentication protocol/passphrase, privacy protocol):

- Zabbix receives an ERROR from net-snmp, except for wrong *Privacy passphrase* in which case Zabbix receives a TIMEOUT error from net-snmp;
- (since Zabbix 6.0.13) SNMP interface availability will switch to red (unavailable).

#### Warning:

Changes in *Authentication protocol*, *Authentication passphrase*, *Privacy protocol* or *Privacy passphrase*, made without changing the *Security name*, will take effect only after the cache on a server/proxy is manually cleared (by using **-R snmp\_cache\_reload**) or the server/proxy is restarted. In cases, where *Security name* is also changed, all parameters will be updated immediately.

You can use one of the provided SNMP templates (*Template SNMP Device* and others) that will automatically add a set of items. However, the template may not be compatible with the host. Click on *Add* to save the host.

### Step 3

Create an item for monitoring.

So, now go back to Zabbix and click on *Items* for the SNMP host you created earlier. Depending on whether you used a template or not when creating your host, you will have either a list of SNMP items associated with your host or just an empty list. We will work on the assumption that you are going to create the item yourself using the information you have just gathered using *snmpwalk* and *snmpget*, so click on *Create item*. In the new item form:

- Enter the item name
- Change the 'Type' field to 'SNMP agent'
- Enter the 'Key' as something meaningful
- Make sure the 'Host interface' field has your switch/router in it
- Enter the textual or numeric OID that you retrieved earlier into the 'SNMP OID' field, for example: .1.3.6.1.2.1.31.1.1.1.6.3
- Set the 'Type of information' to *Numeric (unsigned)*
- Enter an 'Update interval' and 'History storage' period if you want them to be different from the default
- In the *Preprocessing* tab, add a *Change per second* step (important, otherwise you will get cumulative values from the SNMP device instead of the latest change). Choose a custom multiplier if you want one.

| Item                | Tags                            | Preprocessing |
|---------------------|---------------------------------|---------------|
| * Name              | Interface wlp3s0: Bits received |               |
| Type                | SNMP agent                      |               |
| * Key               | net.if.in[ifHCInOctets.3]       |               |
| Type of information | Numeric (unsigned)              |               |
| * Host interface    | 127.0.0.1:161                   |               |
| * SNMP OID          | 1.3.6.1.2.1.31.1.1.1.6.3        |               |
| Units               | bps                             |               |
| * Update interval   | 3m                              |               |

All mandatory input fields are marked with a red asterisk.

Now save the item and go to *Monitoring > Latest data* for your SNMP data!

Example 1

General example:

| Parameter  | Description   |
|------------|---|
| <b>OID</b> | 1.2.3.45.6.7.8.0 (or .1.2.3.45.6.7.8.0)   |
| <b>Key</b> | <Unique string to be used as reference to triggers><br>For example, "my_param". |

Note that OID can be given in either numeric or string form. However, in some cases, string OID must be converted to numeric representation. Utility `snmpget` may be used for this purpose:

```
snmpget -On localhost public enterprises.ucdavis.memory.memTotalSwap.0
```

Example 2

Monitoring of uptime:

| Parameter                                    | Description      |
|--|------------------|
| <b>OID</b>                                   | MIB::sysUpTime.0 |
| <b>Key</b>                                   | router.uptime    |
| <b>Value type</b>                            | Float            |
| <b>Units</b>                                 | uptime           |
| <b>Preprocessing step: Custom multiplier</b> | 0.01             |

Internal workings of bulk processing

Zabbix server and proxy query SNMP devices for multiple values in a single request. This affects several types of SNMP items:

- regular SNMP items
- SNMP items **with dynamic indexes**
- SNMP **low-level discovery rules**

All SNMP items on a single interface with identical parameters are scheduled to be queried at the same time. The first two types of items are taken by pollers in batches of at most 128 items, whereas low-level discovery rules are processed individually, as before.

On the lower level, there are two kinds of operations performed for querying values: getting multiple specified objects and walking an OID tree.

For "getting", a GetRequest-PDU is used with at most 128 variable bindings. For "walking", a GetNextRequest-PDU is used for SNMPv1 and GetBulkRequest with "max-repetitions" field of at most 128 is used for SNMPv2 and SNMPv3.

Thus, the benefits of bulk processing for each SNMP item type are outlined below:

- regular SNMP items benefit from "getting" improvements;
- SNMP items with dynamic indexes benefit from both "getting" and "walking" improvements: "getting" is used for index verification and "walking" for building the cache;
- SNMP low-level discovery rules benefit from "walking" improvements.

However, there is a technical issue that not all devices are capable of returning 128 values per request. Some always return a proper response, but others either respond with a "tooBig(1)" error or do not respond at all once the potential response is over a certain limit.

In order to find an optimal number of objects to query for a given device, Zabbix uses the following strategy. It starts cautiously with querying 1 value in a request. If that is successful, it queries 2 values in a request. If that is successful again, it queries 3 values in a request and continues similarly by multiplying the number of queried objects by 1.5, resulting in the following sequence of request sizes: 1, 2, 3, 4, 6, 9, 13, 19, 28, 42, 63, 94, 128.

However, once a device refuses to give a proper response (for example, for 42 variables), Zabbix does two things.

First, for the current item batch it halves the number of objects in a single request and queries 21 variables. If the device is alive, then the query should work in the vast majority of cases, because 28 variables were known to work and 21 is significantly less than that. However, if that still fails, then Zabbix falls back to querying values one by one. If it still fails at this point, then the device is definitely not responding and request size is not an issue.

The second thing Zabbix does for subsequent item batches is it starts with the last successful number of variables (28 in our example) and continues incrementing request sizes by 1 until the limit is hit. For example, assuming the largest response size is 32 variables, the subsequent requests will be of sizes 29, 30, 31, 32, and 33. The last request will fail and Zabbix will never issue a request of size 33 again. From that point on, Zabbix will query at most 32 variables for this device.

If large queries fail with this number of variables, it can mean one of two things. The exact criteria that a device uses for limiting response size cannot be known, but we try to approximate that using the number of variables. So the first possibility is that this number of variables is around the device's actual response size limit in the general case: sometimes response is less than the limit, sometimes it is greater than that. The second possibility is that a UDP packet in either direction simply got lost. For these reasons, if Zabbix gets a failed query, it reduces the maximum number of variables to try to get deeper into the device's comfortable range, but (starting from 2.2.8) only up to two times.

In the example above, if a query with 32 variables happens to fail, Zabbix will reduce the count to 31. If that happens to fail, too, Zabbix will reduce the count to 30. However, Zabbix will not reduce the count below 30, because it will assume that further failures are due to UDP packets getting lost, rather than the device's limit.

If, however, a device cannot handle bulk requests properly for other reasons and the heuristic described above does not work, since Zabbix 2.4 there is a "Use bulk requests" setting for each interface that allows to disable bulk requests for that device.

## 1 Dynamic indexes

### Overview

While you may find the required index number (for example, of a network interface) among the SNMP OIDs, sometimes you may not completely rely on the index number always staying the same.

Index numbers may be dynamic - they may change over time and your item may stop working as a consequence.

To avoid this scenario, it is possible to define an OID which takes into account the possibility of an index number changing.

For example, if you need to retrieve the index value to append to **ifInOctets** that corresponds to the **GigabitEthernet0/1** interface on a Cisco device, use the following OID:

```
ifInOctets["index","ifDescr","GigabitEthernet0/1"]
```

The syntax

A special syntax for OID is used:

<OID of data>["index", "<base OID of index>", "<string to search for>"]

| Parameter            | Description   |
|----------------------|---|
| OID of data          | Main OID to use for data retrieval on the item.   |
| index                | Method of processing. Currently one method is supported:<br><b>index</b> – search for index and append it to the data OID |
| base OID of index    | This OID will be looked up to get the index value corresponding to the string.  |
| string to search for | The string to use for an exact match with a value when doing lookup. Case sensitive.                                      |

#### Example

Getting memory usage of *apache* process.

If using this OID syntax:

```
HOST-RESOURCES-MIB::hrSWRunPerfMem["index", "HOST-RESOURCES-MIB::hrSWRunPath", "/usr/sbin/apache2"]
```

the index number will be looked up here:

```
...
HOST-RESOURCES-MIB::hrSWRunPath.5376 = STRING: "/sbin/getty"
HOST-RESOURCES-MIB::hrSWRunPath.5377 = STRING: "/sbin/getty"
HOST-RESOURCES-MIB::hrSWRunPath.5388 = STRING: "/usr/sbin/apache2"
HOST-RESOURCES-MIB::hrSWRunPath.5389 = STRING: "/sbin/sshd"
...
```

Now we have the index, 5388. The index will be appended to the data OID in order to receive the value we are interested in:

```
HOST-RESOURCES-MIB::hrSWRunPerfMem.5388 = INTEGER: 31468 KBytes
```

#### Index lookup caching

When a dynamic index item is requested, Zabbix retrieves and caches whole SNMP table under base OID for index, even if a match would be found sooner. This is done in case another item would refer to the same base OID later - Zabbix would look up index in the cache, instead of querying the monitored host again. Note that each poller process uses separate cache.

In all subsequent value retrieval operations only the found index is verified. If it has not changed, value is requested. If it has changed, cache is rebuilt - each poller that encounters a changed index walks the index SNMP table again.

## 2 Special OIDs

Some of the most used SNMP OIDs are translated automatically to a numeric representation by Zabbix. For example, **ifIndex** is translated to **1.3.6.1.2.1.2.2.1.1**, **ifIndex.0** is translated to **1.3.6.1.2.1.2.2.1.1.0**.

The table contains list of the special OIDs.

| Special OID   | Identifier           | Description   |
|---------------|----------------------|---|
| ifIndex       | 1.3.6.1.2.1.2.2.1.1  | A unique value for each interface.  |
| ifDescr       | 1.3.6.1.2.1.2.2.1.2  | A textual string containing information about the interface. This string should include the name of the manufacturer, the product name and the version of the hardware interface. |
| ifType        | 1.3.6.1.2.1.2.2.1.3  | The type of interface, distinguished according to the physical/link protocol(s) immediately 'below' the network layer in the protocol stack.                                      |
| ifMtu         | 1.3.6.1.2.1.2.2.1.4  | The size of the largest datagram which can be sent / received on the interface, specified in octets.  |
| ifSpeed       | 1.3.6.1.2.1.2.2.1.5  | An estimate of the interface's current bandwidth in bits per second.  |
| ifPhysAddress | 1.3.6.1.2.1.2.2.1.6  | The interface's address at the protocol layer immediately 'below' the network layer in the protocol stack.  |
| ifAdminStatus | 1.3.6.1.2.1.2.2.1.7  | The current administrative state of the interface.  |
| ifOperStatus  | 1.3.6.1.2.1.2.2.1.8  | The current operational state of the interface.   |
| ifInOctets    | 1.3.6.1.2.1.2.2.1.10 | The total number of octets received on the interface, including framing characters.   |
| ifInUcastPkts | 1.3.6.1.2.1.2.2.1.11 | The number of subnetwork-unicast packets delivered to a higher-layer protocol.  |

| Special OID       | Identifier           | Description   |
|-------------------|----------------------|---|
| ifInNUcastPkts    | 1.3.6.1.2.1.2.2.1.12 | The number of non-unicast (i.e., subnetwork- broadcast or subnetwork-multicast) packets delivered to a higher-layer protocol.   |
| ifInDiscards      | 1.3.6.1.2.1.2.2.1.13 | The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. One possible reason for discarding such a packet could be to free up buffer space. |
| ifInErrors        | 1.3.6.1.2.1.2.2.1.14 | The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.  |
| ifInUnknownProtos | 1.3.6.1.2.1.2.2.1.15 | The number of packets received via the interface which were discarded because of an unknown or unsupported protocol.  |
| ifOutOctets       | 1.3.6.1.2.1.2.2.1.16 | The total number of octets transmitted out of the interface, including framing characters.  |
| ifOutUcastPkts    | 1.3.6.1.2.1.2.2.1.17 | The total number of packets that higher-level protocols requested be transmitted, and which were not addressed to a multicast or broadcast address at this sub-layer, including those that were discarded or not sent.                                    |
| ifOutNUcastPkts   | 1.3.6.1.2.1.2.2.1.18 | The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a multicast or broadcast address at this sub-layer, including those that were discarded or not sent.  |
| ifOutDiscards     | 1.3.6.1.2.1.2.2.1.19 | The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet could be to free up buffer space.                           |
| ifOutErrors       | 1.3.6.1.2.1.2.2.1.20 | The number of outbound packets that could not be transmitted because of errors.   |
| ifOutQLen         | 1.3.6.1.2.1.2.2.1.21 | The length of the output packet queue (in packets).   |

### 3 MIB files

#### Introduction

MIB stands for the Management Information Base. MIB files allow to use textual representation of an OID (Object Identifier). It is possible to use raw OIDs when monitoring SNMP devices with Zabbix, but if you feel more comfortable using textual representation, you need to install MIB files.

For example,

`ifHCOutOctets`

is textual representation of the OID

`1.3.6.1.2.1.31.1.1.1.10`

#### Installing MIB files

On Debian-based systems:

```
apt install snmp-mibs-downloader
download-mibs
```

On RedHat-based systems:

```
dnf install net-snmp-libs
```

#### Enabling MIB files

On RedHat-based systems, MIB files should be enabled by default. On Debian-based systems, you have to edit the file `/etc/snmp/snmp.conf` and comment out the line that says `mibs` :

```
# As the snmp packages come without MIB files due to license reasons, loading
# of MIBs is disabled by default. If you added the MIBs you can re-enable
# loading them by commenting out the following line.
mibs :
```

## Testing MIB files

Testing SNMP MIBs can be done using `snmpwalk` utility. If you don't have it installed, use the following instructions.

On Debian-based systems:

```
apt install snmp
```

On RedHat-based systems:

```
dnf install net-snmp-utils
```

After that, the following command must not give error when you query a network device:

```
$ snmpwalk -v 2c -c public <NETWORK DEVICE IP> ifInOctets
IF-MIB::ifInOctets.1 = Counter32: 176137634
IF-MIB::ifInOctets.2 = Counter32: 0
IF-MIB::ifInOctets.3 = Counter32: 240375057
IF-MIB::ifInOctets.4 = Counter32: 220893420
[...]
```

## Using MIBs in Zabbix

The most important to keep in mind is that Zabbix processes do not get informed of the changes made to MIB files. So after every change you must restart Zabbix server or proxy, e. g.:

```
systemctl restart zabbix-server
```

After that, the changes made to MIB files are in effect.

## Using custom MIB files

There are standard MIB files coming with every GNU/Linux distribution. But some device vendors provide their own.

Let's say, you would like to use **CISCO-SMI** MIB file. The following instructions will download and install it:

```
wget ftp://ftp.cisco.com/pub/mibs/v2/CISCO-SMI.my -P /tmp
mkdir -p /usr/local/share/snmp/mibs
grep -q '^mibdirs +/usr/local/share/snmp/mibs' /etc/snmp/snmp.conf 2>/dev/null || echo "mibdirs +/usr/local/share/snmp/mibs" >> /etc/snmp/snmp.conf
cp /tmp/CISCO-SMI.my /usr/local/share/snmp/mibs
```

Now you should be able to use it. Try to translate the name of the object *ciscoProducts* from the MIB file to OID:

```
snmptranslate -IR -On CISCO-SMI::ciscoProducts
.1.3.6.1.4.1.9.1
```

If you receive errors instead of the OID, ensure all the previous commands did not return any errors.

The object name translation worked, you are ready to use custom MIB file. Note the MIB name prefix (*CISCO-SMI::*) used in the query. You will need this when using command-line tools as well as Zabbix.

Don't forget to restart Zabbix server/proxy before using this MIB file in Zabbix.

### Attention:

Keep in mind that MIB files can have dependencies. That is, one MIB may require another. In order to satisfy these dependencies you have to install all the affected MIB files.

## 3 SNMP traps

### Overview

Receiving SNMP traps is the opposite to querying SNMP-enabled devices.

In this case, the information is sent from an SNMP-enabled device and is collected or "trapped" by Zabbix.

Usually, traps are sent upon some condition change and the agent connects to the server on port 162 (as opposed to port 161 on the agent side that is used for queries). Using traps may detect some short problems that occur amidst the query interval and may be missed by the query data.

Receiving SNMP traps in Zabbix is designed to work with **snmptrapd** and one of the mechanisms for passing the traps to Zabbix - either a Bash or Perl script or SNMPPTT.

**Note:**

The simplest way to set up trap monitoring after configuring Zabbix is to use the Bash script solution, because Perl and SNMPPTT are often missing in modern distributions and require more complex configuration. However, this solution uses a script configured as `traphandle`. For better performance on production systems, use the embedded Perl solution (either script with `do_perl` option or SNMPPTT).

The workflow of receiving a trap:

1. `snmptrapd` receives a trap
2. `snmptrapd` passes the trap to the receiver script (Bash, Perl) or SNMPPTT
3. The receiver parses, formats and writes the trap to a file
4. Zabbix SNMP trapper reads and parses the trap file
5. For each trap Zabbix finds all "SNMP trapper" items with host interfaces matching the received trap address. Note that only the selected "IP" or "DNS" in host interface is used during the matching.
6. For each found item, the trap is compared to `regex` in `snmptrap[regex]`. The trap is set as the value of **all** matched items. If no matching item is found and there is an `snmptrap.fallback` item, the trap is set as the value of that.
7. If the trap was not set as the value of any item, Zabbix by default logs the unmatched trap. (This is configured by "Log unmatched SNMP traps" in Administration > General > Other.)

Configuring SNMP traps

This item type requires the following frontend configuration.

1. Create an SNMP interface for your host

- In *Configuration > Hosts*, create/edit the host, and in the *Interfaces* field, add the interface type "SNMP", specifying the IP or DNS address.<br><br>The address from each received trap will be compared to the IP and DNS addresses of all SNMP interfaces to find the corresponding hosts.

2. Configure the item

- In *Configuration > Hosts*, create/edit the necessary item.
- In the *Key* field, use one of the SNMP trap keys:

| Key   |              |  |
|---|--------------|--|
| Description   | Return value | Comments   |
| <b>snmptrap[regex]</b><br>Catches all SNMP traps that match the <b>regular expression</b> specified in <b>regex</b> . If <code>regex</code> is unspecified, catches any trap. | SNMP trap    | This item can be set only for SNMP interfaces. User macros and global regular expressions are supported in the parameter of this item key. |
| <b>snmptrap.fallback</b><br>Catches all SNMP traps that were not caught by any of the <code>snmptrap[]</code> items for that interface.                                       | SNMP trap    | This item can be set only for SNMP interfaces.   |

**Note:**

Multiline regular expression matching is not supported at this time.

- Set the *Type of information* to "Log" for the timestamps to be parsed. Other formats such as "Numeric" are also acceptable but might require a custom trap handler.

Setting up SNMP trap monitoring

Configuring Zabbix server/proxy

To read the traps, Zabbix server or proxy must be configured to start the SNMP trapper process and point to the trap file that is being written by SNMPPTT or a Bash/Perl trap receiver. To do that, edit the configuration file (`zabbix_server.conf` or `zabbix_proxy.conf`):

```
StartSNMPTrapper=1
SNMPTrapperFile=[TRAP FILE]
```



**Warning:**

If systemd parameter **PrivateTmp** is used, this file is unlikely to work in `/tmp`.

## Configuring Bash trap receiver

Requirements: only snmptrapd.

A Bash trap receiver [script](#) can be used to pass traps to Zabbix server directly from snmptrapd. To configure it, add the `traphandle` option to snmptrapd configuration file (`snmptrapd.conf`), see [example](#).

## Configuring Perl trap receiver

Requirements: Perl, Net-SNMP compiled with `--enable-embedded-perl` (done by default since Net-SNMP 5.4)

A Perl trap receiver (look for `misc/snmptrap/zabbix_trap_receiver.pl`) can be used to pass traps to Zabbix server directly from snmptrapd. To configure it:

- add the Perl script to the snmptrapd configuration file (`snmptrapd.conf`), e.g.:

```
perl do "[FULL PATH TO PERL RECEIVER SCRIPT]";
```

- configure the receiver, e.g:

```
$SNMPTrapperFile = '[TRAP FILE]';
$DateTimeFormat = '[DATE TIME FORMAT]';
```

**Note:**

If the script name is not quoted, snmptrapd will refuse to start up with messages, similar to these:<br><br>

Regex modifiers `/l` and `/a` are mutually exclusive at (eval 2) line 1, at end of line  
 Regex modifier `/l` may not appear twice at (eval 2) line 1, at end of line

## Configuring SNMPPTT

At first, snmptrapd should be configured to use SNMPPTT.

**Note:**

For the best performance, SNMPPTT should be configured as a daemon using **snmpthandler-embedded** to pass the traps to it. See instructions for [configuring SNMPPTT](#).

When SNMPPTT is configured to receive the traps, configure `snmpptt.ini`:

1. enable the use of the Perl module from the NET-SNMP package:

```
net_snmp_perl_enable = 1
```

2. log traps to the trap file which will be read by Zabbix:

```
log_enable = 1
log_file = [TRAP FILE]
```

3. set the date-time format:

```
date_time_format = %H:%M:%S %Y/%m/%d
```

**Warning:**

The "net-snmp-perl" package has been removed in RHEL 8.0-8.2; re-added in RHEL 8.3. For more information, see the [known issues](#).

Now format the traps for Zabbix to recognize them (edit `snmpptt.conf`):

1. Each `FORMAT` statement should start with `"ZBXTRAP [address]"`, where `[address]` will be compared to IP and DNS addresses of SNMP interfaces on Zabbix. E.g.:

```
EVENT coldStart .1.3.6.1.6.3.1.1.5.1 "Status Events" Normal
FORMAT ZBXTRAP $aA Device reinitialized (coldStart)
```

2. See more about SNMP trap format below.

**Attention:**

Do not use unknown traps - Zabbix will not be able to recognize them. Unknown traps can be handled by defining a general event in `snmptrapd.conf`: `<br><br>`

```
EVENT general .* "General event" Normal
```

**SNMP trap format**

All customized Perl trap receivers and SNMPPTT trap configuration must format the trap in the following way:

```
[timestamp] [the trap, part 1] ZBXTRAP [address] [the trap, part 2]
```

where

- [timestamp] - the timestamp used for log items
- ZBXTRAP - header that indicates that a new trap starts in this line
- [address] - IP address used to find the host for this trap

Note that "ZBXTRAP" and "[address]" will be cut out from the message during processing. If the trap is formatted otherwise, Zabbix might parse the traps unexpectedly.

Example trap:

```
11:30:15 2011/07/27 .1.3.6.1.6.3.1.1.5.3 Normal "Status Events" localhost - ZBXTRAP 192.168.1.1 Link down
```

This will result in the following trap for SNMP interface with IP=192.168.1.1:

```
11:30:15 2011/07/27 .1.3.6.1.6.3.1.1.5.3 Normal "Status Events"
localhost - Link down on interface 2. Admin state: 1. Operational state: 2
```

**System requirements****Large file support**

Zabbix has large file support for SNMP trapper files. The maximum file size that Zabbix can read is  $2^{63}$  (8 EiB). Note that the filesystem may impose a lower limit on the file size.

**Log rotation**

Zabbix does not provide any log rotation system - that should be handled by the user. The log rotation should first rename the old file and only later delete it so that no traps are lost:

1. Zabbix opens the trap file at the last known location and goes to step 3
2. Zabbix checks if the currently opened file has been rotated by comparing the inode number to the defined trap file's inode number. If there is no opened file, Zabbix resets the last location and goes to step 1.
3. Zabbix reads the data from the currently opened file and sets the new location.
4. The new data are parsed. If this was the rotated file, the file is closed and goes back to step 2.
5. If there was no new data, Zabbix sleeps for 1 second and goes back to step 2.

**File system**

Because of the trap file implementation, Zabbix needs the file system to support inodes to differentiate files (the information is acquired by a `stat()` call).

**Setup examples using different SNMP protocol versions**

This example uses `snmptrapd` and a Bash receiver script to pass traps to Zabbix server.

Setup:

1. Configure Zabbix to start SNMP trapper and set the trap file. Add to `zabbix_server.conf`:

```
StartSNMPTrapper=1
SNMPTrapperFile=/var/lib/zabbix/snmptraps/snmptraps.log
```

2. Download the Bash script to `/usr/sbin/zabbix_trap_handler.sh`:

```
curl -o /usr/sbin/zabbix_trap_handler.sh https://raw.githubusercontent.com/zabbix/zabbix-docker/6.0/Docker
```

If necessary, adjust the `ZABBIX_TRAPS_FILE` variable in the script. To use the default value, create the parent directory first:

```
mkdir -p /var/lib/zabbix/snmptraps
```

3. Add the following to `snmptrapd.conf` (refer to working [example](#))

```
traphandle default /bin/bash /usr/sbin/zabbix_trap_handler.sh
```

4. **Create** an SNMP item TEST (keep in mind the initial **configuration requirements**):

Type: SNMP trap  
Type of information: Log Host interface: SNMP 127.0.0.1  
Key: `snmptrap["linkUp"]`  
Log time format: `yyyyMMdd.hhmmss`

5. Next we will configure `snmptrapd` for our chosen SNMP protocol version and send test traps using the `snmptrap` utility.

#### SNMPv1, SNMPv2

SNMPv1 and SNMPv2 protocols rely on "community string" authentication. In the example below we will use "secret" as community string. It must be set to the same value on SNMP trap senders.

Please note that while still widely used in production environments, SNMPv2 doesn't offer any encryption and real sender authentication. The data is sent as plain text and therefore these protocol versions should only be used in secure environments such as private network and should never be used over any public or third-party network.

SNMP version 1 isn't really used these days since it doesn't support 64-bit counters and is considered a legacy protocol.

To enable accepting SNMPv1 or SNMPv2 traps you should add the following line to `snmptrapd.conf`. Replace "secret" with the SNMP community string configured on SNMP trap senders:

```
authCommunity log,execute,net secret
```

Next we can send a test trap using `snmptrap`. We will use the common "link up" OID in this example:

```
snmptrap -v 2c -c secret localhost 0 linkUp.0
```

#### SNMPv3

SNMPv3 addresses SNMPv1/v2 security issues and provides authentication and encryption. You can use the MD5 or multiple SHA authentication methods and DES/multiple AES as cipher.

To enable accepting SNMPv3 add the following lines to `snmptrapd.conf`:

```
createUser -e 0x8000000001020304 traptest SHA mypassword AES  
authuser log,execute traptest
```

#### Attention:

Please note the "execute" keyword that allows to execute scripts for this user security model.

```
snmptrap -v 3 -n "" -a SHA -A mypassword -x AES -X mypassword -l authPriv -u traptest -e 0x8000000001020304
```

#### Warning:

If you wish to use strong encryption methods such as AES192 or AES256, please use `net-snmp` starting with version 5.8. You might have to recompile it with configure option: `--enable-blumenthal-aes`. Older versions of `net-snmp` do not support AES192/AES256. See also: [Strong Authentication or Encryption](#).

#### Verification

In both examples you will see similar lines in your `/var/lib/zabbix/snmptraps/snmptraps.log`:

```
20220805.102235 ZBXTRAP 127.0.0.1  
UDP: [127.0.0.1]:35736->[127.0.0.1]:162  
DISMAN-EVENT-MIB::sysUpTimeInstance = 0:0:00:00.00  
SNMPv2-MIB::snmpTrapOID.0 = IF-MIB::linkUp.0
```

The item value in Zabbix will be:

```
2022-08-05 10:22:352022-08-05 10:22:33  
  
20220805.102233 UDP: [127.0.0.1]:35736->[127.0.0.1]:162  
DISMAN-EVENT-MIB::sysUpTimeInstance = 0:0:00:00.00  
SNMPv2-MIB::snmpTrapOID.0 = IF-MIB::linkUp.0
```

See also

- [Zabbix blog article on SNMP traps](#)
- [Configuring snmptrapd \(official net-snmp documentation\)](#)
- [Configuring snmptrapd to receive SNMPv3 notifications \(official net-snmp documentation\)](#)

## 4 IPMI checks

### Overview

You can monitor the health and availability of Intelligent Platform Management Interface (IPMI) devices in Zabbix. To perform IPMI checks Zabbix server must be initially **configured** with IPMI support.

IPMI is a standardized interface for remote "lights-out" or "out-of-band" management of computer systems. It allows to monitor hardware status directly from the so-called "out-of-band" management cards, independently from the operating system or whether the machine is powered on at all.

Zabbix IPMI monitoring works only for devices having IPMI support (HP iLO, DELL DRAC, IBM RSA, Sun SSP, etc).

Since Zabbix 3.4, a new IPMI manager process has been added to schedule IPMI checks by IPMI pollers. Now a host is always polled by only one IPMI poller at a time, reducing the number of open connections to BMC controllers. With those changes it's safe to increase the number of IPMI pollers without worrying about BMC controller overloading. The IPMI manager process is automatically started when at least one IPMI poller is started.

See also **known issues** for IPMI checks.

### Configuration

#### Host configuration

A host must be configured to process IPMI checks. An IPMI interface must be added, with the respective IP and port numbers, and IPMI authentication parameters must be defined.

See the **configuration of hosts** for more details.

#### Server configuration

By default, the Zabbix server is not configured to start any IPMI pollers, thus any added IPMI items won't work. To change this, open the Zabbix server configuration file (**zabbix\_server.conf**) as root and look for the following line:

```
# StartIPMIPollers=0
```

Uncomment it and set poller count to, say, 3, so that it reads:

```
StartIPMIPollers=3
```

Save the file and restart zabbix\_server afterwards.

#### Item configuration

When **configuring an item** on a host level:

- Select 'IPMI agent' as the *Type*
- Enter an item **key** that is unique within the host (say, ipmi.fan.rpm)
- For *Host interface* select the relevant IPMI interface (IP and port). Note that an IPMI interface must exist on the host.
- Specify the *IPMI sensor* (for example 'FAN MOD 1A RPM' on Dell Poweredge) to retrieve the metric from. By default, the sensor ID should be specified. It is also possible to use prefixes before the value:
  - **id**: - to specify sensor ID;
  - **name**: - to specify sensor full name. This can be useful in situations when sensors can only be distinguished by specifying the full name.
- Select the respective type of information ('Numeric (float)' in this case; for discrete sensors - 'Numeric (unsigned)'), units (most likely 'rpm') and any other required item attributes

### Supported checks

IPMI agent supports the built-in item **ipmi.get**.

| Item key |                                  |              |  |
|----------|----------------------------------|--------------|--|
| ▲        | Description                      | Return value | Comments   |
| ipmi.get | IPMI-sensor related information. | JSON object  | This item can be used for the <b>discovery of IPMI sensors</b> . Supported since Zabbix 5.0.0. |

## Timeout and session termination

IPMI message timeouts and retry counts are defined in OpenIPMI library. Due to the current design of OpenIPMI, it is not possible to make these values configurable in Zabbix, neither on interface nor item level.

IPMI session inactivity timeout for LAN is 60 +/-3 seconds. Currently it is not possible to implement periodic sending of Activate Session command with OpenIPMI. If there are no IPMI item checks from Zabbix to a particular BMC for more than the session timeout configured in BMC then the next IPMI check after the timeout expires will time out due to individual message timeouts, retries or receive error. After that a new session is opened and a full rescan of the BMC is initiated. If you want to avoid unnecessary rescans of the BMC it is advised to set the IPMI item polling interval below the IPMI session inactivity timeout configured in BMC.

## Notes on IPMI discrete sensors

To find sensors on a host start Zabbix server with **DebugLevel=4** enabled. Wait a few minutes and find sensor discovery records in Zabbix server logfile:

```
$ grep 'Added sensor' zabbix_server.log
8358:20130318:111122.170 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:7 id:'CATERR' reading_type:
8358:20130318:111122.170 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:15 id:'CPU Therm Trip' read
8358:20130318:111122.171 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:17 id:'System Event Log' re
8358:20130318:111122.171 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:17 id:'PhysicalSecurity' re
8358:20130318:111122.171 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:14 id:'IPMI Watchdog' readi
8358:20130318:111122.171 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:16 id:'Power Unit Stat' rea
8358:20130318:111122.171 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:16 id:'P1 Therm Ctrl %' rea
8358:20130318:111122.172 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:16 id:'P1 Therm Margin' rea
8358:20130318:111122.172 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:13 id:'System Fan 2' readin
8358:20130318:111122.172 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:13 id:'System Fan 3' readin
8358:20130318:111122.172 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:14 id:'P1 Mem Margin' readi
8358:20130318:111122.172 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:17 id:'Front Panel Temp' re
8358:20130318:111122.173 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:15 id:'Baseboard Temp' read
8358:20130318:111122.173 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:9 id:'BB +5.0V' reading_typ
8358:20130318:111122.173 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:14 id:'BB +3.3V STBY' readi
8358:20130318:111122.173 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:9 id:'BB +3.3V' reading_typ
8358:20130318:111122.173 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:17 id:'BB +1.5V P1 DDR3' re
8358:20130318:111122.173 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:17 id:'BB +1.1V P1 Vccp' re
8358:20130318:111122.174 Added sensor: host:'192.168.1.12:623' id_type:0 id_sz:14 id:'BB +1.05V PCH' readi
```

To decode IPMI sensor types and states, a copy of [IPMI 2.0 specifications](#) is available (please note that [no further updates](#) to the IPMI specification are planned).

The first parameter to start with is "reading\_type". Use "Table 42-1, Event/Reading Type Code Ranges" from the specifications to decode "reading\_type" code. Most of the sensors in our example have "reading\_type:0x1" which means "threshold" sensor. "Table 42-3, Sensor Type Codes" shows that "type:0x1" means temperature sensor, "type:0x2" - voltage sensor, "type:0x4" - Fan etc. Threshold sensors sometimes are called "analog" sensors as they measure continuous parameters like temperature, voltage, revolutions per minute.

Another example - a sensor with "reading\_type:0x3". "Table 42-1, Event/Reading Type Code Ranges" says that reading type codes 02h-0Ch mean "Generic Discrete" sensor. Discrete sensors have up to 15 possible states (in other words - up to 15 meaningful bits). For example, for sensor 'CATERR' with "type:0x7" the "Table 42-3, Sensor Type Codes" shows that this type means "Processor" and the meaning of individual bits is: 00h (the least significant bit) - IERR, 01h - Thermal Trip etc.

There are few sensors with "reading\_type:0x6f" in our example. For these sensors the "Table 42-1, Event/Reading Type Code Ranges" advises to use "Table 42-3, Sensor Type Codes" for decoding meanings of bits. For example, sensor 'Power Unit Stat' has type "type:0x9" which means "Power Unit". Offset 00h means "PowerOff/Power Down". In other words if the least significant bit is 1, then server is powered off. To test this bit, the **bitand** function with mask '1' can be used. The trigger expression could be like

```
bitand(last(/www.example.com/Power Unit Stat,#1),1)=1
```

to warn about a server power off.

## Notes on discrete sensor names in OpenIPMI-2.0.16, 2.0.17, 2.0.18 and 2.0.19

Names of discrete sensors in OpenIPMI-2.0.16, 2.0.17 and 2.0.18 often have an additional "0" (or some other digit or letter) appended at the end. For example, while ipmitool and OpenIPMI-2.0.19 display sensor names as "PhysicalSecurity" or "CATERR", in OpenIPMI-2.0.16, 2.0.17 and 2.0.18 the names are "PhysicalSecurity0" or "CATERR0", respectively.

When configuring an IPMI item with Zabbix server using OpenIPMI-2.0.16, 2.0.17 and 2.0.18, use these names ending with "0" in the *IPMI sensor* field of IPMI agent items. When your Zabbix server is upgraded to a new Linux distribution, which uses OpenIPMI-2.0.19 (or later), items with these IPMI discrete sensors will become "NOT SUPPORTED". You have to change their *IPMI sensor* names (remove the '0' in the end) and wait for some time before they turn "Enabled" again.

## Notes on threshold and discrete sensor simultaneous availability

Some IPMI agents provide both a threshold sensor and a discrete sensor under the same name. In Zabbix versions prior to 2.2.8 and 2.4.3, the first provided sensor was chosen. Since versions 2.2.8 and 2.4.3, preference is always given to the threshold sensor.

## Notes on connection termination

If IPMI checks are not performed (by any reason: all host IPMI items disabled/notsupported, host disabled/deleted, host in maintenance etc.) the IPMI connection will be terminated from Zabbix server or proxy in 3 to 4 hours depending on the time when Zabbix server/proxy was started.

## 5 Simple checks

### Overview

Simple checks are normally used for remote agent-less checks of services.

Note that Zabbix agent is not needed for simple checks. Zabbix server/proxy is responsible for the processing of simple checks (making external connections, etc).

Examples of using simple checks:

```
net.tcp.service[ftp,,155]
net.tcp.service[http]
net.tcp.service.perf[http,,8080]
net.udp.service.perf[ntp]
```

#### Note:

*User name* and *Password* fields in simple check item configuration are used for VMware monitoring items; ignored otherwise.

### Supported simple checks

List of supported simple checks:

See also:

- [VMware monitoring item keys](#)

#### Key

| Description   | Return value                                    | Parameters  | Comments  |
|---|---|---|---|
| <b>icmping</b> [<target>,<packets>,<interval>,<size>,<timeout>]           |   |   |   |
| Host accessibility by ICMP ping.  | 0 - ICMP ping fails<br>1 - ICMP ping successful | <b>target</b> - host IP or DNS name<br><b>packets</b> - number of packets<br><b>interval</b> - time between successive packets in milliseconds<br><b>size</b> - packet size in bytes<br><b>timeout</b> - timeout in milliseconds  | Example:<br>=> icmping[,4] → if at least one packet of the four is returned, the item will return 1.<br><br>See also: table of <a href="#">default values</a> .   |
| <b>icmpingloss</b> [<target>,<packets>,<interval>,<size>,<timeout>]       | Float.  | <b>target</b> - host IP or DNS name<br><b>packets</b> - number of packets<br><b>interval</b> - time between successive packets in milliseconds<br><b>size</b> - packet size in bytes<br><b>timeout</b> - timeout in milliseconds  | See also: table of <a href="#">default values</a> .   |
| <b>icmpingsec</b> [<target>,<packets>,<interval>,<size>,<timeout>,<mode>] | Float.  | <b>target</b> - host IP or DNS name<br><b>packets</b> - number of packets<br><b>interval</b> - time between successive packets in milliseconds<br><b>size</b> - packet size in bytes<br><b>timeout</b> - timeout in milliseconds<br><b>mode</b> - possible values: <i>min</i> , <i>max</i> , <i>avg</i> (default) | Packets which are lost or timed out are not used in the calculation.<br><br>If host is not available (timeout reached), the item will return 0.<br>If the return value is less than 0.0001 seconds, the value will be set to 0.0001 seconds.<br><br>See also: table of <a href="#">default values</a> . |

**net.tcp.service**[service,<ip>,<port>]

Checks if service is running and accepting TCP connections. 0 - service is down 1 - service is running

**service** - possible values: *ssh, ldap, smtp, ftp, http, pop, nntp, imap, tcp, https, telnet* (see [details](#))

**ip** - IP address or DNS name (by default host IP/DNS is used)

**port** - port number (by default standard service port number is used).

Example:

=> `net.tcp.service[ftp,,45]` → can be used to test the availability of FTP server on TCP port 45.

Note that with *tcp* service indicating the port is mandatory.

These checks may result in additional messages in system daemon logfiles (SMTP and SSH sessions being logged usually).

Checking of encrypted protocols (like IMAP on port 993 or POP on port 995) is currently not supported. As a workaround, please use `net.tcp.service[tcp,<ip>,<port>]` for checks like these.

*https* and *telnet* services are supported since Zabbix 2.0.

**net.tcp.service.perf**[service,<ip>,<port>]

Checks performance of TCP service. Float. 0.000000 - service is down

seconds - the number of seconds spent while connecting to the service

**service** - possible values: *ssh, ldap, smtp, ftp, http, pop, nntp, imap, tcp, https, telnet* (see [details](#))

**ip** - IP address or DNS name (by default, host IP/DNS is used)

**port** - port number (by default standard service port number is used).

Example:

=> `net.tcp.service.perf[ssh]` → can be used to test the speed of initial response from SSH server.

Note that with *tcp* service indicating the port is mandatory.

Checking of encrypted protocols (like IMAP on port 993 or POP on port 995) is currently not supported. As a workaround, please use `net.tcp.service.perf[tcp,<ip>,<port>]` for checks like these.

*https* and *telnet* services are supported since Zabbix 2.0.

Called `tcp_perf` before Zabbix 2.0.

**net.udp.service**[service,<ip>,<port>]

Checks if service is running and responding to UDP requests. 0 - service is down 1 - service is running

**service** - possible values: *ntp* (see [details](#))

**ip** - IP address or DNS name (by default host IP/DNS is used)

**port** - port number (by default standard service port number is used).

Example:

=> `net.udp.service[ntp,,45]` → can be used to test the availability of NTP service on UDP port 45.

This item is supported since Zabbix 3.0, but *ntp* service was available for `net.tcp.service[]` item in prior versions.

**net.udp.service.perf**[service,<ip>,<port>]

Checks performance of UDP service. Float. 0.000000 - service is down

seconds - the number of seconds spent waiting for response from the service

**service** - possible values: *ntp* (see [details](#))

**ip** - IP address or DNS name (by default, host IP/DNS is used)

**port** - port number (by default standard service port number is used).

Example:

=> `net.udp.service.perf[ntp]` → can be used to test response time from NTP service.

This item is supported since Zabbix 3.0, but *ntp* service was available for `net.tcp.service[]` item in prior versions.

**Attention:**

For SourceIP support in LDAP simple checks (e.g. `net.tcp.service[ldap]`), OpenLDAP version 2.6.1 or above is required. SourceIP is supported in LDAP simple checks since Zabbix 6.0.1.

## Timeout processing

Zabbix will not process a simple check longer than the Timeout seconds defined in the Zabbix server/proxy configuration file. For `icmping*` items, the timeout and retries are specified directly in the item key, and are not influenced by the global Timeout parameter.

## ICMP pings

Zabbix uses external utility **fping** for processing of ICMP pings.

The utility is not part of Zabbix distribution and has to be additionally installed. If the utility is missing, has wrong permissions or its location does not match the location set in the Zabbix server/proxy configuration file ('FpingLocation' parameter), ICMP pings (**icmping**, **icmpingloss**, **icmpingsec**) will not be processed.

See also: [known issues](#)

**fping** must be executable by the user Zabbix daemons run as and setuid root. Run these commands as user **root** in order to set up correct permissions:

```
chown root:zabbix /usr/sbin/fping
chmod 4710 /usr/sbin/fping
```

After performing the two commands above check ownership of the **fping** executable. In some cases the ownership can be reset by executing the `chmod` command.

Also check, if user `zabbix` belongs to group `zabbix` by running:

```
groups zabbix
```

and if it's not add by issuing:

```
usermod -a -G zabbix zabbix
```

Defaults, limits and description of values for ICMP check parameters:

| Parameter | Unit        | Description   | Fping's flag | Defaults set by   |               | Allowed limits by Zabbix |            |
|-----------|-------------|---|--------------|---|---------------|--------------------------|------------|
|           |             |   |              | <b>fping</b>  | <b>Zabbix</b> | <b>min</b>               | <b>max</b> |
| packets   | number      | number of request packets to a target   | -C           |   | 3             | 1                        | 10000      |
| interval  | millisecond | time to wait between successive packets   | -p           | 1000  |               | 20                       | unlimited  |
| size      | bytes       | packet size in bytes<br>56 bytes on x86, 68 bytes on x86_64   | -b           | 56 or 68  |               | 24                       | 65507      |
| timeout   | millisecond | <b>fping v3.x</b> - timeout to wait after last packet sent, affected by -C flag<br><b>fping v4.x</b> - individual timeout for each packet | -t           | <b>fping v3.x</b> - 500<br><b>fping v4.x</b> - inherited from -p flag, but not more than 2000 |               | 50                       | unlimited  |

In addition Zabbix uses `fping` options `-i interval ms` (do not mix up with the item parameter `interval` mentioned in the table above, which corresponds to `fping` option `-p`) and `-S source IP address` (or `-I` in older `fping` versions). Those options are auto-detected by running checks with different option combinations. Zabbix tries to detect the minimal value in milliseconds that `fping` allows to use with `-i` by trying 3 values: 0, 1 and 10. The value that first succeeds is then used for subsequent ICMP checks. This process is done by each **ICMP pinger** process individually.



Auto-detected fping options are invalidated every hour and detected again on the next attempt to perform ICMP check. Set DebugLevel>=4 in order to view details of this process in the server or proxy log file.

### Warning:

Warning: fping defaults can differ depending on platform and version - if in doubt, check fping documentation.

Zabbix writes IP addresses to be checked by any of three *icmping\** keys to a temporary file, which is then passed to **fping**. If items have different key parameters, only ones with identical key parameters are written to a single file.

All IP addresses written to the single file will be checked by fping in parallel, so Zabbix icmp pinger process will spend fixed amount of time disregarding the number of IP addresses in the file.

## 1 VMware monitoring item keys

### Item keys

The table provides details on the simple checks that can be used to monitor **VMware environments**.

Parameters without angle brackets are mandatory. Parameters marked with angle brackets < > are optional.

| Key   | Description  | Return value  | Parameters  | Comments  |
|---|--|---|---|---|
| vmware.cl.perfcounter[url,id,path,<instance>] | VMware cluster performance counter metrics.                            | Integer   | <b>url</b> - VMware service URL<br><b>id</b> - VMware cluster ID<br><b>path</b> - performance counter path <sup>1</sup><br><b>instance</b> - performance counter instance | id can be received from vmware.cluster.discovery[] as {#CLUSTER.ID} |
| vmware.cluster.discovery[url]                 | Discovery of VMware clusters.  | JSON object   | <b>url</b> - VMware service URL   |   |
| vmware.cluster.status[url,name]               | VMware cluster status.   | Integer:<br>0 - gray;<br>1 - green;<br>2 - yellow;<br>3 - red | <b>url</b> - VMware service URL<br><b>name</b> - VMware cluster name  |   |
| vmware.datastore.discovery[url]               | Discovery of VMware datastores.  | JSON object   | <b>url</b> - VMware service URL   |   |
| vmware.datastore.hv.list[url,datastore]       | List of datastore hypervisors.   | JSON object   | <b>url</b> - VMware service URL<br><b>datastore</b> - datastore name  |   |
| vmware.datastore.read[url,datastore,<mode>]   | Amount of time for a read operation from the datastore (milliseconds). | Integer <sup>2</sup>  | <b>url</b> - VMware service URL<br><b>datastore</b> - datastore name<br><b>mode</b> - latency (average value, default), maxlatency (maximum value)                        |   |
| vmware.datastore.size[url,datastore,<mode>]   | VMware datastore space in bytes or in percentage from total.           | Integer - for bytes<br>Float - for percentage                 | <b>url</b> - VMware service URL<br><b>datastore</b> - datastore name<br><b>mode</b> - possible values: total (default), free, pfree (free, percentage), uncommitted       |   |
| vmware.datastore.write[url,datastore,<mode>]  | Amount of time for a write operation to the datastore (milliseconds).  | Integer <sup>2</sup>  | <b>url</b> - VMware service URL<br><b>datastore</b> - datastore name<br><b>mode</b> - latency (average value, default), maxlatency (maximum value)                        |   |

| Key   |   |                      |  |  |
|---|---|----------------------|--|--|
| vmware.dc.discovery[url]  | Discovery of VMware datacenters.  | JSON object          | <b>url</b> - VMware service URL  |  |
| vmware.eventlog[url,<mode>]                                       | VMware event log.   | Log                  | <b>url</b> - VMware service URL<br><b>mode</b> - <i>all</i> (default), <i>skip</i> - skip processing of older data   | There must be only one vmware.eventlog[] item key per URL.<br><br>See also: <a href="#">example of filtering</a> VMware event log records. |
| vmware.fullname[url]  | VMware service full name.   | String               | <b>url</b> - VMware service URL  |  |
| vmware.hv.cluster.name[url,uuid]                                  | VMware hypervisor cluster name.   | String               | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier  |  |
| vmware.hv.cpu.usage[url,uuid]                                     | VMware hypervisor processor usage (Hz).   | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier  |  |
| vmware.hv.cpu.usage.perf[url,uuid]                                | VMware hypervisor processor usage as a percentage during the interval.                                    | Float                | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier  |  |
| vmware.hv.cpu.utilization[url,uuid]                               | VMware hypervisor processor usage as a percentage during the interval, depends on power management or HT. | Float                | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier  |  |
| vmware.hv.datacenter.name[url,uuid]                               | VMware hypervisor datacenter name.  | String               | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier  |  |
| vmware.hv.datastore.discovery[url,uuid]                           | Discovery of VMware hypervisor datastores.  | JSON object          | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier  |  |
| vmware.hv.datastore.list[url,uuid]                                | List of VMware hypervisor datastores.   | JSON object          | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier  |  |
| vmware.hv.datastore.multipath[url,uuid,<datastore>,<partitionid>] | Number of available datastore paths.  | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier<br><b>datastore</b> - datastore UUID or name<br><b>partitionid</b> - internal ID of physical device from vmware.hv.datastore.discovery |  |
| vmware.hv.datastore.read[url,uuid,datastore,<mode>]               | Average amount of time for a read operation from the datastore (milliseconds).                            | Integer <sup>2</sup> | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier<br><b>datastore</b> - datastore UUID or name<br><b>mode</b> - latency (default)  |  |
| vmware.hv.datastore.size[url,uuid,datastore,<mode>]               |   |                      |  |  |

| Key  |   |   |   |  |
|--|---|---|---|--|
|  | VMware datastore space in bytes or in percentage from total.                  | Integer - for bytes<br>Float - for percentage | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier<br><b>datastore</b> - datastore UUID or name<br><b>mode</b> - possible values: total (default), free, pfree (free, percentage), uncommitted |  |
| vmware.hv.datastore.write[url,uuid,datastore,<mode>] | Average amount of time for a write operation to the datastore (milliseconds). | Integer <sup>2</sup>                          | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier<br><b>datastore</b> - datastore UUID or name<br><b>mode</b> - latency (default)   |  |
| vmware.hv.discovery[url]                             | Discovery of VMware hypervisors.  | JSON object                                   | <b>url</b> - VMware service URL   |  |
| vmware.hv.fullname[url,uuid]                         | VMware hypervisor name.   | String  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.hw.cpu.freq[url,uuid]                      | VMware hypervisor processor frequency (Hz).                                   | Integer                                       | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.hw.cpu.model[url,uuid]                     | VMware hypervisor processor model.  | String  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.hw.cpu.num[url,uuid]                       | Number of processor cores on VMware hypervisor.                               | Integer                                       | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.hw.cpu.threads[url,uuid]                   | Number of processor threads on VMware hypervisor.                             | Integer                                       | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.hw.memory[url,uuid]                        | VMware hypervisor total memory size (bytes).                                  | Integer                                       | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.hw.model[url,uuid]                         | VMware hypervisor model.  | String  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.hw.uuid[url,uuid]                          | VMware hypervisor BIOS UUID.  | String  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.hw.vendor[url,uuid]                        | VMware hypervisor vendor name.  | String  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.maintenance[url,uuid]                      | VMware hypervisor maintenance status.   | Integer                                       | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   | Returns '0' - not in maintenance or '1' - in maintenance |
| vmware.hv.memory.size.ballooned[url,uuid]            | VMware hypervisor ballooned memory size (bytes).                              | Integer                                       | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |

| Key   |   |   |   |  |
|---|---|---|---|--|
| vmware.hv.memory.used[url,uuid]                 | VMware hypervisor used memory size (bytes).                     | Integer   | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.network.in[url,uuid,<mode>]           | VMware hypervisor network input statistics (bytes per second).  | Integer <sup>2</sup>  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier<br><b>mode</b> - bps (default)  |  |
| vmware.hv.network.out[url,uuid,<mode>]          | VMware hypervisor network output statistics (bytes per second). | Integer <sup>2</sup>  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier<br><b>mode</b> - bps (default)  |  |
| vmware.hv.perfcounter[url,uuid,path,<instance>] | VMware hypervisor performance counter value.                    | Integer <sup>2</sup>  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier<br><b>path</b> - performance counter path <sup>1</sup><br><b>instance</b> - performance counter instance. Use empty instance for aggregate values (default) |  |
| vmware.hv.power[url,uuid,<max>]                 | VMware hypervisor power usage (W).                              | Integer   | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier<br><b>max</b> - maximum allowed power usage   |  |
| vmware.hv.sensor.health.state[url,uuid]         | VMware hypervisor health state rollup sensor.                   | Integer:<br>0 - gray;<br>1 - green;<br>2 - yellow;<br>3 - red | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   | The item might not work in the VMware vSphere 6.5 and newer, because VMware has deprecated the <i>VMware Rollup Health State</i> sensor. |
| vmware.hv.sensors.get[url,uuid]                 | VMware hypervisor HW vendor state sensors.                      | JSON  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.status[url,uuid]                      | VMware hypervisor status.                                       | Integer:<br>0 - gray;<br>1 - green;<br>2 - yellow;<br>3 - red | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   | Uses the host system overall status property.  |
| vmware.hv.uptime[url,uuid]                      | VMware hypervisor uptime (seconds).                             | Integer   | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.version[url,uuid]                     | VMware hypervisor version.                                      | String  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.hv.vm.num[url,uuid]                      | Number of virtual machines on VMware hypervisor.                | Integer   | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware hypervisor global unique identifier   |  |
| vmware.version[url]                             | VMware service version.   | String  | <b>url</b> - VMware service URL   |  |
| vmware.vm.cluster.name[url,uuid]                |   |   |   |  |

| Key   |   |                      |  |
|---|---|----------------------|--|
|   | VMware virtual machine name.  | String               | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier                                   |
| vmware.vm.cpu.latency[url,uuid]               | Percentage of time the virtual machine is unable to run because it is contending for access to the physical CPU(s).   | Float                | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier                                   |
| vmware.vm.cpu.num[url,uuid]                   | Number of processors on VMware virtual machine.   | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier                                   |
| vmware.vm.cpu.readiness[url,uuid,<instance>]  | Percentage of time that the virtual machine was ready, but could not get scheduled to run on the physical CPU.  | Float                | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>instance</b> - CPU instance |
| vmware.vm.cpu.ready[url,uuid]                 | Time (in milliseconds) that the virtual machine was ready, but could not get scheduled to run on the physical CPU. CPU ready time is dependent on the number of virtual machines on the host and their CPU loads (%). | Integer <sup>2</sup> | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier                                   |
| vmware.vm.cpu.swapwait[url,uuid,<instance>]   | Percentage of CPU time spent waiting for swap-in.   | Float                | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>instance</b> - CPU instance |
| vmware.vm.cpu.usage[url,uuid]                 | VMware virtual machine processor usage (Hz).  | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier                                   |
| vmware.vm.cpu.usage.perf[url,uuid]            | VMware virtual machine processor usage as a percentage during the interval.   | Float                | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier                                   |
| vmware.vm.datacenter.name[url,uuid]           | VMware virtual machine datacenter name.   | String               | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier                                   |
| vmware.vm.discovery[url]                      | Discovery of VMware virtual machines.   | JSON object          | <b>url</b> - VMware service URL  |
| vmware.vm.guest.memory.size.swapped[url,uuid] | Amount of guest physical memory that is swapped out to the swap space (KB).   | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier                                   |
| vmware.vm.guest.osuptime[url,uuid]            | Total time elapsed since the last operating system boot-up (in seconds).  | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier                                   |
| vmware.vm.hv.name[url,uuid]                   | VMware virtual machine hypervisor name.   | String               | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier                                   |
| vmware.vm.memory.size[url,uuid]               | VMware virtual machine total memory size (bytes).   | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier                                   |

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Key

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|  |  |                      |  |
|--|--|----------------------|--|
| vmware.vm.memory.size.ballooned[url,uuid]      | VMware virtual machine ballooned memory size (bytes).                                    | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.memory.size.compressed[url,uuid]     | VMware virtual machine compressed memory size (bytes).                                   | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.memory.size.consumed[url,uuid]       | Amount of host physical memory consumed for backing up guest physical memory pages (KB). | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.memory.size.private[url,uuid]        | VMware virtual machine private memory size (bytes).                                      | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.memory.size.shared[url,uuid]         | VMware virtual machine shared memory size (bytes).                                       | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.memory.size.swapped[url,uuid]        | VMware virtual machine swapped memory size (bytes).                                      | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.memory.size.usage.guest[url,uuid]    | VMware virtual machine guest memory usage (bytes).                                       | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.memory.size.usage.host[url,uuid]     | VMware virtual machine host memory usage (bytes).  | Integer              | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.memory.usage[url,uuid]               | Percentage of host physical memory that has been consumed.                               | Float                | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.net.if.discovery[url,uuid]           | Discovery of VMware virtual machine network interfaces.                                  | JSON object          | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.net.if.in[url,uuid,instance,<mode>]  | VMware virtual machine network interface input statistics (bytes/packets per second).    | Integer <sup>2</sup> | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>instance</b> - network interface instance<br><b>mode</b> - bps (default)/pps - bytes/packets per second |
| vmware.vm.net.if.out[url,uuid,instance,<mode>] | VMware virtual machine network interface output statistics (bytes/packets per second).   | Integer <sup>2</sup> | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>instance</b> - network interface instance<br><b>mode</b> - bps (default)/pps - bytes/packets per second |
| vmware.vm.net.if.usage[url,uuid,<instance>]    |  |                      |  |

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Key

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|  |  |  |
|--|--|--|
| VMware virtual machine network utilization (combined transmit-rates and receive-rates) during the interval (KBps).                               | Integer  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>instance</b> - network interface instance   |
| vmware.vm.perfcounter[url,uuid,path,<instance>]<br>VMware virtual machine performance counter value.   | Integer <sup>2</sup>   | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>path</b> - performance counter path <sup>1</sup><br><b>instance</b> - performance counter instance. Use empty instance for aggregate values (default) |
| vmware.vm.powerstate[url,uuid]<br>VMware virtual machine power state.  | Integer:<br>0 - poweredOff;<br>1 - poweredOn;<br>2 - suspended | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.storage.committed[url,uuid]<br>VMware virtual machine committed storage space (bytes).   | Integer  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.storage.readio[url,uuid,instance]<br>Average number of outstanding read requests to the virtual disk during the collection interval.   | Integer  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>instance</b> - disk device instance (mandatory)   |
| vmware.vm.storage.totalreadlatency[url,uuid,instance]<br>The average time a read from the virtual disk takes (milliseconds).                     | Integer  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>instance</b> - disk device instance (mandatory)   |
| vmware.vm.storage.totalwritelatency[url,uuid,instance]<br>The average time a write to the virtual disk takes (milliseconds).                     | Integer  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>instance</b> - disk device instance (mandatory)   |
| vmware.vm.storage.uncommitted[url,uuid]<br>VMware virtual machine uncommitted storage space (bytes).   | Integer  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.storage.unshared[url,uuid]<br>VMware virtual machine unshared storage space (bytes).   | Integer  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |
| vmware.vm.storage.writeio[url,uuid,instance]<br>Average number of outstanding write requests to the virtual disk during the collection interval. | Integer  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>instance</b> - disk device instance (mandatory)   |
| vmware.vm.uptime[url,uuid]<br>VMware virtual machine uptime (seconds).   | Integer  | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier   |

| Key   |  |  |   |  |
|---|--|--|---|--|
| vmware.vm.vfs.dev.discovery[url,uuid]             | Discovery of VMware virtual machine disk devices.                                  | JSON object                                    | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier  |  |
| vmware.vm.vfs.dev.read[url,uuid,instance,<mode>]  | VMware virtual machine disk device read statistics (bytes/operations per second).  | Integer <sup>2</sup>                           | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>instance</b> - disk device instance<br><b>mode</b> - bps (default)/ops - bytes/operations per second |  |
| vmware.vm.vfs.dev.write[url,uuid,instance,<mode>] | VMware virtual machine disk device write statistics (bytes/operations per second). | Integer <sup>2</sup>                           | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>instance</b> - disk device instance<br><b>mode</b> - bps (default)/ops - bytes/operations per second |  |
| vmware.vm.vfs.fs.discovery[url,uuid]              | Discovery of VMware virtual machine file systems.                                  | JSON object                                    | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier  | VMware Tools must be installed on the guest virtual machine. |
| vmware.vm.vfs.fs.size[url,uuid,fsname,<mode>]     | VMware virtual machine file system statistics (bytes/percentages).                 | Integer - for bytes<br>Float - for percent-age | <b>url</b> - VMware service URL<br><b>uuid</b> - VMware virtual machine global unique identifier<br><b>fsname</b> - file system name<br><b>mode</b> - total/free/used/pfree/pused                           | VMware Tools must be installed on the guest virtual machine. |

#### Footnotes

<sup>1</sup> See [Creating custom performance counter names for VMware](#).

<sup>2</sup> The value of these items is obtained from VMware performance counters and the VMwarePerfFrequency [parameter](#) is used to refresh their data in Zabbix VMware cache:

- vmware.hv.datastore.read
- vmware.hv.datastore.write
- vmware.hv.network.in
- vmware.hv.network.out
- vmware.hv.perfcounter
- vmware.vm.cpu.ready
- vmware.vm.net.if.in
- vmware.vm.net.if.out
- vmware.vm.perfcounter
- vmware.vm.vfs.dev.read
- vmware.vm.vfs.dev.write

#### More info

See [Virtual machine monitoring](#) for detailed information how to configure Zabbix to monitor VMware environments.

## 6 Log file monitoring

### Overview

Zabbix can be used for centralized monitoring and analysis of log files with/without log rotation support.

Notifications can be used to warn users when a log file contains certain strings or string patterns.

To monitor a log file you must have:

- Zabbix agent running on the host



- log monitoring item set up

### Attention:

The size limit of a monitored log file depends on [large file support](#).

## Configuration

### Verify agent parameters

Make sure that in the [agent configuration file](#):

- 'Hostname' parameter matches the host name in the frontend
- Servers in the 'ServerActive' parameter are specified for the processing of active checks

## Item configuration

Configure a log monitoring [item](#).

| Item                     | Tags   | Preprocessing |      |          |        |     |  |  |
|--------------------------|--|---------------|------|----------|--------|-----|--|--|
| * Name                   | Log item   |               |      |          |        |     |  |  |
| Type                     | Zabbix agent (active) ▼  |               |      |          |        |     |  |  |
| * Key                    | log[/var/log/syslog,error]   |               |      |          |        |     |  |  |
| Type of information      | Log ▼  |               |      |          |        |     |  |  |
| * Update interval        | 30s  |               |      |          |        |     |  |  |
| Custom intervals         | <table border="1"> <thead> <tr> <th>Type</th> <th>Interval</th> <th>Period</th> </tr> </thead> <tbody> <tr> <td>Add</td> <td></td> <td></td> </tr> </tbody> </table> |               | Type | Interval | Period | Add |  |  |
| Type                     | Interval   | Period        |      |          |        |     |  |  |
| Add                      |  |               |      |          |        |     |  |  |
| * History storage period | <div>Do not keep history</div> <div>Storage period 3600</div>  |               |      |          |        |     |  |  |
| Log time format          | ppppddphh:mm:ss  |               |      |          |        |     |  |  |

All mandatory input fields are marked with a red asterisk.

Specifically for log monitoring items you enter:

|                          |   |
|--------------------------|---|
| Type                     | Select <b>Zabbix agent (active)</b> here.   |
| Key                      | Use one of the following item keys:<br><b>log[]</b> or <b>logrt[]</b> :<br>These two item keys allow to monitor logs and filter log entries by the content regexp, if present. For example: <code>log[/var/log/syslog,error]</code> . Make sure that the file has read permissions for the 'zabbix' user otherwise the item status will be set to 'unsupported'.<br><b>log.count[]</b> or <b>logrt.count[]</b> :<br>These two item keys allow to return the number of matching lines only. See supported <a href="#">Zabbix agent item</a> key section for details on using these item keys and their parameters. |
| Type of information      | Prefilled automatically:<br>For log[] or logrt[] items - Log;<br>For log.count[] or logrt.count[] items - Numeric (unsigned).<br>If optionally using the output parameter, you may manually select the appropriate type of information other than Log.<br>Note that choosing a non-Log type of information will lead to the loss of local timestamp.  |
| Update interval (in sec) | The parameter defines how often Zabbix agent will check for any changes in the log file. Setting it to 1 second will make sure that you get new records as soon as possible.  |

---

|                        |  |
|------------------------|--|
| <i>Log time format</i> | <p>In this field you may optionally specify the pattern for parsing the log line timestamp. Supported placeholders:</p> <ul style="list-style-type: none"> <li>* <b>y</b>: Year (1970-2038)</li> <li>* <b>M</b>: Month (01-12)</li> <li>* <b>d</b>: Day (01-31)</li> <li>* <b>h</b>: Hour (00-23)</li> <li>* <b>m</b>: Minute (00-59)</li> <li>* <b>s</b>: Second (00-59)</li> </ul> <p>If left blank, the timestamp will be set to 0 in Unix time, representing January 1, 1970.</p> <p>For example, consider the following line from the Zabbix agent log file:</p> <pre>" 23480:20100328:154718.045 Zabbix agent started. Zabbix 1.8.2 (revision 11211)."</pre> <p>It begins with six character positions for PID, followed by date, time, and the rest of the message. The log time format for this line would be "pppppp:yyyyMMdd:hhmmss".</p> <p>Note that "p" and ":" characters are placeholders and can be any character except "yMdhms".</p> |
|------------------------|--|

---

## Important notes

- The server and agent keep the trace of a monitored log's size and last modification time (for logrt) in two counters. Additionally:
  - The agent also internally uses inode numbers (on UNIX/GNU/Linux), file indexes (on Microsoft Windows) and MD5 sums of the first 512 log file bytes for improving decisions when logfiles get truncated and rotated.
  - On UNIX/GNU/Linux systems it is assumed that the file systems where log files are stored report inode numbers, which can be used to track files.
  - On Microsoft Windows Zabbix agent determines the file system type the log files reside on and uses:
    - \* On NTFS file systems 64-bit file indexes.
    - \* On ReFS file systems (only from Microsoft Windows Server 2012) 128-bit file IDs.
    - \* On file systems where file indexes change (e.g. FAT32, exFAT) a fall-back algorithm is used to take a sensible approach in uncertain conditions when log file rotation results in multiple log files with the same last modification time.
  - The inode numbers, file indexes and MD5 sums are internally collected by Zabbix agent. They are not transmitted to Zabbix server and are lost when Zabbix agent is stopped.
  - Do not modify the last modification time of log files with 'touch' utility, do not copy a log file with later restoration of the original name (this will change the file inode number). In both cases the file will be counted as different and will be analyzed from the start, which may result in duplicated alerts.
  - If there are several matching log files for logrt[] item and Zabbix agent is following the most recent of them and this most recent log file is deleted, a warning message "there are no files matching "<regexp mask>" in "<directory>" is logged. Zabbix agent ignores log files with modification time less than the most recent modification time seen by the agent for the logrt[] item being checked.
- The agent starts reading the log file from the point it stopped the previous time.
- The number of bytes already analyzed (the size counter) and last modification time (the time counter) are stored in the Zabbix database and are sent to the agent to make sure the agent starts reading the log file from this point in cases when the agent is just started or has received items which were previously disabled or not supported. However, if the agent has received a non-zero size counter from server, but the logrt[] or logrt.count[] item is unable to find matching files, the size counter is reset to 0 to analyze from the start if the files appear later.
- Whenever the log file becomes smaller than the log size counter known by the agent, the counter is reset to zero and the agent starts reading the log file from the beginning taking the time counter into account.
- If there are several matching files with the same last modification time in the directory, then the agent tries to correctly analyze all log files with the same modification time and avoid skipping data or analyzing the same data twice, although it cannot be guaranteed in all situations. The agent does not assume any particular log file rotation scheme nor determines one. When presented multiple log files with the same last modification time, the agent will process them in a lexicographically descending order. Thus, for some rotation schemes the log files will be analyzed and reported in their original order. For other rotation schemes the original log file order will not be honored, which can lead to reporting matched log file records in altered order (the problem does not happen if log files have different last modification times).
- Zabbix agent processes new records of a log file once per *Update interval* seconds.
- Zabbix agent does not send more than **maxlines** of a log file per second. The limit prevents overloading of network and CPU resources and overrides the default value provided by **MaxLinesPerSecond** parameter in the **agent configuration file**.
- To find the required string Zabbix will process 10 times more new lines than set in MaxLinesPerSecond. Thus, for example, if a log[] or logrt[] item has *Update interval* of 1 second, by default the agent will analyze no more than 200 log file records and will send no more than 20 matching records to Zabbix server in one check. By increasing **MaxLinesPerSecond** in the agent configuration file or setting **maxlines** parameter in the item key, the limit can be increased up to 10000 analyzed log file records and 1000 matching records sent to Zabbix server in one check. If the *Update interval* is set to 2 seconds the limits for one check would be set 2 times higher than with *Update interval* of 1 second.

- Additionally, log and log.count values are always limited to 50% of the agent send buffer size, even if there are no non-log values in it. So for the **maxlines** values to be sent in one connection (and not in several connections), the agent **BufferSize** parameter must be at least maxlines x 2. Zabbix agent can upload data during log gathering and thus free the buffer, whereas Zabbix agent 2 will stop log gathering until the data is uploaded and the buffer is freed, which is performed asynchronously.
- In the absence of log items all agent buffer size is used for non-log values. When log values come in they replace the older non-log values as needed, up to the designated 50%.
- For log file records longer than 256kB, only the first 256kB are matched against the regular expression and the rest of the record is ignored. However, if Zabbix agent is stopped while it is dealing with a long record the agent internal state is lost and the long record may be analyzed again and differently after the agent is started again.
- Special note for “\” path separators: if file\_format is “file.log”, then there should not be a “file” directory, since it is not possible to unambiguously define whether “.” is escaped or is the first symbol of the file name.
- Regular expressions for logrt are supported in filename only, directory regular expression matching is not supported.
- On UNIX platforms a logrt [] item becomes NOTSUPPORTED if a directory where the log files are expected to be found does not exist.
- On Microsoft Windows, if a directory does not exist the item will not become NOTSUPPORTED (for example, if directory is misspelled in item key).
- An absence of log files for logrt [] item does not make it NOTSUPPORTED. Errors of reading log files for logrt [] item are logged as warnings into Zabbix agent log file but do not make the item NOTSUPPORTED.
- Zabbix agent log file can be helpful to find out why a log [] or logrt [] item became NOTSUPPORTED. Zabbix can monitor its agent log file, except when at DebugLevel=4 or DebugLevel=5.
- Searching for a question mark using a regular expression, e.g. \? may result in false positives if the text file contains NUL symbols, as those are replaced with “?” by Zabbix to continue processing the line until the newline character.

#### Extracting matching part of regular expression

Sometimes we may want to extract only the interesting value from a target file instead of returning the whole line when a regular expression match is found.

Since Zabbix 2.2.0, log items have the ability to extract desired values from matched lines. This is accomplished by the additional **output** parameter in log and logrt items.

Using the ‘output’ parameter allows to indicate the “capturing group” of the match that we may be interested in.

So, for example

```
log[/path/to/the/file,"large result buffer allocation.*Entries: ([0-9]+)",,,,\1]
```

should allow returning the entry count as found in the content of:

```
Fr Feb 07 2014 11:07:36.6690 */ Thread Id 1400 (GLEWF) large result
buffer allocation - /Length: 437136/Entries: 5948/Client Ver: >=10/RPC
ID: 41726453/User: AUser/Form: CFG:ServiceLevelAgreement
```

Only the number will be returned because \1 refers to the first and only capturing group: **([0-9]+)**.

And, with the ability to extract and return a number, the value can be used to define triggers.

Using maxdelay parameter

The ‘maxdelay’ parameter in log items allows ignoring some older lines from log files in order to get the most recent lines analyzed within the ‘maxdelay’ seconds.

#### Warning:

Specifying ‘maxdelay’ > 0 may lead to **ignoring important log file records and missed alerts**. Use it carefully at your own risk only when necessary.

By default items for log monitoring follow all new lines appearing in the log files. However, there are applications which in some situations start writing an enormous number of messages in their log files. For example, if a database or a DNS server is unavailable, such applications flood log files with thousands of nearly identical error messages until normal operation is restored. By default, all those messages will be dutifully analyzed and matching lines sent to server as configured in log and logrt items.

Built-in protection against overload consists of a configurable ‘maxlines’ parameter (protects server from too many incoming matching log lines) and a 10\*‘maxlines’ limit (protects host CPU and I/O from overloading by agent in one check). Still, there are 2 problems with the built-in protection. First, a large number of potentially not-so-informative messages are reported to server and consume space in the database. Second, due to the limited number of lines analyzed per second the agent may lag behind the newest log records for hours. Quite likely, you might prefer to be sooner informed about the current situation in the log files instead of crawling through old records for hours.

The solution to both problems is using the 'maxdelay' parameter. If 'maxdelay' > 0 is specified, during each check the number of processed bytes, the number of remaining bytes and processing time is measured. From these numbers the agent calculates an estimated delay - how many seconds it would take to analyze all remaining records in a log file.

If the delay does not exceed 'maxdelay' then the agent proceeds with analyzing the log file as usual.

If the delay is greater than 'maxdelay' then the agent **ignores a chunk of a log file by "jumping" over it** to a new estimated position so that the remaining lines could be analyzed within 'maxdelay' seconds.

Note that agent does not even read ignored lines into buffer, but calculates an approximate position to jump to in a file.

The fact of skipping log file lines is logged in the agent log file like this:

```
14287:20160602:174344.206 item:"logrt["/home/zabbix32/test[0-9].log",ERROR,,1000,,120.0]"
logfile:"/home/zabbix32/test1.log" skipping 679858 bytes
(from byte 75653115 to byte 76332973) to meet maxdelay
```

The "to byte" number is approximate because after the "jump" the agent adjusts the position in the file to the beginning of a log line which may be further in the file or earlier.

Depending on how the speed of growing compares with the speed of analyzing the log file you may see no "jumps", rare or often "jumps", large or small "jumps", or even a small "jump" in every check. Fluctuations in the system load and network latency also affect the calculation of delay and hence, "jumping" ahead to keep up with the "maxdelay" parameter.

Setting 'maxdelay' < 'update interval' is not recommended (it may result in frequent small "jumps").

Notes on handling 'copytruncate' log file rotation

logrt with the copytruncate option assumes that different log files have different records (at least their timestamps are different), therefore MD5 sums of initial blocks (up to the first 512 bytes) will be different. Two files with the same MD5 sums of initial blocks means that one of them is the original, another - a copy.

logrt with the copytruncate option makes effort to correctly process log file copies without reporting duplicates. However, things like producing multiple log file copies with the same timestamp, log file rotation more often than logrt[] item update interval, frequent restarting of agent are not recommended. The agent tries to handle all these situations reasonably well, but good results cannot be guaranteed in all circumstances.

Notes on persistent files for log\*[] items

Purpose of persistent files

When Zabbix agent is started it receives a list of active checks from Zabbix server or proxy. For log\*[] metrics it receives the processed log size and the modification time for finding where to start log file monitoring from. Depending on the actual log file size and modification time reported by file system the agent decides either to continue log file monitoring from the processed log size or re-analyze the log file from the beginning.

A running agent maintains a larger set of attributes for tracking all monitored log files between checks. This in-memory state is lost when the agent is stopped.

The new optional parameter **persistent\_dir** specifies a directory for storing this state of log[], log.count[], logrt[] or logrt.count[] item in a file. The state of log item is restored from the persistent file after the Zabbix agent is restarted.

The primary use-case is monitoring of log file located on a mirrored file system. Until some moment in time the log file is written to both mirrors. Then mirrors are split. On the active copy the log file is still growing, getting new records. Zabbix agent analyzes it and sends processed logs size and modification time to server. On the passive copy the log file stays the same, well behind the active copy. Later the operating system and Zabbix agent are rebooted from the passive copy. The processed log size and modification time the Zabbix agent receives from server may not be valid for situation on the passive copy. To continue log file monitoring from the place the agent left off at the moment of file system mirror split the agent restores its state from the persistent file.

Agent operation with persistent file

On startup Zabbix agent knows nothing about persistent files. Only after receiving a list of active checks from Zabbix server (proxy) the agent sees that some log items should be backed by persistent files under specified directories.

During agent operation the persistent files are opened for writing (with fopen(filename, "w")) and overwritten with the latest data. The chance of losing persistent file data if the overwriting and file system mirror split happen at the same time is very small, no special handling for it. Writing into persistent file is NOT followed by enforced synchronization to storage media (fsync() is not called).

Overwriting with the latest data is done after successful reporting of matching log file record or metadata (processed log size and modification time) to Zabbix server. That may happen as often as every item check if log file keeps changing.

No special actions during agent shutdown.

After receiving a list of active checks the agent marks obsolete persistent files for removal. A persistent file becomes obsolete if: 1) the corresponding log item is no longer monitored, 2) a log item is reconfigured with a different **persistent\_dir** location than before.

Removing is done with delay 24 hours because log files in NOTSUPPORTED state are not included in the list of active checks but they may become SUPPORTED later and their persistent files will be useful.

If the agent is stopped before 24 hours expire, then the obsolete files will not be deleted as Zabbix agent is not getting info about their location from Zabbix server anymore.

**Warning:**

Reconfiguring a log item's **persistent\_dir** back to the old **persistent\_dir** location while the agent is stopped, without deleting the old persistent file by user - will cause restoring the agent state from the old persistent file resulting in missed messages or false alerts.

#### Naming and location of persistent files

Zabbix agent distinguishes active checks by their keys. For example, `logrt[/home/zabbix/test.log]` and `logrt[/home/zabbix/test.log,,10]` are different items. Modifying the item `logrt[/home/zabbix/test.log,,10]` in frontend to `logrt[/home/zabbix/test.log,,20]` will result in deleting the item `logrt[/home/zabbix/test.log,,10]` from the agent's list of active checks and creating `logrt[/home/zabbix/test.log,,20]` item (some attributes are carried across modification in frontend/server, not in agent).

The file name is composed of MD5 sum of item key with item key length appended to reduce possibility of collisions. For example, the state of `logrt[/home/zabbix50/test.log,,,,,]/home/zabbix50/agent_private]` item will be kept in persistent file `c963ade4008054813bbc0a650bb8e09266`.

Multiple log items can use the same value of **persistent\_dir**.

**persistent\_dir** is specified by taking into account specific file system layouts, mount points and mount options and storage mirroring configuration - the persistent file should be on the same mirrored filesystem as the monitored log file.

If **persistent\_dir** directory cannot be created or does not exist, or access rights for Zabbix agent does not allow to create/write/read/delete files the log item becomes NOTSUPPORTED.

If access rights to persistent storage files are removed during agent operation or other errors occur (e.g. disk full) then errors are logged into the agent log file but the log item does not become NOTSUPPORTED.

#### Load on I/O

Item's persistent file is updated after successful sending of every batch of data (containing item's data) to server. For example, default 'BufferSize' is 100. If a log item has found 70 matching records then the first 50 records will be sent in one batch, persistent file will be updated, then remaining 20 records will be sent (maybe with some delay when more data is accumulated) in the 2nd batch, and the persistent file will be updated again.

#### Actions if communication fails between agent and server

Each matching line from `log[]` and `logrt[]` item and a result of each `log.count[]` and `logrt.count[]` item check requires a free slot in the designated 50% area in the agent send buffer. The buffer elements are regularly sent to server (or proxy) and the buffer slots are free again.

While there are free slots in the designated log area in the agent send buffer and communication fails between agent and server (or proxy) the log monitoring results are accumulated in the send buffer. This helps to mitigate short communication failures.

During longer communication failures all log slots get occupied and the following actions are taken:

- `log[]` and `logrt[]` item checks are stopped. When communication is restored and free slots in the buffer are available the checks are resumed from the previous position. No matching lines are lost, they are just reported later.
- `log.count[]` and `logrt.count[]` checks are stopped if `maxdelay = 0` (default). Behavior is similar to `log[]` and `logrt[]` items as described above. Note that this can affect `log.count[]` and `logrt.count[]` results: for example, one check counts 100 matching lines in a log file, but as there are no free slots in the buffer the check is stopped. When communication is restored the agent counts the same 100 matching lines and also 70 new matching lines. The agent now sends `count = 170` as if they were found in one check.
- `log.count[]` and `logrt.count[]` checks with `maxdelay > 0`: if there was no "jump" during the check, then behavior is similar to described above. If a "jump" over log file lines took place then the position after "jump" is kept and the counted result is discarded. So, the agent tries to keep up with a growing log file even in case of communication failure.

#### Handling of regular expression compilation and runtime errors

If a regular expression used in `log[]`, `logrt[]`, `log.count[]` or `logrt.count[]` item cannot be compiled by PCRE or PCRE2 library then the item goes into NOTSUPPORTED state with an error message. To continue monitoring the log item, the regular expression should be fixed.

If the regular expression compiles successfully, but fails at runtime (on some or on all log records), then the log item remains supported and monitoring continues. The runtime error is logged in the Zabbix agent log file (without the log file record).

Note that the logging of regular expression runtime errors is supported since Zabbix 6.0.21.

The logging rate is limited to one runtime error per check to allow Zabbix agent to monitor its own log file. For example, if 10 records are analyzed and 3 records fail with a regexp runtime error, one record is produced in the agent log.

Exception: if MaxLinesPerSecond=1 and update interval=1 (only 1 record is allowed to analyze per check) then regexp runtime errors are not logged.

zabbix\_agentd logs the item key in case of a runtime error, zabbix\_agent2 logs the item ID to help identify which log item has runtime errors. It is recommended to redesign the regular expression in case of runtime errors.

## 7 Calculated items

### Overview

With calculated items it is possible to create calculations based on the values of other items.

Calculations may use both:

- single values of individual items
- complex filters to select multiple items for aggregations (see [aggregate calculations](#) for details)

Thus, calculated items are a way of creating virtual data sources. All calculations are done by Zabbix server only. The values are periodically calculated based on the arithmetical expression used.

The resulting data is stored in the Zabbix database as for any other item; both history and trend values are stored and graphs can be generated.

#### Note:

If the calculation result is a float value it will be trimmed to an integer if the calculated item type of information is *Numeric (unsigned)*.

Calculated items share their syntax with trigger [expressions](#). Comparison to strings is allowed in calculated items. Calculated items may be referenced by macros or other entities same as any other item type.

To use calculated items, choose the item type **Calculated**.

### Configurable fields

The **key** is a unique item identifier (per host). You can create any key name using supported symbols.

Calculation definition should be entered in the **Formula** field. There is virtually no connection between the formula and the key. The key parameters are not used in the formula in any way.

The syntax of a simple formula is:

```
function(/host/key,<parameter1>,<parameter2>,...)
```

where:

|                     |  |
|---------------------|--|
| <i>function</i>     | One of the <a href="#">supported functions</a> : last, min, max, avg, count, etc   |
| <i>host</i>         | Host of the item that is used for calculation.<br>The current host can be omitted (i.e. as in <code>function(/key,parameter,...)</code> ). |
| <i>key</i>          | Key of the item that is used for calculation.  |
| <i>parameter(s)</i> | Parameters of the function, if required.   |

#### Attention:

User macros in the formula will be expanded if used to reference a function parameter, item filter parameter, or a constant. User macros will NOT be expanded if referencing a function, host name, item key, item key parameter or operator.

A more complex formula may use a combination of functions, operators and brackets. You can use all functions and [operators](#) supported in trigger expressions. The logic and operator precedence are exactly the same.

Unlike trigger expressions, Zabbix processes calculated items according to the item update interval, not upon receiving a new value.

All items that are referenced by history functions in the calculated item formula must exist and be collecting data. Also, if you change the item key of a referenced item, you have to manually update any formulas using that key.

A calculated item may become unsupported in several cases:

- referenced item(s)
  - is not found
  - is disabled
  - belongs to a disabled host
  - is not supported (except with `nodata()` function and **operators** with unknown values)
- no data to calculate a function
- division by zero
- incorrect syntax used

Usage examples

Example 1

Calculating percentage of free disk space on '/'.

Use of function **last**:

```
100*last(/vfs.fs.size[/,free])/last(/vfs.fs.size[/,total])
```

Zabbix will take the latest values for free and total disk spaces and calculate percentage according to the given formula.

Example 2

Calculating a 10-minute average of the number of values processed by Zabbix.

Use of function **avg**:

```
avg(/Zabbix Server/zabbix[wcache,values],10m)
```

Note that extensive use of calculated items with long time periods may affect performance of Zabbix server.

Example 3

Calculating total bandwidth on eth0.

Sum of two functions:

```
last(/net.if.in[eth0,bytes])+last(/net.if.out[eth0,bytes])
```

Example 4

Calculating percentage of incoming traffic.

More complex expression:

```
100*last(/net.if.in[eth0,bytes])/(last(/net.if.in[eth0,bytes])+last(/net.if.out[eth0,bytes]))
```

See also: [Examples of aggregate calculations](#)

1 Aggregate calculations

## Overview

Aggregate calculations are a **calculated item** type allowing to collect information from several items by Zabbix server and then calculate an aggregate, depending on the aggregate function used.

Only unsigned integer and float values (type of information) are supported for aggregate calculation items.

Aggregate calculations do not require any agent running on the host being monitored.

## Syntax

To retrieve aggregates, you may:

- list several items for aggregation:

```
aggregate_function(function(/host/key,parameter),function(/host2/key2,parameter),...)
```

Note that `function` here must be a history/trend function.

- use the **foreach** function, as the only parameter, and its item filter to select the required items:

```
aggregate_function(foreach_function(/host/key?[group="host_group"],timeperiod))
```

Aggregate function is one of the supported **aggregate functions**: avg, max, min, sum, etc.

A **foreach** function (e.g. *avg\_foreach*, *count\_foreach*, etc.) returns one aggregate value for each selected item. Items are selected by using the item filter (/host/key?[group="host\_group"]), from item history.

If some of the items have no data for the requested period, they are ignored in the calculation. If no items have data, the function will return an error.

For more details, see **foreach functions**.

**Note:**

If the aggregate results in a float value it will be trimmed to an integer if the aggregated item type of information is *Numeric (unsigned)*.

User macros and low-level discovery macros are supported in:

- item key parameters
- function parameters
- filter conditions (host group name and tag name)
- expression constants

An aggregate calculation may become unsupported if:

- none of the referenced items is found (which may happen if the item key is incorrect, none of the items exists or all included groups are incorrect)
- no data to calculate a function

Usage examples

Examples of keys for aggregate calculations.

Example 1

Total disk space of host group 'MySQL Servers'.

```
sum(last_foreach(/*/vfs.fs.size[/,total]?[group="MySQL Servers"]))
```

Example 2

Sum of latest values of all items matching net.if.in[\*] on the host.

```
sum(last_foreach(/host/net.if.in[*]))
```

Example 3

Average processor load of host group 'MySQL Servers'.

```
avg(last_foreach(/*/system.cpu.load[,avg1]?[group="MySQL Servers"]))
```

Example 4

5-minute average of the number of queries per second for host group 'MySQL Servers'.

```
avg(avg_foreach(/*/mysql.qps?[group="MySQL Servers"],5m))
```

Example 5

Average CPU load on all hosts in multiple host groups that have the specific tags.

```
avg(last_foreach(/*/system.cpu.load?[(group="Servers A" or group="Servers B" or group="Servers C") and (tag="tag1")]))
```

Example 6

Calculation used on the latest item value sums of a whole host group.

```
sum(last_foreach(/*/net.if.out[eth0,bytes]?[group="video"])) / sum(last_foreach(/*/nginx_stat.sh[active]?[group="video"]))
```

Example 7

The total number of unsupported items in host group 'Zabbix servers'.

```
sum(last_foreach(/*/zabbix[host,,items_unsupported]?[group="Zabbix servers"]))
```



## Examples of correct/incorrect syntax

Expressions (including function calls) cannot be used as history, trend, or foreach **function** parameters. However, those functions themselves can be used in other (non-historical) function parameters.

| Expression | Example  |
|------------|--|
| Valid      | <code>avg(last(/host/key1),last(/host/key2)*10,last(/host/key1)*100)</code><br><code>max(avg(avg_foreach(/system.cpu.load?[group="Servers A"],5m)),avg(avg_foreach(/system.cpu.load?[group="Servers B"],5m)),avg(avg_foreach(/system.cpu.load?[group="Servers C"],5m)))</code> |
| Invalid    | <code>sum(/host/key,10+2)</code><br><code>sum(/host/key, avg(10,2))</code><br><code>sum(/host/key,last(/host/key2))</code>   |

Note that in an expression like:

```
sum(sum_foreach(/resptime[*],5m))/sum(count_foreach(/resptime[*],5m))
```

it cannot be guaranteed that both parts of the equation will always have the same set of values. While one part of the expression is evaluated, a new value for the requested period may arrive and then the other part of the expression will have a different set of values.

## 8 Internal checks

### Overview

Internal checks allow to monitor the internal processes of Zabbix. In other words, you can monitor what goes on with Zabbix server or Zabbix proxy.

Internal checks are calculated:

- on Zabbix server - if the host is monitored by server
- on Zabbix proxy - if the host is monitored by proxy

Internal checks are processed by server or proxy regardless of host maintenance status.

To use this item, choose the **Zabbix internal** item type.

#### Note:

Internal checks are processed by Zabbix pollers.

### Performance

Using some internal items may negatively affect performance. These items are:

- `zabbix[host,,items]`
- `zabbix[host,,items_unsupported]`
- `zabbix[hosts]`
- `zabbix[items]`
- `zabbix[items_unsupported]`
- `zabbix[queue,,]`
- `zabbix[requiredperformance]`
- `zabbix[stats,,,queue,,]`
- `zabbix[triggers]`

The **System information** and **Queue** frontend sections are also affected.

### Supported checks

- Parameters without angle brackets are mandatory and must be used as *is* (for example, "host" and "available" in `zabbix[host,<type>,available]`).
- Parameters with angle brackets `< >` must be replaced with a valid value. If a parameter has a default value, it can be omitted.
- Values for items and item parameters labeled "not supported on proxy" can only be retrieved if the host is monitored by server. Conversely, values "not supported on server" can only be retrieved if the host is monitored by proxy.

| Key                             |   |              |   |
|---------------------------------|---|--------------|---|
|                                 | Description   | Return value | Comments  |
| zabbix[boottime]                | Startup time of Zabbix server or Zabbix proxy process in seconds. | Integer.     |   |
| zabbix[cluster,discovery,nodes] | Discover <b>high availability cluster</b> nodes.                  | JSON.        | This item can be used in low-level discovery.   |
| zabbix[history]                 | Number of values stored in the HISTORY table.                     | Integer.     | This item is deprecated since Zabbix 6.0. Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! ( <i>not supported on proxy</i> ) |
| zabbix[history_log]             |   |              |   |

| Key                  |   |   |
|----------------------|---|---|
|                      | Number of values stored in the HISTORY_LOG table. | Integer.  |
|                      |   | This item is deprecated since Zabbix 6.0. Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! <i>(not supported on proxy)</i> |
| zabbix[history_str]  | Number of values stored in the HISTORY_STR table. | Integer.  |
|                      |   | This item is deprecated since Zabbix 6.0. Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! <i>(not supported on proxy)</i> |
| zabbix[history_text] |   |   |

| Key                  |  |   |
|----------------------|--|---|
|                      | Number of values stored in the HISTORY_TEXT table. | Integer.  |
|                      |  | This item is deprecated since Zabbix 6.0. Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! <i>(not supported on proxy)</i> |
| zabbix[history_uint] |  |   |

| Key                             |  |          |  |
|---------------------------------|--|----------|--|
|                                 | Number of values stored in the HISTORY_UINT table.                 | Integer. | This item is deprecated since Zabbix 6.0. Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! This item is supported since Zabbix 1.8.3. ( <i>not supported on proxy</i> ) |
| zabbix[host,,items]             | Number of enabled items (supported and not supported) on the host. | Integer. | This item is supported since Zabbix 3.0.0.   |
| zabbix[host,,items_unsupported] | Number of enabled unsupported items on the host.                   | Integer. | This item is supported since Zabbix 3.0.0.   |
| zabbix[host,,maintenance]       |  |          |  |

---

**Key**

---

Current maintenance status  
of a host.

0 - host in normal state,  
1 - host in maintenance with  
data collection,  
2 - host in maintenance  
without data collection.

This  
item  
is al-  
ways  
pro-  
cessed  
by  
Zab-  
bix  
server  
re-  
gard-  
less  
of  
host  
loca-  
tion  
(on  
server  
or  
proxy).  
The  
proxy  
will  
not  
re-  
ceive  
this  
item  
with  
con-  
figu-  
ra-  
tion  
data.  
The  
sec-  
ond  
pa-  
ram-  
eter  
must  
be  
empty  
and  
is re-  
served  
for  
fu-  
ture  
use.

zabbix[host,discovery,interfaces]

| Key                           |  |              |  |
|-------------------------------|--|--------------|--|
|                               | Details of all configured interfaces of the host in Zabbix frontend. | JSON object. | This item can be used in <b>low-level discovery</b> . This item is supported since Zabbix 3.4.0. ( <i>not supported on proxy</i> ) |
| zabbix[host,<type>,available] |  |              |  |

| Key                       |  |  |   |
|---------------------------|--|--|---|
|                           | Availability of the main interface of a particular type of checks on the host. | 0 - not available, 1 - available, 2 - unknown. | Valid <b>types</b> are: <i>agent</i> , <i>snmp</i> , <i>ipmi</i> , <i>jmx</i><br><br>The item value is calculated according to configuration parameters regarding host <b>un-reach-ability/unavailability</b> .<br><br>This item is supported since Zabbix 2.0.0. |
| zabbix[hosts]             | Number of monitored hosts.   | Integer.                                       |   |
| zabbix[items]             | Number of enabled items (supported and not supported).                         | Integer.                                       |   |
| zabbix[items_unsupported] | Number of not supported items.   | Integer.                                       |   |
| zabbix[java,,<param>]     |  |  |   |



| Key   |   |   |
|---|---|---|
| Information about Zabbix Java gateway.  | <p>If &lt;param&gt; is <i>ping</i>, "1" is returned. Can be used to check Java gateway availability using <code>nodata()</code> trigger function.</p> <p>If &lt;param&gt; is <i>version</i>, version of Java gateway is returned. Example: "2.0.0".</p> | <p>Valid values for <b>param</b> are: <i>ping</i>, <i>version</i></p> <p>Second parameter must be empty and is reserved for future use.</p> |
| <b>zabbix[lld_queue]</b><br>Count of values enqueued in the low-level discovery processing queue. | Integer.  | <p>This item can be used to monitor the low-level discovery processing queue length.</p> <p>This item is supported since Zabbix 4.2.0.</p>  |
| <b>zabbix[preprocessing_queue]</b>  |   |   |

| Key  |          |  |
|--|----------|--|
| Count of values enqueued in the preprocessing queue. | Integer. | This item can be used to monitor the preprocessing queue length. |
| zabbix[process,<type>,<mode>,<state>]                |          | This item is supported since Zabbix 3.4.0.                       |

Time a particular Zabbix process or a group of processes (identified by <type> and <mode>) spent in <state> in percentage. It is calculated for the last minute only. Specifying <type> is **mandatory**.

If <mode> is Zabbix process number that is not running (for example, with 5 pollers running <mode> is specified to be 6), such an item will turn into unsupported state. Minimum and maximum refers to the usage percentage for a single process. So if in a group of 3 pollers usage percentages per process were 2, 18 and 66, min would return 2 and max would return 66. Processes report what they are doing in shared memory and the self-monitoring process summarizes that data each second. State changes (busy/idle) are registered upon change - thus a process that becomes busy registers as such and doesn't change or update the state until it becomes idle. This ensures that even fully hung processes will be correctly registered as 100% busy. Currently, "busy" means "not sleeping", but in the future additional states might be introduced - waiting for locks, performing database queries, etc.

On Linux and most other systems, resolution is 1/100 of a second.

Percentage of time.  
Float.

Supported  
**types**  
of  
server  
pro-  
cesses:  
alert  
man-  
ager,  
alert  
syncer,  
alerter,  
avail-  
abil-  
ity  
man-  
ager,  
con-  
figu-  
ra-  
tion  
syncer,  
dis-  
cov-  
erer,  
esca-  
la-  
tor,  
ha  
man-  
ager  
(since  
Zab-  
bix  
6.0.35),  
his-  
tory  
poller,  
his-  
tory  
syncer,  
house-  
keeper,  
http  
poller,  
icmp  
pinger,  
ipmi  
man-  
ager,  
ipmi  
poller,  
java  
poller,  
lld  
man-  
ager,  
lld  
worker,  
odbc  
poller,  
poller,  
pre-  
pro-  
cess-

---

Key

---

zabbix[proxy,<name>,<param>]

| Key                             |          |   |
|---------------------------------|----------|---|
| Information about Zabbix proxy. | Integer. | <b>name:</b><br>proxy name<br><br>Valid values for <b>param</b> are:<br><i>lastaccess</i> - timestamp of last heart beat message received from proxy <i>delay</i> - how long collected values are un-sent, calculated as "proxy delay" (difference between the current proxy time and the timestamp of the oldest un-sent value on proxy) + |

| Key  |          |  |  |
|--|----------|--|--|
| zabbix[proxy_history]  |          |  |  |
| Number of values in the proxy history table waiting to be sent to the server.                                      | Integer. |  | (not supported on server)  |
| zabbix[queue,<from>,<to>]  |          |  |  |
| Number of monitored items in the queue which are delayed at least by <from> seconds but less than by <to> seconds. | Integer. |  | <b>from</b> - default: 6 seconds<br><b>to</b> - default: infinity<br>Time-unit symbols (s,m,h,d,w) are supported for these parameters. |
| zabbix[rcache,<cache>,<mode>]  |          |  |  |

| Key  |   |                                |   |
|--|---|--------------------------------|---|
| Availability statistics of Zabbix configuration cache. | Integer (for size); float (for percentage). | <b>cache:</b><br><i>buffer</i> | Valid <b>modes</b> are:<br><i>total</i><br>-<br>total size of buffer<br><i>free</i><br>- size of free buffer<br><i>pfree</i><br>- percentage of free buffer<br><i>used</i><br>- size of used buffer<br><i>pused</i><br>- percentage of used buffer<br><br><i>pused</i><br>mode is supported since Zabbix 4.0.0. |
| zabbix[requiredperformance]                            |   |                                |   |

| Key                       |   |        |  |
|---------------------------|---|--------|--|
|                           | Required performance of Zabbix server or Zabbix proxy, in new values per second expected. | Float. | Approximately correlates with "Required server performance, new values per second" in <i>Reports</i> → <i>System information</i> . |
| zabbix[stats,<ip>,<port>] |   |        |  |



| Key   | JSON object. |  |
|---|--------------|--|
| Remote Zabbix server or proxy internal metrics. |              | <p><b>ip</b> - IP/DNS/network mask list of servers/proxies to be re-motely queried (default is 127.0.0.1)</p> <p><b>port</b> - port of server/proxy to be re-motely queried (default is 10051)</p> <p>Note that the stats request will only be accepted from the addresses listed in the 'Stat-sAllowedIP' <b>server/proxy</b> parameter on the target instance.</p> <p>A selected set of internal</p> |

---

Key

---

zabbix[stats,<ip>,<port>,queue,<from>,<to>]

| Key   | JSON object. |   |
|---|--------------|---|
| Remote Zabbix server or proxy internal queue metrics (see zabbix[queue,<from>,<to>]). |              | <p><b>ip</b> - IP/DNS/network mask list of servers/proxies to be re-motely queried (de-fault is 127.0.0.1)</p> <p><b>port</b> - port of server/proxy to be re-motely queried (de-fault is 10051)</p> <p><b>from</b> - de-layed by at least (de-fault is 6 sec-onds)</p> <p><b>to</b> - de-layed by at most (de-fault is infin-ity)</p> <p>Note that the stats re-quest will only be ac-cepted from the ad-dresses listed in the</p> |

---

Key

---

zabbix[tcache,cache,<parameter>]

| Key | Effectiveness statistics of the Zabbix trend function cache. | Integer (for size); float (for percentage). | Valid <b>pa-ram-e-ters</b> are:<br><i>all</i> - total cache re-quests (de-fault)<br><i>hits</i> - cache hits<br><i>phits</i> - per-cent-age of cache hits<br><i>misses</i> - cache misses<br><i>pmisses</i> - per-cent-age of cache misses<br><i>items</i> - the num-ber of cached items<br><i>requests</i> - the num-ber of cached re-quests<br><i>pitems</i> - per-cent-age of cached items from cached items + re-quests.<br>Low per-cent-age |
|-----|--|---|--|
|-----|--|---|--|

| Key                 |  |          |   |
|---------------------|--|----------|---|
| <hr/>               |  |          |   |
| zabbix[trends]      | Number of values stored in the TRENDS table. | Integer. | This item is deprecated since Zabbix 6.0. Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! <i>(not supported on proxy)</i> |
| zabbix[trends_uint] |  |          |   |

| Key                          |   |          |  |
|------------------------------|---|----------|--|
|                              | Number of values stored in the TRENDS_UINT table.                                       | Integer. | This item is deprecated since Zabbix 6.0. Do not use if MySQL InnoDB, Oracle or PostgreSQL is used! This item is supported since Zabbix 1.8.3. <i>(not supported on proxy)</i> |
| zabbix[triggers]             | Number of enabled triggers in Zabbix database, with all items enabled on enabled hosts. | Integer. | <i>(not supported on proxy)</i>  |
| zabbix[uptime]               | Uptime of Zabbix server or Zabbix proxy process in seconds.                             | Integer. |  |
| zabbix[vcache,buffer,<mode>] |   |          |  |

| Key  |   |   |  |
|--|---|---|--|
| Availability statistics of Zabbix value cache. | Integer (for size); float (for percentage). | Valid <b>modes</b> are:<br><i>total</i><br>-<br>total size of buffer<br><i>free</i><br>- size of free buffer<br><i>pfree</i><br>- per-cent-age of free buffer<br><i>used</i><br>- size of used buffer<br><i>pused</i><br>- per-cent-age of used buffer<br><br>( <i>not supported on proxy</i> ) |  |
| zabbix[vcache,cache,<parameter>]               |   |   |  |



| Key   |  |   |
|---|--|---|
| Effectiveness statistics of Zabbix value cache. | Integer.<br><br>With the <i>mode</i> parameter:<br>0 - normal mode,<br>1 - low memory mode | Valid <b>pa-ram-eter</b> values are: <i>requests</i><br>-<br>total number of requests<br><i>hits</i> - number of cache hits (history values taken from the cache)<br><i>misses</i><br>-<br>number of cache misses (history values taken from the database)<br><i>mode</i><br>-<br>value cache operating mode<br><br>This item is supported since Zabbix 2.2.0 and the <i>mode</i> pa-ram- |



| Key    |                  |  |         |  |
|--------|------------------|--|---------|--|
| values | all<br>(default) | Total number of values processed by Zabbix server or Zabbix proxy, except unsupported items. | Integer | Counter. You may use this key with the <i>Change per second</i> pre-processing step in order to get values per second statistics. Counter. |
|        | float            | Number of processed float values.  | Integer | Counter.   |
|        | uint             | Number of processed unsigned integer values.   | Integer | Counter.   |
|        | str              | Number of processed character/string values.   | Integer | Counter.   |
|        | log              | Number of processed log values.  | Integer | Counter.   |
|        | text             | Number of processed text values.   | Integer | Counter.   |
|        | not supported    | Number of times item processing resulted in item becoming unsupported or keeping that state. | Integer | Counter.   |

| Key     |                    |                                    |         |   |
|---------|--------------------|------------------------------------|---------|---|
| history | pfree<br>(default) | Percentage of free history buffer. | Float.  | History cache is used to store item values. A low number indicates performance problems on the database side. |
|         | free               | Size of free history buffer.       | Integer |   |
|         | total              | Total size of history buffer.      | Integer |   |
|         | used               | Size of used history buffer.       | Integer |   |
|         | pusd               | Percentage of used history buffer. | Float.  | <i>pusd</i> mode is supported since Zabbix 4.0.0.   |

| Key   |                    |   |        |  |
|-------|--------------------|---|--------|--|
| index | pfree<br>(default) | Percentage of free history<br>index buffer. | Float. | History in-<br>dex<br>cache<br>is<br>used<br>to in-<br>dex<br>val-<br>ues<br>stored<br>in<br>his-<br>tory<br>cache.<br>After<br>the<br>his-<br>tory<br>cache<br>is<br>filled<br>and<br>then<br>cleared,<br>the<br>his-<br>tory<br>in-<br>dex<br>cache<br>will<br>still<br>keep<br>some<br>data.<br>This<br>be-<br>hav-<br>ior is<br>ex-<br>pected<br>and<br>helps<br>the<br>sys-<br>tem<br>run<br>more<br>effi-<br>ciently<br>by<br>avoid-<br>ing<br>the<br>ex-<br>tra<br>pro-<br>cess-<br>ing<br>re-<br>quired<br>to<br>con-<br>stantly |

| Key   |                    |   |         |   |
|-------|--------------------|---|---------|---|
| trend | free               | Size of free history index history buffer.  | Integer | <i>pused mode is supported since Zabbix 4.0.0. Trend cache stores aggregate for the current hour for all items that receive data. (not supported on proxy) (not supported on proxy)</i> |
|       | total              | Total size of history index history buffer. | Integer |   |
|       | used               | Size of used history index history buffer.  | Integer |   |
|       | pused              | Percentage of used history index buffer.    | Float.  |   |
|       | pfree<br>(default) | Percentage of free trend cache.             | Float.  | <i>(not supported on proxy) (not supported on proxy) (not supported on proxy)</i>   |
|       | free               | Size of free trend buffer.                  | Integer |   |
|       | total              | Total size of trend buffer.                 | Integer |   |
|       | used               | Size of used trend buffer.                  | Integer |   |

| Key |      |                                  |        |  |
|-----|------|----------------------------------|--------|--|
|     | used | Percentage of used trend buffer. | Float. | (not supported on proxy)                   |
|     |      |                                  |        | used mode is supported since Zabbix 4.0.0. |

## 9 SSH checks

### Overview

SSH checks are performed as agent-less monitoring. Zabbix agent is not needed for SSH checks.

To perform SSH checks Zabbix server must be initially **configured** with SSH2 support (libssh or libssh2). See also: **Requirements**.

#### Attention:

Starting with RHEL 8, only libssh is supported. For other distributions, libssh is suggested over libssh2.

### Configuration

#### Passphrase authentication

SSH checks provide two authentication methods - a user/password pair and key-file based.

If you do not intend to use keys, no additional configuration is required, besides linking libssh or libssh2 to Zabbix, if you're building from source.

#### Key file authentication

To use key based authentication for SSH items, certain changes to the server configuration are required.

Open the Zabbix server configuration file (*zabbix\_server.conf*) as root and look for the following line:

```
##### SSHKeyLocation=
```

Uncomment it and set the full path to the folder where the public and private keys will be located:

```
SSHKeyLocation=/home/zabbix/.ssh
```

Save the file and restart Zabbix server afterwards.

The path */home/zabbix* here is the home directory for the *zabbix* user account, and *.ssh* is a directory where by default public and private keys will be generated by an *ssh-keygen* command inside the home directory.

Usually installation packages of Zabbix server from different OS distributions create the *zabbix* user account with a home directory elsewhere, for example, */var/lib/zabbix* (as for system accounts).

Before generating the keys, you could reallocate the home directory to */home/zabbix*, so that it corresponds with the *SSHKeyLocation* Zabbix server configuration parameter mentioned above.

#### Note:

The following steps can be skipped if *zabbix* account has been added manually according to the **installation section**. In such a case the home directory for the *zabbix* account is most likely already */home/zabbix*.

To change the home directory of the *zabbix* user account, all working processes which are using it have to be stopped:

```
systemctl stop zabbix-agent
systemctl stop zabbix-server
```

To change the home directory location with an attempt to move it (if it exists) the following command should be executed:

```
usermod -m -d /home/zabbix zabbix
```

It is also possible that a home directory did not exist in the old location, so it should be created at the new location. A safe attempt to do that is:

```
test -d /home/zabbix || mkdir /home/zabbix
```

To be sure that all is secure, additional commands could be executed to set permissions to the home directory:

```
chown zabbix:zabbix /home/zabbix
```

```
chmod 700 /home/zabbix
```

Previously stopped processes can now be started again:

```
systemctl start zabbix-agent
```

```
systemctl start zabbix-server
```

Now, the steps to generate the public and private keys can be performed with the following commands (for better readability, command prompts are commented out):

```
sudo -u zabbix ssh-keygen -t rsa
##### Generating public/private rsa key pair.
##### Enter file in which to save the key (/home/zabbix/.ssh/id_rsa):
/home/zabbix/.ssh/id_rsa
##### Enter passphrase (empty for no passphrase):
<Leave empty>
##### Enter same passphrase again:
<Leave empty>
##### Your identification has been saved in /home/zabbix/.ssh/id_rsa.
##### Your public key has been saved in /home/zabbix/.ssh/id_rsa.pub.
##### The key fingerprint is:
##### 90:af:e4:c7:e3:f0:2e:5a:8d:ab:48:a2:0c:92:30:b9 zabbix@it0
##### The key's randomart image is:
##### +--[ RSA 2048 ]-----+
##### |                      |
##### |      .                |
##### |      o                |
##### | .      o              |
##### | +      . S           |
##### | .+    o =            |
##### | E .    * =           |
##### | =o .  . . * .        |
##### | ... oo.o+           |
##### +-----+
#####
```

#### Note:

The public and private keys (*id\_rsa.pub* and *id\_rsa*) have been generated by default in the */home/zabbix/.ssh* directory, which corresponds to the Zabbix server *SSHKeyLocation* configuration parameter.

#### Attention:

Key types other than "rsa" may be supported by the *ssh-keygen* tool and SSH servers but they may not be supported by *libssh2* used by Zabbix.

Shell configuration form

This step should be performed only once for every host that will be monitored by SSH checks.

By using the following commands, the **public** key file can be installed on a remote host *10.10.10.10*, so that the SSH checks can be performed with a *root* account (for better readability, command prompts are commented out):

```
sudo -u zabbix ssh-copy-id root@10.10.10.10
##### The authenticity of host '10.10.10.10 (10.10.10.10)' can't be established.
##### RSA key fingerprint is 38:ba:f2:a4:b5:d9:8f:52:00:09:f7:1f:75:cc:0b:46.
##### Are you sure you want to continue connecting (yes/no)?
yes
```



```
##### Warning: Permanently added '10.10.10.10' (RSA) to the list of known hosts.
##### root@10.10.10.10's password:
<Enter root password>
##### Now try logging into the machine, with "ssh 'root@10.10.10.10'",
##### and check to make sure that only the key(s) you wanted were added.
```

Now it is possible to check the SSH login using the default private key (/home/zabbix/.ssh/id\_rsa) for the zabbix user account:

```
sudo -u zabbix ssh root@10.10.10.10
```

If the login is successful, then the configuration part in the shell is finished and the remote SSH session can be closed.

#### Item configuration

Actual command(s) to be executed must be placed in the *Executed script* field in the item configuration. Multiple commands can be executed one after another by placing them on a new line. In this case returned values will also be formatted as multilined.

Item
Tags
Preprocessing

\* Name
SSH test check (without passphrase)

Type
SSH agent

\* Key
ssh.run[clear]
Select

Type of information
Text

Host interface
10.10.10.10:10050

Authentication method
Public key

\* User name
root

\* Public key file
id\_rsa.pub

\* Private key file
id\_rsa

Key passphrase

\* Executed script
service mysql-server status

\* Update interval
1m

All mandatory input fields are marked with a red asterisk.

The fields that require specific information for SSH items are:

| Parameter | Description                   | Comments |
|-----------|-------------------------------|----------|
| Type      | Select <b>SSH agent</b> here. |          |

| Parameter                         | Description  | Comments  |
|-----------------------------------|--|---|
| <i>Key</i>                        | Unique (per host) item key in the format <b>ssh.run[unique short description,&lt;ip&gt;,&lt;port&gt;,&lt;encoding&gt;,&lt;ssh options&gt;]</b> | <p><b>unique short description</b> is required and should be unique for each SSH item per host.</p> <p>Default port is 22, not the port specified in the interface to which this item is assigned.</p> <p><b>ssh options</b> (supported since version 6.0.25; require libssh of version 0.9.0 and higher or libssh2) allow passing additional SSH options in the format <i>key1=value1;key2=value2,value3</i>. Multiple values for one key can be passed separated by comma (in this case, the parameter must be <b>quoted</b>); multiple option keys can be passed separated by semicolon.</p> <p>The following option keys are supported: KexAlgorithms, HostkeyAlgorithms, Ciphers, MACs. Option key and value support depends on the SSH library; if an option is not supported, an error will be returned, and the item will become unsupported.</p> <p>Note that "+" sign for appending cipher settings and "!" for disabling specific cipher settings (as in GnuTLS and OpenSSL) are not supported.</p> <p>Examples:</p> <pre>=&gt; ssh.run[KexAlgorithms,127.0.0.1,,,Ciphers=aes128] =&gt; ssh.run[KexAlgorithms,,,,"KexAlgorithms=diffie-hellman"]</pre> |
| <i>Authentication method</i>      | One of the "Password" or "Public key".   |   |
| <i>User name</i>                  | User name to authenticate on remote host. Required.  |   |
| <i>Public key file</i>            | File name of public key if <i>Authentication method</i> is "Public key". Required.   | Example: <i>id_rsa.pub</i> - default public key file name generated by a command <a href="#">ssh-keygen</a> .   |
| <i>Private key file</i>           | File name of private key if <i>Authentication method</i> is "Public key". Required.  | Example: <i>id_rsa</i> - default private key file name.   |
| <i>Password or Key passphrase</i> | Password to authenticate or Passphrase <b>if</b> it was used for the private key.  | <p>Leave the <i>Key passphrase</i> field empty if passphrase was not used.</p> <p>See also <b>known issues</b> regarding passphrase usage.</p>  |
| <i>Executed script</i>            | Executed shell command(s) using SSH remote session.  | <p>The return value of the executed shell command(s) is limited to 16MB (including trailing whitespace that is truncated); <b>database limits</b> also apply.</p> <p>Note that the libssh2 library may truncate executable scripts to ~32kB.</p> <p>Examples:</p> <pre>date +%s systemctl status mysql-server ps auxww   grep httpd   wc -l</pre>   |

## 10 Telnet checks

### Overview

Telnet checks are performed as agent-less monitoring. Zabbix agent is not needed for Telnet checks.

## Configurable fields

Actual command(s) to be executed must be placed in the **Executed script** field in the item configuration.

Multiple commands can be executed one after another by placing them on a new line. In this case returned value also will be formatted as multiline.

Supported characters that the shell prompt can end with:

- \$
- #
- >
- %

### Note:

A telnet prompt line which ended with one of these characters will be removed from the returned value, but only for the first command in the commands list, i.e. only at a start of the telnet session.

| Key  | Description  |
|--|--|
| <b>telnet.run[&lt;unique short descrip-<br/>tion&gt;,&lt;ip&gt;,&lt;port&gt;,&lt;encoding&gt;]</b> | Run a command on a remote device using telnet connection |

### Attention:

If a telnet check returns a value with non-ASCII characters and in non-UTF8 encoding then the *<encoding>* parameter of the key should be properly specified. See [encoding of returned values](#) page for more details.

## 11 External checks

### Overview

External check is a check executed by Zabbix server by **running a shell script** or a binary. However, when hosts are monitored by a Zabbix proxy, the external checks are executed by the proxy.

External checks do not require any agent running on a host being monitored.

The syntax of the item key is:

```
script[<parameter1>,<parameter2>,...]
```

Where:

| ARGUMENT            | DEFINITION                          |
|---------------------|-------------------------------------|
| <b>script</b>       | Name of a shell script or a binary. |
| <b>parameter(s)</b> | Optional command line parameters.   |

If you don't want to pass any parameters to the script you may use:

```
script[] or  
script
```

Zabbix server or proxy will search the directory specified for external scripts and execute the command (see `ExternalScripts` parameter in Zabbix [server/proxy](#) configuration file). The command will be executed under the same user as Zabbix server/proxy, so any access permissions or environment variables should be handled in a wrapper script, if necessary. Permissions on the command should also allow that user to execute it. Only commands in the specified directory are available for execution.

### Warning:

Do not overuse external checks, as each script requires starting a fork process by Zabbix server/proxy, and running many scripts can significantly decrease Zabbix performance.

### Usage example

Executing the script **check\_oracle.sh** with the first parameters '-h'. The second parameter will be replaced by IP address or DNS name, depending on the selection in the host properties.

```
check_oracle.sh["-h","{HOST.CONN}"]
```

Assuming host is configured to use IP address, Zabbix server/proxy will execute:

```
check_oracle.sh '-h' '192.168.1.4'
```

External check result

The return value of an external check is a standard output together with a standard error produced by the check.

**Attention:**  
An item that returns text (character, log, or text type of information) will not become unsupported in case of a standard error output.

The return value is limited to 16MB (including trailing whitespace that is truncated); **database limits** also apply.

If the requested script is not found or Zabbix server/proxy has no permissions to execute it, the item will become unsupported and a corresponding error message will be displayed.

In case of a timeout, the item will become unsupported, a corresponding error message will be displayed, and the process forked for the script will be terminated.

12 Trapper items

Overview

Trapper items accept incoming data instead of querying for it.

It is useful for any data you might want to "push" into Zabbix.

To use a trapper item you must:

- have a trapper item set up in Zabbix
- send in the data into Zabbix

Configuration

Item configuration

To configure a trapper item:

- Go to: *Configuration* → *Hosts*
- Click on *Items* in the row of the host
- Click on *Create item*
- Enter parameters of the item in the form

ItemTagsPreprocessing

\* Name

Trapper item

Type

Zabbix trapper

\* Key

trap

Type of information

Text

\* History storage period

Do not keep historyStorage period3600

All mandatory input fields are marked with a red asterisk.

The fields that require specific information for trapper items are:

|                     |  |
|---------------------|--|
| Type                | Select <b>Zabbix trapper</b> here.   |
| Key                 | Enter a key that will be used to recognize the item when sending in data.                    |
| Type of information | Select the type of information that will correspond the format of data that will be sent in. |

|                      |   |
|----------------------|---|
| <b>Allowed hosts</b> | <p>List of comma delimited IP addresses, optionally in CIDR notation, or DNS names.</p> <p>If specified, incoming connections will be accepted only from the hosts listed here.</p> <p>If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address.</p> <p>'0.0.0.0/0' can be used to allow any IPv4 address.</p> <p>Note that "IPv4-compatible IPv6 addresses" (0000::/96 prefix) are supported but deprecated by <a href="#">RFC4291</a>.</p> <p>Example: 127.0.0.1, 192.168.1.0/24, 192.168.3.1-255, 192.168.1-10.1-255, ::1,2001:db8::/32, mysqlserver1, zabbix.example.com, {HOST.HOST}</p> <p>Spaces and <b>user macros</b> are allowed in this field since Zabbix 2.2.0.</p> <p>Host macros {HOST.HOST}, {HOST.NAME}, {HOST.IP}, {HOST.DNS}, {HOST.CONN} are allowed in this field since Zabbix 4.0.2.</p> |
|----------------------|---|

#### Note:

You may have to wait up to 60 seconds after saving the item until the server picks up the changes from a configuration cache update, before you can send in values.

### Sending in data

In the simplest of cases, we may use **zabbix\_sender** utility to send in some 'test value':

```
zabbix_sender -z <server IP address> -p 10051 -s "New host" -k trap -o "test value"
```

To send in the value we use these keys:

- z - to specify Zabbix server IP address
- p - to specify Zabbix server port number (10051 by default)
- s - to specify the host (make sure to use the 'technical' **host name** here, instead of the 'visible' name)
- k - to specify the key of the item we just defined
- o - to specify the actual value to send

#### Attention:

Zabbix trapper process does not expand macros used in the item key in attempt to check corresponding item key existence for targeted host.

### Display

This is the result in *Monitoring* → *Latest data*:

☰ Latest data

| Subfilter affects only filtered data                   |                              |            |            |        |
|--|------------------------------|------------|------------|--------|
| HOSTS  |                              |            |            |        |
| <a href="#">New host 1</a>                             |                              |            |            |        |
| DATA   |                              |            |            |        |
| <a href="#">With data</a> <a href="#">Without data</a> |                              |            |            |        |
| <input type="checkbox"/> Host                          | Name ▲                       | Last check | Last value | Change |
| <input type="checkbox"/> New host                      | <a href="#">Trapper item</a> | 2m 27s     | test value |        |

Note that if a single numeric value is sent in, the data graph will show a horizontal line to the left and to the right of the time point of the value.

## 13 JMX monitoring

### Overview

JMX monitoring can be used to monitor JMX counters of a Java application.

JMX monitoring has native support in Zabbix in the form of a Zabbix daemon called "Zabbix Java gateway", introduced since Zabbix 2.0.

To retrieve the value of a particular JMX counter on a host, Zabbix server queries the Zabbix **Java gateway**, which in turn uses the [JMX management API](#) to query the application of interest remotely.

For more details and setup see the [Zabbix Java gateway](#) section.

**Warning:**

Communication between Java gateway and the monitored JMX application should not be firewalled.

#### Enabling remote JMX monitoring for Java application

A Java application does not need any additional software installed, but it needs to be started with the command-line options specified below to have support for remote JMX monitoring.

As a bare minimum, if you just wish to get started by monitoring a simple Java application on a local host with no security enforced, start it with these options:

```
java \
-Dcom.sun.management.jmxremote \
-Dcom.sun.management.jmxremote.port=12345 \
-Dcom.sun.management.jmxremote.authenticate=false \
-Dcom.sun.management.jmxremote.ssl=false \
-Dcom.sun.management.jmxremote.registry.ssl=false \
-jar /usr/share/doc/openjdk-6-jre-headless/demo/jfc/Notepad/Notepad.jar
```

This makes Java listen for incoming JMX connections on port 12345, from local host only, and tells it not to require authentication or SSL.

If you want to allow connections on another interface, set the `-Djava.rmi.server.hostname` parameter to the IP of that interface.

If you wish to be more stringent about security, there are many other Java options available to you. For instance, the next example starts the application with a more versatile set of options and opens it to a wider network, not just local host.

```
java \
-Djava.rmi.server.hostname=192.168.3.14 \
-Dcom.sun.management.jmxremote \
-Dcom.sun.management.jmxremote.port=12345 \
-Dcom.sun.management.jmxremote.authenticate=true \
-Dcom.sun.management.jmxremote.password.file=/etc/java-6-openjdk/management/jmxremote.password \
-Dcom.sun.management.jmxremote.access.file=/etc/java-6-openjdk/management/jmxremote.access \
-Dcom.sun.management.jmxremote.ssl=true \
-Dcom.sun.management.jmxremote.registry.ssl=true \
-Djavax.net.ssl.keyStore=$YOUR_KEY_STORE \
-Djavax.net.ssl.keyStorePassword=$YOUR_KEY_STORE_PASSWORD \
-Djavax.net.ssl.trustStore=$YOUR_TRUST_STORE \
-Djavax.net.ssl.trustStorePassword=$YOUR_TRUST_STORE_PASSWORD \
-Dcom.sun.management.jmxremote.ssl.need.client.auth=true \
-jar /usr/share/doc/openjdk-6-jre-headless/demo/jfc/Notepad/Notepad.jar
```

Most (if not all) of these settings can be specified in `/etc/java-6-openjdk/management/management.properties` (or wherever that file is on your system).

Note that if you wish to use SSL, you have to modify `startup.sh` script by adding `-Djavax.net.ssl.*` options to Java gateway, so that it knows where to find key and trust stores.

See [Monitoring and Management Using JMX](#) for a detailed description.

#### Configuring JMX interfaces and items in Zabbix frontend

With Java gateway running, server knowing where to find it and a Java application started with support for remote JMX monitoring, it is time to configure the interfaces and items in Zabbix GUI.

##### Configuring JMX interface

You begin by creating a JMX-type interface on the host of interest.

Host
Templates
IPMI
Tags
Macros
Inventory
Encryption
Value mapping

\* Host name

JMX host

Visible name

JMX host

\* Groups

Java (new) X

type here to search

Select

Interfaces

| Type  | IP address | DNS name | Connect to | Port  |
|-------|------------|----------|------------|-------|
| Agent | 127.0.0.1  |          | IP DNS     | 10050 |
| JMX   | 127.0.0.1  |          | IP DNS     | 12345 |

Add

All mandatory input fields are marked with a red asterisk.

Adding JMX agent item

For each JMX counter you are interested in you add **JMX agent** item attached to that interface.

The key in the screenshot below says `jmx["java.lang:type=Memory","HeapMemoryUsage.used"]`.

Item
Tags
Preprocessing

\* Name

Used heap memory

Type

JMX agent

\* Key

jmx["java.lang:type=Memory","HeapMemoryUsage.used"]

Type of information

Numeric (unsigned)

\* Host interface

127.0.0.1:12345

\* JMX endpoint

service:jmx:rmi:///jndi/rmi://{HOST.CONN}:{HOST.PORT}/jmxrmi

User name

{JMX\_USERNAME}

Password

{JMX\_PASSWORD}

Units

All mandatory input fields are marked with a red asterisk.

The fields that require specific information for JMX items are:

|              |   |
|--------------|---|
| Type         | Set <b>JMX agent</b> here.  |
| Key          | <p>The <code>jmx[]</code> item key contains three parameters:</p> <p><b>object name</b> - the object name of an MBean</p> <p><b>attribute name</b> - an MBean attribute name with optional composite data field names separated by dots</p> <p><b>unique short description</b> - a unique description that allows multiple JMX items with the same object name and attribute name on the host (optional)</p> <p>See below for more detail on JMX item keys.</p> <p>Since Zabbix 3.4, you may discover MBeans and MBean attributes using a <code>jmx.discovery[]</code> <b>low-level discovery</b> item.</p> |
| JMX endpoint | <p>You may specify a custom JMX endpoint. Make sure that JMX endpoint connection parameters match the JMX interface. This can be achieved by using <code>{HOST.*}</code> macros as done in the default JMX endpoint.</p> <p>This field is supported since 3.4.0. <code>{HOST.*}</code> <b>macros</b> and user macros are supported.</p>   |

|                  |   |
|------------------|---|
| <i>User name</i> | Specify the user name, if you have configured authentication on your Java application. User macros are supported. |
| <i>Password</i>  | Specify the password, if you have configured authentication on your Java application. User macros are supported.  |

If you wish to monitor a Boolean counter that is either "true" or "false", then you specify type of information as "Numeric (unsigned)" and select "Boolean to decimal" preprocessing step in the Preprocessing tab. Server will store Boolean values as 1 or 0, respectively.

JMX item keys in more detail

Simple attributes

An MBean object name is nothing but a string which you define in your Java application. An attribute name, on the other hand, can be more complex. In case an attribute returns primitive data type (an integer, a string etc.) there is nothing to worry about, the key will look like this:

```
jmx[com.example:Type=Hello,weight]
```

In this example the object name is "com.example:Type=Hello", the attribute name is "weight", and the returned value type should probably be "Numeric (float)".

Attributes returning composite data

It becomes more complicated when your attribute returns composite data. For example: your attribute name is "apple" and it returns a hash representing its parameters, like "weight", "color" etc. Your key may look like this:

```
jmx[com.example:Type=Hello,apple.weight]
```

This is how an attribute name and a hash key are separated, by using a dot symbol. Same way, if an attribute returns nested composite data the parts are separated by a dot:

```
jmx[com.example:Type=Hello,fruits.apple.weight]
```

Attributes returning tabular data

Tabular data attributes consist of one or multiple composite attributes. If such an attribute is specified in the attribute name parameter then this item value will return the complete structure of the attribute in JSON format. The individual element values inside the tabular data attribute can be retrieved using preprocessing.

Tabular data attribute example:

```
jmx[com.example:type=Hello,foodinfo]
```

Item value:

```
[
  {
    "a": "apple",
    "b": "banana",
    "c": "cherry"
  },
  {
    "a": "potato",
    "b": "lettuce",
    "c": "onion"
  }
]
```

Problem with dots

So far so good. But what if an attribute name or a hash key contains dot symbol? Here is an example:

```
jmx[com.example:Type=Hello,all.fruits.apple.weight]
```

That's a problem. How to tell Zabbix that attribute name is "all.fruits", not just "all"? How to distinguish a dot that is part of the name from the dot that separates an attribute name and hash keys?

Before **2.0.4** Zabbix Java gateway was unable to handle such situations and users were left with UNSUPPORTED items. Since 2.0.4 this is possible, all you need to do is to escape the dots that are part of the name with a backslash:

```
jmx[com.example:Type=Hello,all\.fruits.apple.weight]
```

Same way, if your hash key contains a dot you escape it:



```
jmx[com.example:Type=Hello,all\.fruits.apple.total\.weight]
```

Other issues

A backslash character in an attribute name should be escaped:

```
jmx[com.example:type=Hello,c:\\documents]
```

For handling any other special characters in JMX item key, please see the [item key format section](#).

This is actually all there is to it. Happy JMX monitoring!

Non-primitive data types

Since Zabbix 4.0.0 it is possible to work with custom MBeans returning non-primitive data types, which override the **toString()** method.

Using custom endpoint with JBoss EAP 6.4

Custom endpoints allow working with different transport protocols other than the default RMI.

To illustrate this possibility, let's try to configure JBoss EAP 6.4 monitoring as an example. First, let's make some assumptions:

- You have already installed Zabbix Java gateway. If not, then you can do it in accordance with the [documentation](#).
- Zabbix server and Java gateway are installed with the prefix `/usr/local/`
- JBoss is already installed in `/opt/jboss-eap-6.4/` and is running in standalone mode
- We shall assume that all these components work on the same host
- Firewall and SELinux are disabled (or configured accordingly)

Let's make some simple settings in `zabbix_server.conf`:

```
JavaGateway=127.0.0.1
```

```
StartJavaPollers=5
```

And in the `zabbix_java/settings.sh` configuration file (or `zabbix_java_gateway.conf`):

```
START_POLLERS=5
```

Check that JBoss listens to its standard management port:

```
$ netstat -natp | grep 9999
```

```
tcp        0      0 127.0.0.1:9999          0.0.0.0:*               LISTEN      10148/java
```

Now let's create a host with JMX interface 127.0.0.1:9999 in Zabbix.

The screenshot shows the Zabbix web interface for creating a new host. The 'Host' tab is selected. The 'Host name' field is set to 'jboss'. The 'Visible name' field is also set to 'jboss'. The 'Groups' section shows 'Java (new)' selected. Below this, there is a table for 'Interfaces'.

| Interfaces | Type | IP address | DNS name | Connect to | Port  |
|------------|------|------------|----------|------------|-------|
| Agent      |      | 127.0.0.1  |          | IP DNS     | 10050 |
| JMX        |      | 127.0.0.1  |          | IP DNS     | 9999  |

At the bottom of the interface, there is a blue 'Add' button.

As we know that this version of JBoss uses the JBoss Remoting protocol instead of RMI, we may mass update the JMX endpoint parameter for items in our JMX template accordingly:

```
service:jmx:remoting-jmx://{HOST.CONN}:{HOST.PORT}
```

## Mass update

Item

Tags

Preprocessing

Type ☐ Original

JMX endpoint ☒

service:jmx:remoting-jmx://{HOST.CONN}:{HOST.PORT}

Let's update the configuration cache:

```
/usr/local/sbin/zabbix_server -R config_cache_reload
```

Note that you may encounter an error first.

```
3. mc [root@centos7-dev]:/home/vagrant/zabbix-3.2.6/src/zabbix_java (ssh)
com.zabbix.gateway.ZabbixException: java.net.MalformedURLException: Unsupported protocol: remoting-jmx
    at com.zabbix.gateway.JMXItemChecker.getValues(JMXItemChecker.java:97) ~[zabbix-java-gateway-3.4.2.jar:na]
    at com.zabbix.gateway.SocketProcessor.run(SocketProcessor.java:63) ~[zabbix-java-gateway-3.4.2.jar:na]
    at java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1149) [na:1.8.0_144]
    at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:624) [na:1.8.0_144]
    at java.lang.Thread.run(Thread.java:748) [na:1.8.0_144]
Caused by: java.net.MalformedURLException: Unsupported protocol: remoting-jmx
    at javax.management.remote.JMXConnectorFactory.newJMXConnector(JMXConnectorFactory.java:359) ~[na:1.8.0_144]
    at javax.management.remote.JMXConnectorFactory.connect(JMXConnectorFactory.java:269) ~[na:1.8.0_144]
    at com.zabbix.gateway.ZabbixJMXConnectorFactory$1.run(ZabbixJMXConnectorFactory.java:76) ~[zabbix-java-gateway-3.4.2.jar:na]
    at java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:511) ~[na:1.8.0_144]
    at java.util.concurrent.FutureTask.run(FutureTask.java:266) ~[na:1.8.0_144]
    ... 3 common frames omitted
2017-11-07 13:52:12.644 [pool-1-thread-1] WARN com.zabbix.gateway.SocketProcessor - error processing request
com.zabbix.gateway.ZabbixException: java.net.MalformedURLException: Unsupported protocol: remoting-jmx
    at com.zabbix.gateway.JMXItemChecker.getValues(JMXItemChecker.java:97) ~[zabbix-java-gateway-3.4.2.jar:na]
    at com.zabbix.gateway.SocketProcessor.run(SocketProcessor.java:63) ~[zabbix-java-gateway-3.4.2.jar:na]
    at java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1149) [na:1.8.0_144]
    at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:624) [na:1.8.0_144]
    at java.lang.Thread.run(Thread.java:748) [na:1.8.0_144]
Caused by: java.net.MalformedURLException: Unsupported protocol: remoting-jmx
    at javax.management.remote.JMXConnectorFactory.newJMXConnector(JMXConnectorFactory.java:359) ~[na:1.8.0_144]
    at javax.management.remote.JMXConnectorFactory.connect(JMXConnectorFactory.java:269) ~[na:1.8.0_144]
    at com.zabbix.gateway.ZabbixJMXConnectorFactory$1.run(ZabbixJMXConnectorFactory.java:76) ~[zabbix-java-gateway-3.4.2.jar:na]
    at java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:511) ~[na:1.8.0_144]
    at java.util.concurrent.FutureTask.run(FutureTask.java:266) ~[na:1.8.0_144]
    ... 3 common frames omitted
2017-11-07 13:52:14.889 [Thread-0] INFO com.zabbix.gateway.JavaGateway - Zabbix Java Gateway 3.4.2 (revision 72885) as stopped
2017-11-07 13:52:26.167 [main] INFO com.zabbix.gateway.JavaGateway - Zabbix Java Gateway 3.4.2 (revision 72885) has started
```

"Unsupported protocol: remoting-jmx" means that Java gateway does not know how to work with the specified protocol. That can be fixed by creating a `~/needed_modules.txt` file with the following content:

```
jboss-as-remoting
jboss-logging
jboss-logmanager
jboss-marshalling
jboss-remoting
jboss-sasl
jcl-over-slf4j
jul-to-slf4j-stub
log4j-jboss-logmanager
remoting-jmx
slf4j-api
xnio-api
xnio-nio
```

and then executing the command:

```
for i in $(cat ~/needed_modules.txt); do find /opt/jboss-eap-6.4 -iname "${i}*.jar" -exec cp '{}' /usr/local/lib/;
```

Thus, Java gateway will have all the necessary modules for working with jmx-remoting. What's left is to restart the Java gateway, wait a bit and if you did everything right, see that JMX monitoring data begin to arrive in Zabbix (see also: [Latest data](#)).

## 14 ODBC monitoring

### Overview

ODBC monitoring corresponds to the *Database monitor* item type in the Zabbix frontend.

ODBC is a C programming language middle-ware API for accessing database management systems (DBMS). The ODBC concept was developed by Microsoft and later ported to other platforms.

Zabbix may query any database, which is supported by ODBC. To do that, Zabbix does not directly connect to the databases, but uses the ODBC interface and drivers set up in ODBC. This function allows for more efficient monitoring of different databases for multiple purposes - for example, checking specific database queues, usage statistics and so on. Zabbix supports unixODBC, which is one of the most commonly used open source ODBC API implementations.

#### Attention:

See also the [known issues](#) for ODBC checks.

### Installing unixODBC

The suggested way of installing unixODBC is to use the Linux operating system default package repositories. In the most popular Linux distributions unixODBC is included in the package repository by default. If it's not available, it can be obtained at the unixODBC homepage: <http://www.unixodbc.org/download.html>.

Installing unixODBC on Ubuntu/Debian systems using the *apt* package manager:

```
apt install unixodbc unixodbc-dev
```

Installing unixODBC on RedHat/Fedora-based systems using the *dnf* package manager:

```
dnf install unixODBC unixODBC-devel
```

Installing unixODBC on SUSE-based systems using the *zypper* package manager:

```
zypper in unixODBC-devel
```

#### Note:

The `unixodbc-dev` or `unixODBC-devel` package is needed to compile Zabbix with unixODBC support.

### Installing unixODBC drivers

A unixODBC database driver should be installed for the database, which will be monitored. unixODBC has a list of supported databases and drivers: <http://www.unixodbc.org/drivers.html>. In some Linux distributions database drivers are included in package repositories.

Installing MySQL database driver on Ubuntu/Debian systems using the *apt* package manager:

```
apt install odbc-mariadb
```

Installing MySQL database driver on RedHat/Fedora-based systems using the *dnf* package manager:

```
dnf install mariadb-connector-odbc
```

Installing MySQL database driver on SUSE-based systems using the *zypper* package manager:

```
zypper in mariadb-connector-odbc
```

### Configuring unixODBC

ODBC configuration is done by editing the **odbcinst.ini** and **odbc.ini** files. To verify the configuration file location, type:

```
odbcinst -j
```

**odbcinst.ini** is used to list the installed ODBC database drivers:

```
[mysql]
Description = ODBC for MySQL
Driver       = /usr/lib/libmyodbc5.so
```

Parameter details:

| Attribute          | Description                  |
|--------------------|------------------------------|
| <i>mysql</i>       | Database driver name.        |
| <i>Description</i> | Database driver description. |

| Attribute     | Description                       |
|---------------|-----------------------------------|
| <i>Driver</i> | Database driver library location. |

**odbc.ini** is used to define data sources:

```
[test]
Description = MySQL test database
Driver      = mysql
Server      = 127.0.0.1
User        = root
Password    =
Port        = 3306
Database    = zabbix
```

Parameter details:

| Attribute          | Description   |
|--------------------|---|
| <i>test</i>        | Data source name (DSN).                             |
| <i>Description</i> | Data source description.                            |
| <i>Driver</i>      | Database driver name - as specified in odbcinst.ini |
| <i>Server</i>      | Database server IP/DNS.                             |
| <i>User</i>        | Database user for connection.                       |
| <i>Password</i>    | Database user password.                             |
| <i>Port</i>        | Database connection port.                           |
| <i>Database</i>    | Database name.                                      |

To verify if ODBC connection is working successfully, a connection to database should be tested. That can be done with the **isql** utility (included in the unixODBC package):

```
isql test
+-----+
| Connected! |
|           |
| sql-statement |
| help [tablename] |
| quit      |
|           |
+-----+
```

Compiling Zabbix with ODBC support

To enable ODBC support, Zabbix should be compiled with the following flag:

```
--with-unixodbc[=ARG] # Use ODBC driver against unixODBC package.
```

**Note:**

See more about Zabbix installation from the [source code](#).

Item configuration in Zabbix frontend

Configure a database monitoring [item](#).

| Item                | Tags                                    | Preprocessing |
|---------------------|---|---------------|
| * Name              | MySQL host count                        |               |
| Type                | Database monitor ▼                      |               |
| * Key               | db.odbc.select[mysql-simple-check,test] |               |
| Type of information | Numeric (unsigned) ▼                    |               |
| User name           | zabbix                                  |               |
| Password            |   |               |
| * SQL query         | select count(*) from hosts              |               |

All mandatory input fields are marked with a red asterisk.

Specifically for database monitoring items you must enter:

|           |  |
|-----------|--|
| Type      | Select <i>Database monitor</i> here.   |
| Key       | <p>Enter one of the supported item keys:</p> <p><b>db.odbc.select</b>[&lt;unique short description&gt;,&lt;dsn&gt;,&lt;connection string&gt;] - this item is designed to return one value, i.e. the first column of the first row of the SQL query result. If a query returns more than one column, only the first column is read. If a query returns more than one line, only the first line is read.</p> <p><b>db.odbc.get</b>[&lt;unique short description&gt;,&lt;dsn&gt;,&lt;connection string&gt;] - this item is capable of returning multiple rows/columns in JSON format. Thus it may be used as a master item that collects all data in one system call, while JSONPath preprocessing may be used in dependent items to extract individual values. For more information, see an <a href="#">example</a> of the returned format, used in low-level discovery. This item is supported since Zabbix 4.4.</p> <p>The unique description will serve to identify the item in triggers, etc.</p> <p>Although <code>dsn</code> and <code>connection string</code> are optional parameters, at least one of them should be present. If both data source name (DSN) and connection string are defined, the DSN will be ignored.</p> <p>The data source name, if used, must be set as specified in <code>odbc.ini</code>.</p> <p>The connection string may contain driver-specific arguments.</p> <p><b>db.odbc.discovery</b>[&lt;unique short description&gt;,&lt;dsn&gt;,&lt;connection string&gt;] - this item returns <a href="#">low-level discovery</a> data.</p> <p>Example (connection for MySQL ODBC driver 5):</p> <pre>=&gt; db.odbc.get[MySQL exam- ple,,"Driver=/usr/local/lib/libmyodbc5a.so;Database=master;Server=127.0.0.1;Port=3306"]</pre> |
| User name | <p>Enter the database user name</p> <p>This parameter is optional if user is specified in <code>odbc.ini</code>.</p> <p>If connection string is used, and <i>User name</i> field is not empty, it is appended to the connection string as <code>UID=&lt;user&gt;</code></p>  |

|                            |   |
|----------------------------|---|
| <i>Password</i>            | <p>Enter the database user password</p> <p>This parameter is optional if password is specified in <code>odbc.ini</code>.</p> <p>If connection string is used, and <i>Password</i> field is not empty, it is appended to the connection string as <code>PWD=&lt;password&gt;</code>.</p> <p>Since Zabbix 6.0.34, special characters are supported in this field.</p> <p>Before Zabbix 6.0.34, if the password contains a semicolon, it should be wrapped in curly brackets, for example, <code>{P?;}*word</code>. After 6.0.34, wrapping the password in this case is still supported, but not required. The password will be appended to connection string after the username as <code>UID=&lt;username&gt;;PWD={P?;}*word</code>. To test the resulting string, you can run the following command:</p> <pre>isql -v -k 'Driver=libmaodbc.so;Database=zabbix;UID=zabbix;PWD={P?;}*word'</pre> |
| <i>SQL query</i>           | <p>Enter the SQL query.</p> <p>Note that with the <code>db.odbc.select[]</code> item the query must return one value only.</p>  |
| <i>Type of information</i> | <p>It is important to know what type of information will be returned by the query, so that it is selected correctly here. With an incorrect <i>type of information</i> the item will turn unsupported.</p>  |

#### Important notes

- Database monitoring items will become unsupported if no *odbc poller* processes are started in the server or proxy configuration. To activate ODBC pollers, set *StartODBCPollers* parameter in Zabbix **server** configuration file or, for checks performed by proxy, in Zabbix **proxy** configuration file.
- Zabbix does not limit the query execution time. It is up to the user to choose queries that can be executed in a reasonable amount of time.
- The **Timeout** parameter value from Zabbix server is used as the ODBC login timeout (note that depending on ODBC drivers the login timeout setting might be ignored).
- The SQL command must return a result set like any query with `select ...`. The query syntax will depend on the RDBMS which will process them. The syntax of request to a storage procedure must be started with `call` keyword.

#### Error messages

ODBC error messages are structured into fields to provide detailed information. For example, an error message might look like this:

```
Cannot execute ODBC query: [SQL_ERROR]:[42601][7][ERROR: syntax error at or near ";"; Error while executing
```

- "Cannot execute ODBC query" - Zabbix message
- "[SQL\_ERROR]" - ODBC return code
- "[42601]" - SQLState
- "[7]" - Native error code
- "[ERROR: syntax error at or near ";"; Error while executing the query]" - Native error message

Note that the error message length is limited to 2048 bytes, so the message can be truncated. If there is more than one ODBC diagnostic record Zabbix tries to concatenate them (separated with `|`) as far as the length limit allows.

#### 1 Recommended UnixODBC settings for MySQL

#### Installation

- Red Hat Enterprise Linux:**

```
dnf install mariadb-connector-odbc
```

- Debian/Ubuntu:**

Please refer to [MySQL documentation](#) (for `mysql-connector-odbc`), or [MariaDB documentation](#) (for `mariadb-connector-odbc`) to download necessary database driver for the corresponding platform.

For some additional information please refer to: [installing unixODBC](#).

#### Configuration

ODBC configuration is done by editing **odbcinst.ini** and **odbc.ini** files. These configuration files can be found in `/etc` folder. The file **odbcinst.ini** may be missing and in this case it is necessary to create it manually.

#### **odbcinst.ini**

```
[mysql]
Description = General ODBC for MySQL
Driver      = /usr/lib64/libmyodbc5.so
Setup       = /usr/lib64/libodbcmyS.so
FileUsage   = 1
```

Please consider the following examples of **odbc.ini** configuration parameters.

- An example with a connection through an IP:

```
[TEST_MYSQL]
Description = MySQL database 1
Driver      = mysql
Port        = 3306
Server      = 127.0.0.1
```

- An example with a connection through an IP and with the use of credentials. A Zabbix database is used by default:

```
[TEST_MYSQL_FILLED_CRED]
Description = MySQL database 2
Driver      = mysql
User        = root
Port        = 3306
Password    = zabbix
Database    = zabbix
Server      = 127.0.0.1
```

- An example with a connection through a socket and with the use of credentials. A Zabbix database is used by default:

```
[TEST_MYSQL_FILLED_CRED_SOCKET]
Description = MySQL database 3
Driver      = mysql
User        = root
Password    = zabbix
Socket      = /var/run/mysqld/mysqld.sock
Database    = zabbix
```

All other possible configuration parameter options can be found in [MySQL official documentation](#) web page.

## 2 Recommended UnixODBC settings for PostgreSQL

### Installation

- **Red Hat Enterprise Linux:**

```
dnf install postgresql-odbc
```

- **Debian/Ubuntu:**

Please refer to [PostgreSQL documentation](#) to download necessary database driver for the corresponding platform.

For some additional information please refer to: [installing unixODBC](#).

### Configuration

ODBC configuration is done by editing the **odbcinst.ini** and **odbc.ini** files. These configuration files can be found in */etc* folder. The file **odbcinst.ini** may be missing and in this case it is necessary to create it manually.

Please consider the following examples:

#### **odbcinst.ini**

```
[postgresql]
Description = General ODBC for PostgreSQL
Driver      = /usr/lib64/libodbcpsql.so
Setup       = /usr/lib64/libodbcpsqlS.so
FileUsage   = 1
# Since 1.6 if the driver manager was built with thread support you may add another entry to each driver e
# This entry alters the default thread serialization level.
Threading   = 2
```

## odbc.ini

```
[TEST_PSQL]
Description = PostgreSQL database 1
Driver      = postgresql
#CommLog    = /tmp/sql.log
Username    = zbx_test
Password    = zabbix
# Name of Server. IP or DNS
Servername  = 127.0.0.1
# Database name
Database    = zabbix
# Postmaster listening port
Port        = 5432
# Database is read only
# Whether the datasource will allow updates.
ReadOnly    = No
# PostgreSQL backend protocol
# Note that when using SSL connections this setting is ignored.
# 7.4+: Use the 7.4(V3) protocol. This is only compatible with 7.4 and higher backends.
Protocol    = 7.4+
# Includes the OID in SQLColumns
ShowOidColumn = No
# Fakes a unique index on OID
FakeOidIndex  = No
# Row Versioning
# Allows applications to detect whether data has been modified by other users
# while you are attempting to update a row.
# It also speeds the update process since every single column does not need to be specified in the where clause.
RowVersioning = No
# Show SystemTables
# The driver will treat system tables as regular tables in SQLTables. This is good for Access so you can see them.
ShowSystemTables = No
# If true, the driver automatically uses declare cursor/fetch to handle SELECT statements and keeps 100 rows in cache.
Fetch       = Yes
# Booleans as Char
# Booleans are mapped to SQL_CHAR, otherwise to SQL_BIT.
BooleansAsChar = Yes
# SSL mode
SSLmode     = Require
# Send to backend on connection
ConnSettings =

3 Recommended UnixODBC settings for Oracle
```

## Installation

Please refer to [Oracle documentation](#) for all the necessary instructions.

For some additional information please refer to: [Installing unixODBC](#).

## 4 Recommended UnixODBC settings for MSSQL

## Installation

- **Red Hat Enterprise Linux** ([EPEL](#) packages):

```
dnf install epel-release
dnf install freetds
```

- **Debian/Ubuntu:**

Please refer to [FreeTDS user guide](#) to download necessary database driver for the corresponding platform.



For some additional information please refer to: [installing unixODBC](#).

## Configuration

ODBC configuration is done by editing the **odbcinst.ini** and **odbc.ini** files. These configuration files can be found in */etc* folder. The file **odbcinst.ini** may be missing and in this case it is necessary to create it manually.

Please consider the following examples:

### **odbcinst.ini**

```
vi /etc/odbcinst.ini
[FreeTDS]
Driver = /usr/lib64/libtdsodbc.so.0
```

### **odbc.ini**

```
vi /etc/odbc.ini
[sql1]
Driver = FreeTDS
Server = <SQL server 1 IP>
PORT = 1433
TDS_Version = 8.0
```

## 15 Dependent items

### Overview

There are situations when one item gathers multiple metrics at a time or it even makes more sense to collect related metrics simultaneously, for example:

- CPU utilization of individual cores
- Incoming/outgoing/total network traffic

To allow for bulk metric collection and simultaneous use in several related items, Zabbix supports dependent items. Dependent items depend on the master item that collects their data simultaneously, in one query. A new value for the master item automatically populates the values of the dependent items. Dependent items cannot have a different update interval than the master item.

Zabbix preprocessing options can be used to extract the part that is needed for the dependent item from the master item data.

Preprocessing is managed by a `preprocessing manager` process, which has been added in Zabbix 3.4, along with workers that perform the preprocessing steps. All values (with or without preprocessing) from different data gatherers pass through the preprocessing manager before being added to the history cache. Socket-based IPC communication is used between data gatherers (pollers, trappers, etc) and the preprocessing process.

Zabbix server or Zabbix proxy (if host is monitored by proxy) are performing preprocessing steps and processing dependent items.

Item of any type, even dependent item, can be set as master item. Additional levels of dependent items can be used to extract smaller parts from the value of an existing dependent item.

### Limitations

- Only same host (template) dependencies are allowed
- An item prototype can depend on another item prototype or regular item from the same host
- Maximum count of dependent items for one master item is limited to 29999 (regardless of the number of dependency levels)
- Maximum 3 dependency levels allowed
- Dependent item on a host with master item from template will not be exported to XML

### Item configuration

A dependent item depends on its master item for data. That is why the **master item** must be configured (or exist) first:

- Go to: *Configuration* → *Hosts*
- Click on *Items* in the row of the host
- Click on *Create item*
- Enter parameters of the item in the form

Item
Tags
Preprocessing

\*

Name

Apache server status

Type

Zabbix agent

\*

Key

web.page.get[127.0.0.1/server-status]

Type of information

Text

\*

Host interface

127.0.0.1:1050

\*

Update interval

30s

All mandatory input fields are marked with a red asterisk.

Click on *Add* to save the master item.

Then you can configure a **dependent item**.

Item
Tags
Preprocessing

\*

Name

Apache server uptime

Type

Dependent item

\*

Key

apache.server.uptime

Type of information

Text

\*

Master item

Apache: Apache server status

All mandatory input fields are marked with a red asterisk.

The fields that require specific information for dependent items are:

|                     |   |
|---------------------|---|
| Type                | Select <b>Dependent item</b> here.  |
| Key                 | Enter a key that will be used to recognize the item.  |
| Master item         | Select the master item. Master item value will be used to populate dependent item value.    |
| Type of information | Select the type of information that will correspond the format of data that will be stored. |

You may use item value **preprocessing** to extract the required part of the master item value.

Item
Tags
Preprocessing 1

Preprocessing steps

Name

Parameters

1:

Regular expression

<dt>Server uptime: (.\*)</dt>

1

Add

Type of information

Text

Add

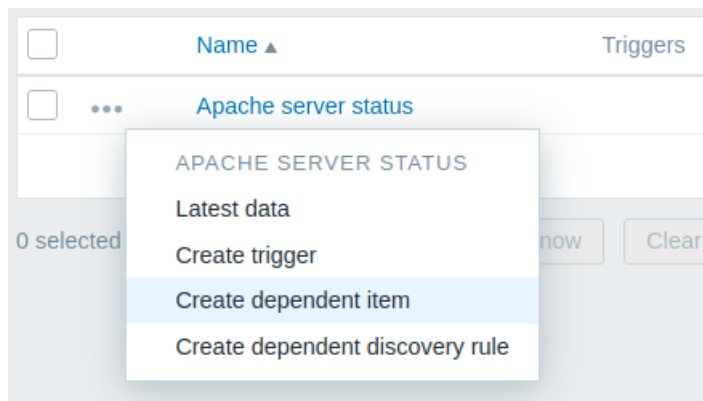
Test

Cancel

Without preprocessing, the dependent item value will be exactly the same as the master item value.

Click on *Add* to save the dependent item.

A shortcut to creating a dependent item quicker can be accessed by clicking on the **...** button in the item list and selecting *Create dependent item*.



## Display

In the item list dependent items are displayed with their master item name as prefix.

| <input type="checkbox"/> | Name ▲   | Triggers | Key                                   |
|--------------------------|--|----------|---------------------------------------|
| <input type="checkbox"/> | ... Apache server status                       |          | web.page.get[127.0.0.1/server-status] |
| <input type="checkbox"/> | ... Apache server status: Apache server uptime |          | apache.server.uptime                  |

If a master item is deleted, so are all its dependent items.

## 16 HTTP agent

### Overview

This item type allows data polling using the HTTP/HTTPS protocol. Trapping is also possible using Zabbix sender or Zabbix sender protocol.

HTTP item check is executed by Zabbix server. However, when hosts are monitored by a Zabbix proxy, HTTP item checks are executed by the proxy.

HTTP item checks do not require any agent running on a host being monitored.

HTTP agent supports both HTTP and HTTPS. Zabbix will optionally follow redirects (see the *Follow redirects* option below). Maximum number of redirects is hard-coded to 10 (using cURL option CURLOPT\_MAXREDIRS).

### Attention:

Zabbix server/proxy must be initially configured with cURL (libcurl) support.

### Configuration

To configure an HTTP item:

- Go to: *Configuration* → *Hosts*
- Click on *Items* in the row of the host
- Click on *Create item*
- Enter parameters of the item in the form

Item

Tags

Preprocessing

Name

HTTP agent item

Type

HTTP agent

Key

http\_value\_search

Type of information

Numeric (unsigned)

URL

http://localhost:5200/in/values/\_search

Query fields

Name

scroll

→

10s

Add

Request type

POST

Timeout

3s

Request body type

Raw data

JSON data

XML data

Request body

```
{
  "query": {
    "bool": {
      "must": [
        "term": {
          "itemid": "28275"
        }
      ]
    }
  }
}
```

Headers

Name

name

→

value

Add

Required status codes

200

Follow redirects

☒

Retrieve mode

Body

Headers

Body and headers

Convert to JSON

☐

HTTP proxy

localhost:8080 (username:password@example.com:port)

HTTP authentication

None

SSL verify peer

☐

SSL verify host

☐

SSL certificate file

SSL key file

SSL key password

Host interface

127.0.0.1:9550

Units

Update interval

1m

Custom intervals

Type

Interval

10m

Add

History storage period

Do not keep history

Storage period

90d

Trend storage period

Do not keep trends

Storage period

365d

Value mapping

Type here to search

Enable trapping

☐

Populates host inventory field

None

Description

Enabled

☒

Add

Test

Cancel

All mandatory input fields are marked with a red asterisk.

The fields that require specific information for HTTP items are:

| Parameter           | Description   |
|---------------------|---|
| <i>Type</i>         | Select <b>HTTP agent</b> here.  |
| <i>Key</i>          | Enter a unique item key.  |
| <i>URL</i>          | <p>URL to connect to and retrieve data. For example:</p> <p>https://www.example.com</p> <p>http://www.example.com/download</p> <p>Domain names can be specified in Unicode characters. They are automatically punycode-converted to ASCII when executing the HTTP check.</p> <p>The <i>Parse</i> button can be used to separate optional query fields (like ?name=Admin&amp;password=mypassword) from the URL, moving the attributes and values into <i>Query fields</i> for automatic URL-encoding.</p> <p>Limited to 2048 characters.</p> <p>Supported macros: {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG}, user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_URL</a> CURL option.</p> |
| <i>Query fields</i> | <p>Variables for the URL (see above).</p> <p>Specified as attribute and value pairs.</p> <p>Values are URL-encoded automatically. Values from macros are resolved and then URL-encoded automatically.</p> <p>Supported macros: {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG}, user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_URL</a> CURL option.</p>   |
| <i>Request type</i> | Select request method type: <i>GET</i> , <i>POST</i> , <i>PUT</i> or <i>HEAD</i>  |

| Parameter                    | Description   |
|------------------------------|---|
| <i>Timeout</i>               | <p>Zabbix will not spend more than the set amount of time on processing the URL (1-60 seconds). Actually this parameter defines the maximum time for making a connection to the URL and maximum time for performing an HTTP request. Therefore, Zabbix will not spend more than 2 x Timeout seconds on one check.</p> <p>Time suffixes are supported, e.g. 30s, 1m.</p> <p>Supported macros: user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_TIMEOUT</a> cURL option.</p>   |
| <i>Request body type</i>     | <p>Select the request body type:</p> <p><b>Raw data</b> - custom HTTP request body, macros are substituted but no encoding is performed</p> <p><b>JSON data</b> - HTTP request body in JSON format. Macros can be used as string, number, true and false; macros used as strings must be enclosed in double quotes. Values from macros are resolved and then escaped automatically. If "Content-Type" is not specified in headers then it will default to "Content-Type: application/json"</p> <p><b>XML data</b> - HTTP request body in XML format. Macros can be used as a text node, attribute or CDATA section. Values from macros are resolved and then escaped automatically in a text node and attribute. If "Content-Type" is not specified in headers then it will default to "Content-Type: application/xml"</p> <p><i>Note that selecting XML data requires libxml2.</i></p> |
| <i>Request body</i>          | <p>Enter the request body.</p> <p>Supported macros: {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG}, user macros, low-level discovery macros.</p>  |
| <i>Headers</i>               | <p>Custom HTTP headers that will be sent when performing a request.</p> <p>Specified as attribute and value pairs.</p> <p>Supported macros: {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG}, user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_HTTPHEADER</a> cURL option.</p>   |
| <i>Required status codes</i> | <p>List of expected HTTP status codes. If Zabbix gets a code which is not in the list, the item will become unsupported. If empty, no check is performed.</p> <p>For example: 200,201,210-299</p> <p>Supported macros in the list: user macros, low-level discovery macros.</p> <p>This uses the <a href="#">CURLINFO_RESPONSE_CODE</a> cURL option.</p>  |
| <i>Follow redirects</i>      | <p>Mark the checkbox to follow HTTP redirects.</p>  |
| <i>Retrieve mode</i>         | <p>This sets the <a href="#">CURLOPT_FOLLOWLOCATION</a> cURL option.</p> <p>Select the part of response that must be retrieved:</p> <p><b>Body</b> - body only</p> <p><b>Headers</b> - headers only</p> <p><b>Body and headers</b> - body and headers</p>   |
| <i>Convert to JSON</i>       | <p>Headers are saved as attribute and value pairs under the "header" key.</p> <p>If 'Content-Type: application/json' is encountered then body is saved as an object, otherwise it is stored as string, for example:</p> <pre>{   "header": {     "&lt;key&gt;": "&lt;value&gt;",     "&lt;key2&gt;": "&lt;value&gt;"   },   "body": &lt;body&gt; }</pre>  |

| Parameter                   | Description   |
|-----------------------------|---|
| <i>HTTP proxy</i>           | <p>You can specify an HTTP proxy to use, using the format <code>[protocol://][username[:password]@]proxy.example.com[:port]</code>.</p> <p>The optional <code>protocol://</code> prefix may be used to specify alternative proxy protocols (e.g. <code>https</code>, <code>socks4</code>, <code>socks5</code>; see <a href="#">documentation</a>; the protocol prefix support was added in cURL 7.21.7). With no protocol specified, the proxy will be treated as an HTTP proxy. If you specify the wrong protocol, the connection will fail and the item will become unsupported.</p> <p>By default, 1080 port will be used.</p> <p>If specified, the proxy will overwrite proxy related environment variables like <code>http_proxy</code>, <code>HTTPS_PROXY</code>. If not specified, the proxy will not overwrite proxy-related environment variables.</p> <p>The entered value is passed on "as is", no sanity checking takes place.</p> <p><i>Note</i> that only simple authentication is supported with HTTP proxy.</p> <p>Supported macros: <code>{HOST.IP}</code>, <code>{HOST.CONN}</code>, <code>{HOST.DNS}</code>, <code>{HOST.HOST}</code>, <code>{HOST.NAME}</code>, <code>{ITEM.ID}</code>, <code>{ITEM.KEY}</code>, <code>{ITEM.KEY.ORIG}</code>, user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_PROXY</a> cURL option.</p> |
| <i>HTTP authentication</i>  | <p>Authentication type:</p> <p><b>None</b> - no authentication used.</p> <p><b>Basic</b> - basic authentication is used.</p> <p><b>NTLM</b> - NTLM (<a href="#">Windows NT LAN Manager</a>) authentication is used.</p> <p><b>Kerberos</b> - Kerberos authentication is used. See also: <a href="#">Configuring Kerberos with Zabbix</a>.</p> <p><b>Digest</b> - Digest authentication is used.</p> <p>Selecting an authentication method will provide two additional fields for entering a user name and password, where user macros and low-level discovery macros are supported.</p> <p>This sets the <a href="#">CURLOPT_HTTPAUTH</a> cURL option.</p>  |
| <i>SSL verify peer</i>      | <p>Mark the checkbox to verify the SSL certificate of the web server. The server certificate will be automatically taken from system-wide certificate authority (CA) location. You can override the location of CA files using Zabbix server or proxy configuration parameter <code>SSLCALocation</code>.</p> <p>This sets the <a href="#">CURLOPT_SSL_VERIFYPEER</a> cURL option.</p>  |
| <i>SSL verify host</i>      | <p>Mark the checkbox to verify that the Common Name field or the Subject Alternate Name field of the web server certificate matches.</p> <p>This sets the <a href="#">CURLOPT_SSL_VERIFYHOST</a> cURL option.</p>   |
| <i>SSL certificate file</i> | <p>Name of the SSL certificate file used for client authentication. The certificate file must be in PEM<sup>1</sup> format. If the certificate file contains also the private key, leave the SSL key file field empty. If the key is encrypted, specify the password in SSL key password field. The directory containing this file is specified by Zabbix server or proxy configuration parameter <code>SSLCertLocation</code>.</p> <p>Supported macros: <code>{HOST.IP}</code>, <code>{HOST.CONN}</code>, <code>{HOST.DNS}</code>, <code>{HOST.HOST}</code>, <code>{HOST.NAME}</code>, <code>{ITEM.ID}</code>, <code>{ITEM.KEY}</code>, <code>{ITEM.KEY.ORIG}</code>, user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_SSLCERT</a> cURL option.</p>   |
| <i>SSL key file</i>         | <p>Name of the SSL private key file used for client authentication. The private key file must be in PEM<sup>1</sup> format. The directory containing this file is specified by Zabbix server or proxy configuration parameter <code>SSLKeyLocation</code>.</p> <p>Supported macros: <code>{HOST.IP}</code>, <code>{HOST.CONN}</code>, <code>{HOST.DNS}</code>, <code>{HOST.HOST}</code>, <code>{HOST.NAME}</code>, <code>{ITEM.ID}</code>, <code>{ITEM.KEY}</code>, <code>{ITEM.KEY.ORIG}</code>, user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_SSLKEY</a> cURL option.</p>   |
| <i>SSL key password</i>     | <p>SSL private key file password.</p> <p>Supported macros: user macros, low-level discovery macros.</p> <p>This sets the <a href="#">CURLOPT_KEYPASSWD</a> cURL option.</p>   |
| <i>Enable trapping</i>      | <p>With this checkbox marked, the item will also function as <b>trapper item</b> and will accept data sent to this item by Zabbix sender or using Zabbix sender protocol.</p>   |
| <i>Allowed hosts</i>        | <p>Visible only if <i>Enable trapping</i> checkbox is marked.</p> <p>List of comma delimited IP addresses, optionally in CIDR notation, or DNS names.</p> <p>If specified, incoming connections will be accepted only from the hosts listed here.</p> <p>If IPv6 support is enabled then <code>'127.0.0.1'</code>, <code>'::127.0.0.1'</code>, <code>'::ffff:127.0.0.1'</code> are treated equally and <code>'::/0'</code> will allow any IPv4 or IPv6 address.</p> <p><code>'0.0.0.0/0'</code> can be used to allow any IPv4 address.</p> <p><i>Note</i> that "IPv4-compatible IPv6 addresses" (0000::&lt;96 prefix) are supported but deprecated by <a href="#">RFC4291</a>.</p> <p>Example: <code>127.0.0.1, 192.168.1.0/24, 192.168.3.1-255, 192.168.1-10.1-255, ::1, 2001:db8::/32, mysqlserver1, zabbix.example.com, {HOST.HOST}</code></p> <p>Spaces and <b>user macros</b> are allowed in this field.</p> <p>Host macros: <code>{HOST.HOST}</code>, <code>{HOST.NAME}</code>, <code>{HOST.IP}</code>, <code>{HOST.DNS}</code>, <code>{HOST.CONN}</code> are allowed in this field.</p>  |

**Note:**

If the *HTTP proxy* field is left empty, another way for using an HTTP proxy is to set proxy-related environment variables. For HTTP - set the `http_proxy` environment variable for the Zabbix server user. For example:  
`http_proxy=http://proxy_ip:proxy_port`.  
 For HTTPS - set the `HTTPS_PROXY` environment variable. For example:  
`HTTPS_PROXY=http://proxy_ip:proxy_port`. More details are available by running a shell command: `# man curl`.

**Attention:**

[1] Zabbix supports certificate and private key files in PEM format only. In case you have your certificate and private key data in PKCS #12 format file (usually with extension \*.p12 or \*.pfx) you may generate the PEM file from it using the following commands:

```
openssl pkcs12 -in ssl-cert.p12 -clcerts -nokeys -out ssl-cert.pem
openssl pkcs12 -in ssl-cert.p12 -nocerts -nodes -out ssl-cert.key
```

**Examples****Example 1**

Send simple GET requests to retrieve data from services such as Elasticsearch:

- Create a GET item with URL: `localhost:9200/?pretty`
- Notice the response:

```
{
  "name" : "YQ2VAY-",
  "cluster_name" : "elasticsearch",
  "cluster_uuid" : "kH4CYqh5QfqgeTsjh2F9zg",
  "version" : {
    "number" : "6.1.3",
    "build_hash" : "af51318",
    "build_date" : "2018-01-26T18:22:55.523Z",
    "build_snapshot" : false,
    "lucene_version" : "7.1.0",
    "minimum_wire_compatibility_version" : "5.6.0",
    "minimum_index_compatibility_version" : "5.0.0"
  },
  "tagline" : "You know, for search"
}
```

- Now extract the version number using a JSONPath preprocessing step: `$.version.number`

**Example 2**

Send simple POST requests to retrieve data from services such as Elasticsearch:

- Create a POST item with URL: `http://localhost:9200/str/values/_search?scroll=10s`
- Configure the following POST body to obtain the processor load (1 min average per core)

```
{
  "query": {
    "bool": {
      "must": [{
        "match": {
          "itemid": 28275
        }
      }],
      "filter": [{
        "range": {
          "clock": {
            "gt": 1517565836,
            "lte": 1517566137
          }
        }
      }]
    }
  }
}
```

```

}

• Received:

{
  "_scroll_id": "DnF1ZXJ5VGhlbkZldGNoBQAAAAAAAAAAkF1lRMlZBWS1UU1pxTmdEeGVwQjRBTfEAAAAAAAAAAJRZZUTJWQVktVFN",
  "took": 18,
  "timed_out": false,
  "_shards": {
    "total": 5,
    "successful": 5,
    "skipped": 0,
    "failed": 0
  },
  "hits": {
    "total": 1,
    "max_score": 1.0,
    "hits": [{
      "_index": "dbl",
      "_type": "values",
      "_id": "dqX9VWEBV6sEKSMYk6sw",
      "_score": 1.0,
      "_source": {
        "itemid": 28275,
        "value": "0.138750",
        "clock": 1517566136,
        "ns": 25388713,
        "ttl": 604800
      }
    }]
  }
}

```

- Now use a JSONPath preprocessing step to get the item value: `$.hits.hits[0]._source.value`

### Example 3

Checking if Zabbix API is alive, using [apiinfo.version](#).

- Item configuration:





Host groups
Select

Name

Hosts
Select

Show items without data
☐

Application
Select

Show details
☐

Apply
Reset

| <input type="checkbox"/> Host          | Name ▲                   | Last check          | Last value | Change                |
|--|--------------------------|---------------------|------------|-----------------------|
| <input type="checkbox"/> Zabbix server | - other - (1 Item)       |                     |            |                       |
| <input type="checkbox"/>               | Check Zabbix API version | 2018-05-16 23:50:34 | OK (200)   | <a href="#">Graph</a> |

#### Example 4

Retrieving weather information by connecting to the Openweathermap public service.

- Configure a master item for bulk data collection in a single JSON:

Item
Tags
Preprocessing

\* Name

Type

\* Key

Type of information

\* URL

Query fields

| Name  | Value                |
|-------|----------------------|
| units | metric               |
| lat   | { \$LAT }            |
| lon   | { \$LON }            |
| APPID | { \$WEATHER_APIKEY } |
| lang  | { \$WEATHER_LANG }   |

Add

Request type

\* Timeout

Request body type

Request body

Note the usage of macros in query fields. Refer to the [Openweathermap API](#) for how to fill them.

Sample JSON returned in response to HTTP agent:

```
{
  "body": {
    "coord": {
      "lon": 40.01,
```

```

    "lat": 56.11
  },
  "weather": [{
    "id": 801,
    "main": "Clouds",
    "description": "few clouds",
    "icon": "02n"
  }],
  "base": "stations",
  "main": {
    "temp": 15.14,
    "pressure": 1012.6,
    "humidity": 66,
    "temp_min": 15.14,
    "temp_max": 15.14,
    "sea_level": 1030.91,
    "grnd_level": 1012.6
  },
  "wind": {
    "speed": 1.86,
    "deg": 246.001
  },
  "clouds": {
    "all": 20
  },
  "dt": 1526509427,
  "sys": {
    "message": 0.0035,
    "country": "RU",
    "sunrise": 1526432608,
    "sunset": 1526491828
  },
  "id": 487837,
  "name": "Stavrovo",
  "cod": 200
}
}

```

The next task is to configure dependent items that extract data from the JSON.

- Configure a sample dependent item for humidity:

| Item | Tags | Preprocessing  |
|------|------|--|
|      |      | <p><b>* Name</b> <input type="text" value="Humidity"/></p> <p><b>Type</b> <input type="text" value="Dependent item"/></p> <p><b>* Key</b> <input type="text" value="humidity"/></p> <p><b>Type of information</b> <input type="text" value="Numeric (float)"/></p> <p><b>* Master item</b> <input type="text" value="Apache: Get weather"/></p> <p><b>Units</b> <input type="text"/></p> |

Other weather metrics such as 'Temperature' are added in the same manner.

- Sample dependent item value preprocessing with JSONPath:

Item
Tags
Preprocessing 1

Preprocessing steps

1:

JSONPath

▼

\$.body.main.humidity

Add

- Check the result of weather data in *Latest data*:

| ▼ <input type="checkbox"/> Host    | Name ▲  | Inter... | History | Trends | Type       | Last check          | Last value                     |
|------------------------------------|---|----------|---------|--------|------------|---------------------|--------------------------------|
| ▼ <input type="checkbox"/> weather | Weather (8 Items)   |          |         |        |            |                     |                                |
| <input type="checkbox"/>           | Get weather<br><a href="#">get_weather.http</a>                         | 10m      | 1d      |        | HTTP agent | 2018-05-17 01:23:45 | { "body": { "coord": { "lon... |
| <input type="checkbox"/>           | Get weather HTTP response code<br><a href="#">get_weather.http_code</a> |          | 7d      | 0      | Depende... | 2018-05-17 01:23:45 | OK (200)                       |
| <input type="checkbox"/>           | Humidity<br><a href="#">humidity</a>                                    |          | 90d     | 365d   | Depende... | 2018-05-17 01:23:45 | 66 %                           |
| <input type="checkbox"/>           | Temperature<br><a href="#">temp</a>                                     |          | 90d     | 365d   | Depende... | 2018-05-17 01:23:45 | 15.14 C                        |
| <input type="checkbox"/>           | Weather<br><a href="#">weather</a>                                      |          | 90d     |        | Depende... | 2018-05-17 01:23:45 | Clouds                         |
| <input type="checkbox"/>           | Weather condition id<br><a href="#">weather.condition.id</a>            |          | 7d      | 0      | Depende... | 2018-05-17 01:23:45 | 801                            |
| <input type="checkbox"/>           | Weather description<br><a href="#">weather.description</a>              |          | 90d     |        | Depende... | 2018-05-17 01:23:45 | few clouds                     |
| <input type="checkbox"/>           | Wind speed<br><a href="#">wind_speed</a>                                |          | 90d     | 365d   | Depende... | 2018-05-17 01:23:45 | 1.86 m/s                       |

#### Example 5

Connecting to Nginx status page and getting its metrics in bulk.

- Configure Nginx following the [official guide](#).
- Configure a master item for bulk data collection:

Item
Tags
Preprocessing

\* Name

Nginx: Get stub status page

Type

HTTP agent ▼

\* Key

nginx.get\_stub\_status

Type of information

Text ▼

\* URL

http://{HOST.CONN}/nginx\_status

Query fields

Name

Value

name

⇒

value

Add

Request type

GET ▼

\* Timeout

3s

Request body type

Raw data
JSON data
XML data

Sample Nginx stub status output:

Active connections: 1 Active connections:  
 server accepts handled requests  
 52 52 52  
 Reading: 0 Writing: 1 Waiting: 0

The next task is to configure dependent items that extract data.

- Configure a sample dependent item for requests per second:

The screenshot shows the Zabbix item configuration interface. The 'Preprocessing' tab is active. The configuration is as follows:

- Name:** Client requests per second
- Type:** Dependent item
- Key:** nginx\_requests\_rps
- Type of information:** Numeric (unsigned)
- Master item:** Nginx by HTTP: Nginx: Get stub status page

- Sample dependent item value preprocessing with regular expression `server accepts handled requests\s+([0-9]+) ([0-9]+) ([0-9]+)`:

The screenshot shows the 'Preprocessing steps' configuration for the item. It lists two steps:

- Step 1:** Regular expression. Parameters: `requests\s+([0-9]+) ([0-9]+) ([0-9]+)`. The result of the expression is shown as `\3`.
- Step 2:** Change per second.

An 'Add' button is visible at the bottom of the list.

- Check the complete result from stub module in *Latest data*:

| <input type="checkbox"/> Host             | Name ▲                         | Last check          | Last value            |
|---|--------------------------------|---------------------|-----------------------|
| <input checked="" type="checkbox"/> nginx | <b>Nginx (8 Items)</b>         |                     |                       |
| <input type="checkbox"/>                  | Accepted client connections    | 2018-05-18 17:54:53 | 568                   |
| <input type="checkbox"/>                  | Active connections             | 2018-05-18 17:54:53 | 1                     |
| <input type="checkbox"/>                  | Client requests per second     | 2018-05-18 17:54:53 | 0 rps                 |
| <input checked="" type="checkbox"/>       | Get Nginx stub status          | 2018-05-18 17:54:53 | HTTP/1.1 200 OK Se... |
| <input type="checkbox"/>                  | Handled connections per second | 2018-05-18 17:54:53 | 0                     |
| <input type="checkbox"/>                  | Reading                        | 2018-05-18 17:54:53 | 0                     |
| <input type="checkbox"/>                  | Waiting                        | 2018-05-18 17:54:53 | 0                     |
| <input type="checkbox"/>                  | Writing                        | 2018-05-18 17:54:53 | 1                     |

## 17 Prometheus checks

### Overview

Zabbix can query metrics exposed in the Prometheus line format.

Two steps are required to start gathering Prometheus data:

- an **HTTP master item** pointing to the appropriate data endpoint, e.g. `https://<prometheus host>/metrics`
- dependent items using a Prometheus preprocessing option to query required data from the metrics gathered by the master item

There are two Prometheus data preprocessing options:

- *Prometheus pattern* - used in normal items to query Prometheus data

- *Prometheus to JSON* - used in normal items and for low-level discovery. In this case queried Prometheus data are returned in a JSON format.

## Bulk processing

Bulk processing is supported for dependent items. To enable caching and indexing, the *Prometheus pattern* preprocessing must be the **first** preprocessing step. When *Prometheus pattern* is first preprocessing step then the parsed Prometheus data is cached and indexed by the first `<label>==<value>` condition in the *Prometheus pattern* preprocessing step. This cache is reused when processing other dependent items in this batch. For optimal performance, the first label should be the one with most different values.

If there is other preprocessing to be done before the first step, it should be moved either to the master item or to a new dependent item which would be used as the master item for the dependent items.

## Configuration

Providing you have the HTTP master item configured, you need to create a **dependent item** that uses a Prometheus preprocessing step:

- Enter general dependent item parameters in the configuration form
- Go to the Preprocessing tab
- Select a Prometheus preprocessing option (*Prometheus pattern* or *Prometheus to JSON*)

The following parameters are specific to the *Prometheus pattern* preprocessing option:

| Parameter      | Description  | Examples   |
|----------------|--|--|
| <i>Pattern</i> | <p>To define the required data pattern you may use a query language that is similar to Prometheus query language (see <a href="#">comparison table</a>), e.g.:</p> <p><code>&lt;metric name&gt;</code> - select by metric name</p> <p><code>{__name__="&lt;metric name&gt;"}</code> - select by metric name</p> <p><code>{__name__=~"&lt;regex&gt;"}</code> - select by metric name matching a regular expression</p> <p><code>{&lt;label name&gt;="&lt;label value&gt;","..."}</code> - select by label name</p> <p><code>{&lt;label name&gt;=~"&lt;regex&gt;","..."}</code> - select by label name matching a regular expression</p> <p><code>{__name__=~".*" }==&lt;value&gt;</code> - select by metric value</p> <p>Or a combination of the above:</p> <p><code>&lt;metric name&gt;{&lt;label1 name&gt;="&lt;label1 value&gt;",&lt;label2 name&gt;=~"&lt;regex&gt;","..." }==&lt;value&gt;</code></p> <p>Label value can be any sequence of UTF-8 characters, but the backslash, double-quote and line feed characters have to be escaped as <code>\\</code>, <code>\"</code> and <code>\n</code> respectively; other characters shall not be escaped.</p> | <pre>wmi_os_physical_memory_free_bytes cpu_usage_system{cpu="cpu-total"} cpu_usage_system{cpu=~".*"} cpu_usage_system{cpu="cpu-total",host=~".*"} wmi_service_state{name="dhcp"}==1 wmi_os_timezone{timezone=~".*"}==1</pre> |

| Parameter                | Description   | Examples                                     |
|--------------------------|---|--|
| <i>Result processing</i> | Specify whether to return the value, the label or apply the appropriate function (if the pattern matches several lines and the result needs to be aggregated):<br><b>value</b> - return metric value (error if multiple lines matched)<br><b>label</b> - return value of the label specified in the <i>Label</i> field (error if multiple metrics are matched)<br><b>sum</b> - return the sum of values<br><b>min</b> - return the minimum value<br><b>max</b> - return the maximum value<br><b>avg</b> - return the average value<br><b>count</b> - return the count of values<br>This field is only available for the <i>Prometheus pattern</i> option. | See also examples of using parameters below. |
| <i>Output</i>            | Define label name (optional). In this case the value corresponding to the label name is returned.<br>This field is only available for the <i>Prometheus pattern</i> option, if 'Label' is selected in the <i>Result processing</i> field.   |  |

## Examples of using parameters

1. The most common use case is to return the **value**. To return the value of `/var/db` from:

```
node_disk_usage_bytes{path="/var/cache"} 2.1766144e+09<br>node_disk_usage_bytes{path="/var/db"} 20480<br>node_disk_usage_bytes{path="/var/dpkg"} 8192<br>node_disk_usage_bytes{path="/var/empty"} 4096
```

use the following parameters:

- *Pattern* - `node_disk_usage_bytes{path="/var/db"}`
- *Result processing* - select 'value'

2. You may also be interested in the **average** value of all `node_disk_usage_bytes` parameters:

- *Pattern* - `node_disk_usage_bytes`
- *Result processing* - select 'avg'

3. While Prometheus supports only numerical data, it is popular to use a workaround that allows to return the relevant textual description as well. This can be accomplished with a filter and specifying the label. So, to return the value of the 'color' label from

```
elasticsearch_cluster_health_status{cluster="elasticsearch",color="green"} 1<br>elasticsearch_cluster_health_status{cluster="elasticsearch",color="yellow"} 0
```

use the following parameters:

- *Pattern* - `elasticsearch_cluster_health_status {cluster="elasticsearch"} == 1`
- *Result processing* - select 'label'
- *Label* - specify 'color'

The filter (based on the numeric value '1') will match the appropriate row, while the label will return the health status description (currently 'green'; but potentially also 'red' or 'yellow').

Prometheus to JSON

Data from Prometheus can be used for low-level discovery. In this case data in JSON format are needed and the *Prometheus to JSON* preprocessing option will return exactly that.

For more details, see [Discovery using Prometheus data](#).

Query language comparison

The following table lists differences and similarities between PromQL and Zabbix Prometheus preprocessing query language.

| PromQL instant vector selector | Zabbix Prometheus preprocessing |
|--------------------------------|---------------------------------|
| <b>Differences</b>             |                                 |

| PromQL instant vector selector                                  |  | Zabbix Prometheus preprocessing  |
|---|--|--|
| Query target  | Prometheus server                              | Plain text in Prometheus exposition format   |
| Returns   | Instant vector                                 | Metric or label value (Prometheus pattern)<br>Array of metrics for single value in JSON (Prometheus to JSON) |
| Label matching operators  | =, !=, =~, !~                                  | =, !=, =~, !~  |
| Regular expression used in label or metric name matching        | RE2  | PCRE   |
| Comparison operators  | See <a href="#">list</a>                       | Only == (equal) is supported for value filtering   |
| <b>Similarities</b>   |  |  |
| Selecting by metric name that equals string                     | <metric name> or<br>{__name__="<metric name>"} | <metric name> or<br>{__name__="<metric name>"}   |
| Selecting by metric name that matches regular expression        | {__name__=~"<regex>"}                          | {__name__=~"<regex>"}  |
| Selecting by <label name> value that equals string              | {<label name>="<label value>","...}"}          | {<label name>="<label value>","...}"}  |
| Selecting by <label name> value that matches regular expression | {<label name>=~"<regex>","...}"}               | {<label name>=~"<regex>","...}"}   |
| Selecting by value that equals string                           | {__name__=~".*"} == <value>                    | {__name__=~".*"} == <value>  |

## 18 Script items

### Overview

Script items can be used to collect data by executing a user-defined JavaScript code with the ability to retrieve data over HTTP/HTTPS. In addition to the script, an optional list of parameters (pairs of name and value) and timeout can be specified.

This item type may be useful in data collection scenarios that require multiple steps or complex logic. As an example, a Script item can be configured to make an HTTP call, then process the data received in the first step in some way, and pass transformed value to the second HTTP call.

Script items are processed by Zabbix server or proxy pollers.

### Configuration

In the *Type* field of **item configuration form** select Script then fill out required fields.

Item

Tags

Preprocessing

\* Name

Data collector script

Type

Script

\* Key

script.data.collector

Type of information

Text

Parameters

| Name     | Value        | Action |
|----------|--------------|--------|
| host     | {HOST.CONN}  | Remove |
| endpoint | {\$ENDPOINT} | Remove |
| Add      |              |        |

\* Script

var request = new HttpRequest();...

\* Timeout

3s

All mandatory input fields are marked with a red asterisk.

The fields that require specific information for Script items are:



| Field      | Description   |
|------------|---|
| Key        | Enter a unique key that will be used to identify the item.  |
| Parameters | Specify the variables to be passed to the script as the attribute and value pairs.<br><b>Built-in macros</b> {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.IP}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}, {ITEM.KEY.ORIG} and <b>user macros</b> are supported.   |
| Script     | Enter JavaScript code in the block that appears when clicking in the parameter field (or on the view/edit button next to it). This code must provide the logic for returning the metric value.<br>The code has access to all parameters, it may perform HTTP GET, POST, PUT and DELETE requests and has control over HTTP headers and request body.<br>See also: <a href="#">Additional JavaScript objects</a> , <a href="#">JavaScript Guide</a> . |
| Timeout    | JavaScript execution timeout (1-60s, default 3s); exceeding it will return error.<br>Time suffixes are supported, e.g. 30s, 1m.<br>Depending on the script it might take longer for the timeout to trigger.   |

## Examples

### Simple data collection

Collect the content of [https://www.example.com/release\\_notes](https://www.example.com/release_notes):

- Create an item with type "Script".
- In the *Script* field, enter:

```
var request = new HttpRequest();
return request.get("https://www.example.com/release_notes");
```

### Data collection with parameters

Collect the content of a specific page and make use of parameters:

- Create an item with type "Script" and two parameters:
  - **url** : **{ \$DOMAIN }** (the user macro { \$DOMAIN } should be defined, preferably on the host level)
  - **subpage** : **/release\_notes**

Item
Tags
Preprocessing

\* Name

Type

Script

\* Key

Select

Type of information

Text

Parameters

| Name                                 | Value                                       | Action                 |
|--------------------------------------|---|------------------------|
| <input type="text" value="url"/>     | <input type="text" value="{ \$DOMAIN }"/>   | <a href="#">Remove</a> |
| <input type="text" value="subpage"/> | <input type="text" value="/release_notes"/> | <a href="#">Remove</a> |
| <a href="#">Add</a>                  |   |                        |

\* Script

- In the *Script* field, enter:

```
var obj = JSON.parse(value);
var url = obj.url;
var subpage = obj.subpage;
var request = new HttpRequest();
return request.get(url + subpage);
```

### Multiple HTTP requests

Collect the content of both <https://www.example.com> and [https://www.example.com/release\\_notes](https://www.example.com/release_notes):

- Create an item with type "Script".
- In the *Script* field, enter:

```
var request = new HttpRequest();
return request.get("https://www.example.com") + request.get("https://www.example.com/release_notes");
```

#### Logging

Add the "Log test" entry to the Zabbix server log and receive the item value "1" in return:

- Create an item with type "Script".
- In the *Script* field, enter:

```
Zabbix.log(3, 'Log test');
return 1;
```

## 4 History and trends

### Overview

History and trends are the two ways of storing collected data in Zabbix.

Whereas history keeps each collected value, trends keep averaged information on hourly basis and therefore are less resource-hungry.

### Keeping history

You can set for how many days history will be kept:

- in the item properties **form**
- when mass-updating items
- when **setting up** housekeeper tasks

Any older data will be removed by the housekeeper.

The general strong advice is to keep history for the smallest possible number of days and that way not to overload the database with lots of historical values.

Instead of keeping a long history, you can keep longer data of trends. For example, you could keep history for 14 days and trends for 5 years.

You can get a good idea of how much space is required by history versus trends data by referring to the **database sizing page**.

While keeping shorter history, you will still be able to review older data in graphs, as graphs will use trend values for displaying older data.

#### Attention:

If history is set to '0', the item will update only dependent items and inventory. No trigger functions will be evaluated because trigger evaluation is based on history data only.

#### Note:

As an alternative way to preserve history consider to use **history export** functionality of loadable modules.

### Keeping trends

Trends is a built-in historical data reduction mechanism which stores minimum, maximum, average and the total number of values per every hour for numeric data types.

You can set for how many days trends will be kept:

- in the item properties **form**
- when mass-updating items
- when setting up Housekeeper tasks

Trends usually can be kept for much longer than history. Any older data will be removed by the housekeeper.

Zabbix server accumulates trend data in runtime in the trend cache, as the data flows in. Server flushes **previous hour** trends of every item into the database (where frontend can find them) in these situations:

- server receives the first current hour value of the item
- 5 or less minutes of the current hour left and still no current hour values of the item
- server stops

To see trends on a graph you need to wait at least to the beginning of the next hour (if item is updated frequently) and at most to the end of the next hour (if item is updated rarely), which is 2 hours maximum.

When server flushes trend cache and there are already trends in the database for this hour (for example, server has been restarted mid-hour), server needs to use update statements instead of simple inserts. Therefore on a bigger installation if restart is needed it is desirable to stop server in the end of one hour and start in the beginning of the next hour to avoid trend data overlap.

History tables do not participate in trend generation in any way.

**Attention:**

If trends are set to '0', Zabbix server does not calculate or store trends at all.

**Note:**

The trends are calculated and stored with the same data type as the original values. As a result the average value calculations of unsigned data type values are rounded and the less the value interval is the less precise the result will be. For example if item has values 0 and 1, the average value will be 0, not 0.5. Also restarting server might result in the precision loss of unsigned data type average value calculations for the current hour.

## 5 User parameters

### Overview

Sometimes you may want to run an agent check that does not come predefined with Zabbix. This is where user parameters come to help.

You may write a command that retrieves the data you need and include it in the user parameter in the **agent configuration file** ('UserParameter' configuration parameter).

A user parameter has the following syntax:

`UserParameter=<key>,<command>`

As you can see, a user parameter also contains a key. The key will be necessary when configuring an item. Enter a key of your choice that will be easy to reference (it must be unique within a host).

Restart the agent or use the agent **runtime control** option to pick up the new parameter, e. g.:

```
zabbix_agentd -R userparameter_reload
```

Then, when **configuring an item**, enter the key to reference the command from the user parameter you want executed.

User parameters are commands executed by Zabbix agent. Note that up to 16MB of data can be returned before **item value preprocessing** steps.

**/bin/sh** is used as a command line interpreter under UNIX operating systems. User parameters obey the agent check timeout; if timeout is reached the forked user parameter process is terminated.

See also:

- **Step-by-step tutorial** on making use of user parameters
- **Command execution**

### Examples of simple user parameters

A simple command:

```
UserParameter=ping,echo 1
```

The agent will always return '1' for an item with 'ping' key.

A more complex example:

```
UserParameter=mysql.ping,mysqladmin -uroot ping | grep -c alive
```

The agent will return '1', if MySQL server is alive, '0' - otherwise.

### Flexible user parameters

Flexible user parameters accept parameters with the key. This way a flexible user parameter can be the basis for creating several items.

Flexible user parameters have the following syntax:

UserParameter=key[\*],command

| Parameter      | Description  |
|----------------|--|
| <b>Key</b>     | Unique item key. The [*] defines that this key accepts parameters within the brackets. Parameters are given when configuring the item.   |
| <b>Command</b> | Command to be executed to evaluate value of the key.<br><i>For flexible user parameters only:</i><br>You may use positional references \$1...\$9 in the command to refer to the respective parameter in the item key.<br>Zabbix parses the parameters enclosed in [ ] of the item key and substitutes \$1,...,\$9 in the command accordingly.<br>\$0 will be substituted by the original command (prior to expansion of \$0,...,\$9) to be run.<br>Positional references are interpreted regardless of whether they are enclosed between double (") or single (') quotes.<br>To use positional references unaltered, specify a double dollar sign - for example, awk '{print \$\$2}'. In this case \$\$2 will actually turn into \$2 when executing the command. |

**Attention:**

Positional references with the \$ sign are searched for and replaced by Zabbix agent only for flexible user parameters. For simple user parameters, such reference processing is skipped and, therefore, any \$ sign quoting is not necessary.

**Attention:**

Certain symbols are not allowed in user parameters by default. See [UnsafeUserParameters](#) documentation for a full list.

Example 1

Something very simple:

UserParameter=ping[\*],echo \$1

We may define unlimited number of items for monitoring all having format ping[something].

- ping[0] - will always return '0'
- ping[aaa] - will always return 'aaa'

Example 2

Let's add more sense!

UserParameter=mysql.ping[\*],mysqladmin -u\$1 -p\$2 ping | grep -c alive

This parameter can be used for monitoring availability of MySQL database. We can pass user name and password:

mysql.ping[zabbix,our\_password]

Example 3

How many lines matching a regular expression in a file?

UserParameter=wc[\*],grep -c "\$2" \$1

This parameter can be used to calculate number of lines in a file.

wc[/etc/passwd,root]

wc[/etc/services,zabbix]

Command result

The return value of the command is a standard output together with a standard error produced by the command.

**Attention:**

An item that returns text (character, log, or text type of information) will not become unsupported in case of a standard error output.

The return value is limited to 16MB (including trailing whitespace that is truncated); [database limits](#) also apply.

User parameters that return text (character, log, or text type of information) can also return a whitespace. In case of an invalid result, the item will become unsupported.

## 1 Extending Zabbix agents

This tutorial provides step-by-step instructions on how to extend the functionality of Zabbix agent with the use of a [user parameter](#).

### Step 1

Write a script or command line to retrieve required parameter.

For example, we may write the following command in order to get total number of queries executed by a MySQL server:

```
mysqladmin -uroot status | cut -f4 -d":" | cut -f1 -d"S"
```

When executed, the command returns total number of SQL queries.

### Step 2

Add the command to `zabbix_agentd.conf`:

```
UserParameter=mysql.questions,mysqladmin -uroot status | cut -f4 -d":" | cut -f1 -d"S"
```

**mysql.questions** is a unique identifier. It can be any valid key identifier, for example, *queries*.

Test this parameter by using Zabbix agent with `-t` flag (if running under root, however, note that the agent may have different permissions when launched as a daemon):

```
zabbix_agentd -t mysql.questions
```

### Step 3

Reload user parameters from the configuration file by running:

```
zabbix_agentd -R userparameter_reload
```

You may also restart the agent instead of the runtime control command.

Test the parameter by using [zabbix\\_get](#) utility.

### Step 4

Add new item with `Key=mysql.questions` to the monitored host. Type of the item must be either Zabbix Agent or Zabbix Agent (active).

Be aware that type of returned values must be set correctly on Zabbix server. Otherwise Zabbix won't accept them.

## 6 Loadable modules

### 1 Overview

Loadable modules offer a performance-minded option for extending Zabbix functionality.

There already are ways of extending Zabbix functionality by way of:

- [user parameters](#) (agent metrics)
- [external checks](#) (agent-less monitoring)
- `system.run []` Zabbix [agent item](#).

They work very well, but have one major drawback, namely `fork()`. Zabbix has to fork a new process every time it handles a user metric, which is not good for performance. It is not a big deal normally, however it could be a serious issue when monitoring embedded systems, having a large number of monitored parameters or heavy scripts with complex logic or long startup time.

Support of loadable modules offers ways for extending Zabbix agent, server and proxy without sacrificing performance.

A loadable module is basically a shared library used by Zabbix daemon and loaded on startup. The library should contain certain functions, so that a Zabbix process may detect that the file is indeed a module it can load and work with.

Loadable modules have a number of benefits. Great performance and ability to implement any logic are very important, but perhaps the most important advantage is the ability to develop, use and share Zabbix modules. It contributes to trouble-free maintenance and helps to deliver new functionality easier and independently of the Zabbix core code base.

Module licensing and distribution in binary form is governed by the GPL license (modules are linking with Zabbix in runtime and are using Zabbix headers; currently the whole Zabbix code is licensed under GPL license). Binary compatibility is not guaranteed by Zabbix.

Module API stability is guaranteed during one Zabbix LTS (Long Term Support) [release](#) cycle. Stability of Zabbix API is not guaranteed (technically it is possible to call Zabbix internal functions from a module, but there is no guarantee that such modules will work).

## 2 Module API

In order for a shared library to be treated as a Zabbix module, it should implement and export several functions. There are currently six functions in the Zabbix module API, only one of which is mandatory and the other five are optional.

### 2.1 Mandatory interface

The only mandatory function is **zbx\_module\_api\_version()**:

```
int zbx_module_api_version(void);
```

This function should return the API version implemented by this module and in order for the module to be loaded this version must match module API version supported by Zabbix. Version of module API supported by Zabbix is ZBX\_MODULE\_API\_VERSION. So this function should return this constant. Old constant ZBX\_MODULE\_API\_VERSION\_ONE used for this purpose is now defined to equal ZBX\_MODULE\_API\_VERSION to preserve source compatibility, but it's usage is not recommended.

### 2.2 Optional interface

The optional functions are **zbx\_module\_init()**, **zbx\_module\_item\_list()**, **zbx\_module\_item\_timeout()**, **zbx\_module\_history\_write\_cbs()** and **zbx\_module\_uninit()**:

```
int zbx_module_init(void);
```

This function should perform the necessary initialization for the module (if any). If successful, it should return ZBX\_MODULE\_OK. Otherwise, it should return ZBX\_MODULE\_FAIL. In the latter case Zabbix will not start.

```
ZBX_METRIC *zbx_module_item_list(void);
```

This function should return a list of items supported by the module. Each item is defined in a ZBX\_METRIC structure, see the section below for details. The list is terminated by a ZBX\_METRIC structure with "key" field of NULL.

```
void zbx_module_item_timeout(int timeout);
```

If module exports **zbx\_module\_item\_list()** then this function is used by Zabbix to specify the timeout settings in Zabbix configuration file that the item checks implemented by the module should obey. Here, the "timeout" parameter is in seconds.

```
ZBX_HISTORY_WRITE_CBS zbx_module_history_write_cbs(void);
```

This function should return callback functions Zabbix server will use to export history of different data types. Callback functions are provided as fields of ZBX\_HISTORY\_WRITE\_CBS structure, fields can be NULL if module is not interested in the history of certain type.

```
int zbx_module_uninit(void);
```

This function should perform the necessary uninitialization (if any) like freeing allocated resources, closing file descriptors, etc.

All functions are called once on Zabbix startup when the module is loaded, with the exception of zbx\_module\_uninit(), which is called once on Zabbix shutdown when the module is unloaded.

### 2.3 Defining items

Each item is defined in a ZBX\_METRIC structure:

```
typedef struct
{
    char      *key;
    unsigned   flags;
    int       (*function)();
    char      *test_param;
}
ZBX_METRIC;
```

Here, **key** is the item key (e.g., "dummy.random"), **flags** is either CF\_HAVEPARAMS or 0 (depending on whether the item accepts parameters or not), **function** is a C function that implements the item (e.g., "zbx\_module\_dummy\_random"), and **test\_param** is the parameter list to be used when Zabbix agent is started with the "-p" flag (e.g., "1,1000", can be NULL). An example definition may look like this:

```
static ZBX_METRIC keys[] =
{
    { "dummy.random", CF_HAVEPARAMS, zbx_module_dummy_random, "1,1000" },
    { NULL }
}
```

Each function that implements an item should accept two pointer parameters, the first one of type AGENT\_REQUEST and the second one of type AGENT\_RESULT:

```
int zbx_module_dummy_random(AGENT_REQUEST *request, AGENT_RESULT *result)
{
    ...

    SET_UI64_RESULT(result, from + rand() % (to - from + 1));

    return SYSINFO_RET_OK;
}
```

These functions should return SYSINFO\_RET\_OK, if the item value was successfully obtained. Otherwise, they should return SYSINFO\_RET\_FAIL. See example "dummy" module below for details on how to obtain information from AGENT\_REQUEST and how to set information in AGENT\_RESULT.

## 2.4 Providing history export callbacks

### Attention:

History export via module is no longer supported by Zabbix proxy since Zabbix 4.0.0.

Module can specify functions to export history data by type: Numeric (float), Numeric (unsigned), Character, Text and Log:

```
typedef struct
{
    void (*history_float_cb)(const ZBX_HISTORY_FLOAT *history, int history_num);
    void (*history_integer_cb)(const ZBX_HISTORY_INTEGER *history, int history_num);
    void (*history_string_cb)(const ZBX_HISTORY_STRING *history, int history_num);
    void (*history_text_cb)(const ZBX_HISTORY_TEXT *history, int history_num);
    void (*history_log_cb)(const ZBX_HISTORY_LOG *history, int history_num);
}
ZBX_HISTORY_WRITE_CB;
```

Each of them should take "history" array of "history\_num" elements as arguments. Depending on history data type to be exported, "history" is an array of the following structures, respectively:

```
typedef struct
{
    zbx_uint64_t itemid;
    int clock;
    int ns;
    double value;
}
ZBX_HISTORY_FLOAT;
```

```
typedef struct
{
    zbx_uint64_t itemid;
    int clock;
    int ns;
    zbx_uint64_t value;
}
ZBX_HISTORY_INTEGER;
```

```
typedef struct
{
    zbx_uint64_t itemid;
    int clock;
    int ns;
    const char *value;
}
ZBX_HISTORY_STRING;
```

```
typedef struct
{
```

```

    zbx_uint64_t    itemid;
    int            clock;
    int            ns;
    const char     *value;
}
ZBX_HISTORY_TEXT;

typedef struct
{
    zbx_uint64_t    itemid;
    int            clock;
    int            ns;
    const char     *value;
    const char     *source;
    int            timestamp;
    int            logeventid;
    int            severity;
}
ZBX_HISTORY_LOG;

```

Callbacks will be used by Zabbix server history syncer processes in the end of history sync procedure after data is written into Zabbix database and saved in value cache.

#### Attention:

In case of internal error in history export module it is recommended that module is written in such a way that it does not block whole monitoring until it recovers but discards data instead and allows Zabbix server to continue running.

## 2.5 Building modules

Modules are currently meant to be built inside Zabbix source tree, because the module API depends on some data structures that are defined in Zabbix headers.

The most important header for loadable modules is **include/module.h**, which defines these data structures. Other necessary system headers that help **include/module.h** to work properly are **stdlib.h** and **stdint.h**.

With this information in mind, everything is ready for the module to be built. The module should include **stdlib.h**, **stdint.h** and **module.h**, and the build script should make sure that these files are in the include path. See example "dummy" module below for details.

Another useful header is **include/log.h**, which defines **zabbix\_log()** function, which can be used for logging and debugging purposes.

## 3 Configuration parameters

Zabbix agent, server and proxy support two **parameters** to deal with modules:

- LoadModulePath – full path to the location of loadable modules
- LoadModule – module(s) to load at startup. The modules must be located in a directory specified by LoadModulePath or the path must precede the module name. If the preceding path is absolute (starts with '/') then LoadModulePath is ignored. It is allowed to include multiple LoadModule parameters.

For example, to extend Zabbix agent we could add the following parameters:

```

LoadModulePath=/usr/local/lib/zabbix/agent/
LoadModule=mariadb.so
LoadModule=apache.so
LoadModule=kernel.so
LoadModule=/usr/local/lib/zabbix/dummy.so

```

Upon agent startup it will load the mariadb.so, apache.so and kernel.so modules from the /usr/local/lib/zabbix/agent directory while dummy.so will be loaded from /usr/local/lib/zabbix. The agent will fail to start if a module is missing, in case of bad permissions or if a shared library is not a Zabbix module.

## 4 Frontend configuration

Loadable modules are supported by Zabbix agent, server and proxy. Therefore, item type in Zabbix frontend depends on where the module is loaded. If the module is loaded into the agent, then the item type should be "Zabbix agent" or "Zabbix agent (active)". If the module is loaded into server or proxy, then the item type should be "Simple check".



History export through Zabbix modules does not need any frontend configuration. If the module is successfully loaded by server and provides **zbx\_module\_history\_write\_cbs()** function which returns at least one non-NULL callback function then history export will be enabled automatically.

## 5 Dummy module

Zabbix includes a sample module written in C language. The module is located under `src/modules/dummy`:

```
alex@alex:~trunk/src/modules/dummy$ ls -l
-rw-rw-r-- 1 alex alex 9019 Apr 24 17:54 dummy.c
-rw-rw-r-- 1 alex alex  67 Apr 24 17:54 Makefile
-rw-rw-r-- 1 alex alex 245 Apr 24 17:54 README
```

The module is well documented, it can be used as a template for your own modules.

After `./configure` has been run in the root of Zabbix source tree as described above, just run **make** in order to build **dummy.so**.

```
/*
** Zabbix
** Copyright (C) 2001-2020 Zabbix SIA
**
** This program is free software; you can redistribute it and/or modify
** it under the terms of the GNU General Public License as published by
** the Free Software Foundation; either version 2 of the License, or
** (at your option) any later version.
**
** This program is distributed in the hope that it will be useful,
** but WITHOUT ANY WARRANTY; without even the implied warranty of
** MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
** GNU General Public License for more details.
**
** You should have received a copy of the GNU General Public License
** along with this program; if not, write to the Free Software
** Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA.
**/

####include <stdlib.h>
####include <string.h>
####include <time.h>
####include <stdint.h>

####include "module.h"

/* the variable keeps timeout setting for item processing */
static int  item_timeout = 0;

/* module SHOULD define internal functions as static and use a naming pattern different from Zabbix intern
/* symbols (zbx_*) and loadable module API functions (zbx_module_*) to avoid conflicts
static int  dummy_ping(AGENT_REQUEST *request, AGENT_RESULT *result);
static int  dummy_echo(AGENT_REQUEST *request, AGENT_RESULT *result);
static int  dummy_random(AGENT_REQUEST *request, AGENT_RESULT *result);

static ZBX_METRIC keys[] =
/* KEY          FLAG          FUNCTION      TEST PARAMETERS */
{
    {"dummy.ping",      0,          dummy_ping, NULL},
    {"dummy.echo",      CF_HAVEPARAMS,  dummy_echo, "a message"},
    {"dummy.random",    CF_HAVEPARAMS,  dummy_random, "1,1000"},
    {NULL}
};

/*****
*
* Function: zbx_module_api_version
*
* Purpose: returns version number of the module interface
*****/
```

```

*
* Return value: ZBX_MODULE_API_VERSION - version of module.h module is
*               compiled with, in order to load module successfully Zabbix
*               MUST be compiled with the same version of this header file
*
*/
int zbx_module_api_version(void)
{
    return ZBX_MODULE_API_VERSION;
}

/*****
*
* Function: zbx_module_item_timeout
*
* Purpose: set timeout value for processing of items
*
* Parameters: timeout - timeout in seconds, 0 - no timeout set
*
*****/
void zbx_module_item_timeout(int timeout)
{
    item_timeout = timeout;
}

/*****
*
* Function: zbx_module_item_list
*
* Purpose: returns list of item keys supported by the module
*
* Return value: list of item keys
*
*****/
ZBX_METRIC *zbx_module_item_list(void)
{
    return keys;
}

static int dummy_ping(AGENT_REQUEST *request, AGENT_RESULT *result)
{
    SET_UI64_RESULT(result, 1);

    return SYSINFO_RET_OK;
}

static int dummy_echo(AGENT_REQUEST *request, AGENT_RESULT *result)
{
    char *param;

    if (1 != request->nparam)
    {
        /* set optional error message */
        SET_MSG_RESULT(result, strdup("Invalid number of parameters.));
        return SYSINFO_RET_FAIL;
    }

    param = get_rparam(request, 0);

    SET_STR_RESULT(result, strdup(param));

    return SYSINFO_RET_OK;
}

```

```

/*****
*
* Function: dummy_random
*
* Purpose: a main entry point for processing of an item
*
* Parameters: request - structure that contains item key and parameters
*              request->key - item key without parameters
*              request->nparam - number of parameters
*              request->params[N-1] - pointers to item key parameters
*              request->types[N-1] - item key parameters types:
*                  REQUEST_PARAMETER_TYPE_UNDEFINED (key parameter is empty)
*                  REQUEST_PARAMETER_TYPE_ARRAY (array)
*                  REQUEST_PARAMETER_TYPE_STRING (quoted or unquoted string)
*
*              result - structure that will contain result
*
* Return value: SYSINFO_RET_FAIL - function failed, item will be marked
*               as not supported by zabbix
*               SYSINFO_RET_OK - success
*
* Comment: get_rparam(request, N-1) can be used to get a pointer to the Nth
*           parameter starting from 0 (first parameter). Make sure it exists
*           by checking value of request->nparam.
*           In the same manner get_rparam_type(request, N-1) can be used to
*           get a parameter type.
*
*****/
static int dummy_random(AGENT_REQUEST *request, AGENT_RESULT *result)
{
    char    *param1, *param2;
    int from, to;

    if (2 != request->nparam)
    {
        /* set optional error message */
        SET_MSG_RESULT(result, strdup("Invalid number of parameters.));
        return SYSINFO_RET_FAIL;
    }

    param1 = get_rparam(request, 0);
    param2 = get_rparam(request, 1);

    /* there is no strict validation of parameters and types for simplicity sake */
    from = atoi(param1);
    to = atoi(param2);

    if (from > to)
    {
        SET_MSG_RESULT(result, strdup("Invalid range specified.));
        return SYSINFO_RET_FAIL;
    }

    SET_UI64_RESULT(result, from + rand() % (to - from + 1));

    return SYSINFO_RET_OK;
}

/*****
*
* Function: zbx_module_init
*
*****/

```

```

* Purpose: the function is called on agent startup                                     *
*         It should be used to call any initialization routines                       *
*                                                                                     *
* Return value: ZBX_MODULE_OK - success                                             *
*               ZBX_MODULE_FAIL - module initialization failed                     *
*                                                                                     *
* Comment: the module won't be loaded in case of ZBX_MODULE_FAIL                   *
*                                                                                     *
*****/
int zbx_module_init(void)
{
    /* initialization for dummy.random */
    srand(time(NULL));

    return ZBX_MODULE_OK;
}

/*****
*                                                                                     *
* Function: zbx_module_uninit                                                         *
*                                                                                     *
* Purpose: the function is called on agent shutdown                               *
*         It should be used to cleanup used resources if there are any             *
*                                                                                     *
* Return value: ZBX_MODULE_OK - success                                             *
*               ZBX_MODULE_FAIL - function failed                                 *
*                                                                                     *
*****/
int zbx_module_uninit(void)
{
    return ZBX_MODULE_OK;
}

/*****
*                                                                                     *
* Functions: dummy_history_float_cb                                                  *
*             dummy_history_integer_cb                                              *
*             dummy_history_string_cb                                              *
*             dummy_history_text_cb                                               *
*             dummy_history_log_cb                                                *
*                                                                                     *
* Purpose: callback functions for storing historical data of types float,         *
*         integer, string, text and log respectively in external storage           *
*                                                                                     *
* Parameters: history      - array of historical data                             *
*             history_num - number of elements in history array                   *
*                                                                                     *
*****/
static void dummy_history_float_cb(const ZBX_HISTORY_FLOAT *history, int history_num)
{
    int i;

    for (i = 0; i < history_num; i++)
    {
        /* do something with history[i].itemid, history[i].clock, history[i].ns, history[i].value, ... */
    }
}

static void dummy_history_integer_cb(const ZBX_HISTORY_INTEGER *history, int history_num)
{
    int i;

```

```

    for (i = 0; i < history_num; i++)
    {
        /* do something with history[i].itemid, history[i].clock, history[i].ns, history[i].value, ... */
    }
}

static void dummy_history_string_cb(const ZBX_HISTORY_STRING *history, int history_num)
{
    int i;

    for (i = 0; i < history_num; i++)
    {
        /* do something with history[i].itemid, history[i].clock, history[i].ns, history[i].value, ... */
    }
}

static void dummy_history_text_cb(const ZBX_HISTORY_TEXT *history, int history_num)
{
    int i;

    for (i = 0; i < history_num; i++)
    {
        /* do something with history[i].itemid, history[i].clock, history[i].ns, history[i].value, ... */
    }
}

static void dummy_history_log_cb(const ZBX_HISTORY_LOG *history, int history_num)
{
    int i;

    for (i = 0; i < history_num; i++)
    {
        /* do something with history[i].itemid, history[i].clock, history[i].ns, history[i].value, ... */
    }
}

/*****
 *
 * Function: zbx_module_history_write_cbs
 *
 * Purpose: returns a set of module functions Zabbix will call to export
 *          different types of historical data
 *
 * Return value: structure with callback function pointers (can be NULL if
 *              module is not interested in data of certain types)
 *
 *****/
ZBX_HISTORY_WRITE_CBS    zbx_module_history_write_cbs(void)
{
    static ZBX_HISTORY_WRITE_CBS    dummy_callbacks =
    {
        dummy_history_float_cb,
        dummy_history_integer_cb,
        dummy_history_string_cb,
        dummy_history_text_cb,
        dummy_history_log_cb,
    };

    return dummy_callbacks;
}

```

The module exports three new items:

- `dummy.ping` - always returns '1'
- `dummy.echo[param1]` - returns the first parameter as it is, for example, `dummy.echo[ABC]` will return ABC
- `dummy.random[param1, param2]` - returns a random number within the range of param1-param2, for example, `dummy.random[1,1000000]`

## 6 Limitations

Support of loadable modules is implemented for the Unix platform only. It means that it does not work for Windows agents.

In some cases a module may need to read module-related configuration parameters from `zabbix_agentd.conf`. It is not supported currently. If you need your module to use some configuration parameters you should probably implement parsing of a module-specific configuration file.

## 7 Windows performance counters

### Overview

You can effectively monitor Windows performance counters using the `perf_counter[]` key.

For example:

```
perf_counter["\Processor(0)\Interrupts/sec"]
```

or

```
perf_counter["\Processor(0)\Interrupts/sec", 10]
```

For more information on using this key or its English-only equivalent `perf_counter_en`, see [Windows-specific item keys](#).

In order to get a full list of performance counters available for monitoring, you may run:

```
typeperf -qx
```

You may also use low-level discovery to discover multiple [object instances](#) of Windows performance counters and automate the creation of `perf_counter` items for multiple instance objects.

### Numeric representation

Windows maintains numeric representations (indexes) for object and performance counter names. Zabbix supports these numeric representations as parameters to the `perf_counter`, `perf_counter_en` item keys and in `PerfCounter`, `PerfCounterEn` configuration parameters.

However, it's not recommended to use them unless you can guarantee your numeric indexes map to correct strings on specific hosts. If you need to create portable items that work across different hosts with various localized Windows versions, you can use the `perf_counter_en` key or `PerfCounterEn` configuration parameter which allow to use English names regardless of system locale.

To find out the numeric equivalents, run **regedit**, then find `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Perflib\00000000`

The registry entry contains information like this:

```
1
1847
2
System
4
Memory
6
% Processor Time
10
File Read Operations/sec
12
File Write Operations/sec
14
File Control Operations/sec
16
File Read Bytes/sec
18
File Write Bytes/sec
....
```

Here you can find the corresponding numbers for each string part of the performance counter, like in '`\System\% Processor Time`':

System → 2

% Processor Time → 6

Then you can use these numbers to represent the path in numbers:

\2\6

Performance counter parameters

You can deploy some PerfCounter parameters for the monitoring of Windows performance counters.

For example, you can add these to the Zabbix agent configuration file:

```
PerfCounter=UserPerfCounter1,"\Memory\Page Reads/sec",30
or
PerfCounter=UserPerfCounter2,"4\24",30
```

With such parameters in place, you can then simply use *UserPerfCounter1* or *UserPerfCounter2* as the keys for creating the respective items.

Remember to restart Zabbix agent after making changes to the configuration file.

## 8 Mass update

Overview

Sometimes you may want to change some attribute for a number of items at once. Instead of opening each individual item for editing, you may use the mass update function for that.

Using mass update

To mass-update some items, do the following:

- Mark the checkboxes of the items to update in the list
- Click on *Mass update* below the list
- Navigate to the tab with required attributes (*Item*, *Tags* or *Preprocessing*)
- Mark the checkboxes of the attributes to update
- Enter new values for the attributes

### Mass update

Item

Tags

Preprocessing

Password ☐ Original

Update interval ☐ Original

History storage period ☒

Do not keep history

Storage period

7d

Trend storage period ☐ Original

Status ☐ Original

Log time format ☐ Original

Value mapping ☐ Original

Enable trapping ☐ Original

Mass update

Item

Tags

Preprocessing

Tags ☒

Add

Replace

Remove

Name

Value

tag

value

Add

The *Tags* option allows to:

- *Add* - add specified tags to the items (tags with the same name, but different values are not considered 'duplicates' and can be added to the same item).
- *Replace* - remove the specified tags and add tags with new values
- *Remove* - remove specified tags from the items

User macros, {INVENTORY.\*} macros, {HOST.HOST}, {HOST.NAME}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {HOST.PORT} and {HOST.ID} macros are supported in tags.

Mass update

Item

Tags

Preprocessing

Preprocessing steps ☒

Name

Parameters

1: JavaScript

script

2: JSONPath

\$.path.to.node

Add

The *Preprocessing* option allows to **replace** the existing preprocessing steps on the items with the steps that are specified here. When done, click on *Update*.

## 9 Value mapping

### Overview

Value mapping allows configuring a more user-friendly representation of received values using mappings between numeric/string values and string representations.

For example, when an item's value is "0" or "1," value mappings can be used to represent these values in a more user-friendly manner:

- 0 → Not Available
- 1 → Available

Value mappings for data backup types could be configured as follows:

- F → Full
- D → Differential



- I → Incremental

Value ranges for voltage could be configured as follows:

- <=209 → Low
- 210-230 → OK
- >=231 → High

Value mapping is used in Zabbix frontend and notifications sent by media types.

**Attention:**

Substitution of the received value with the configured representation is performed both in Zabbix frontend and server; however, the server handles substitution only in the following cases:<br><br>

- when populating **host inventory**;
- when expanding **supported macros** {ITEM.VALUE}, {ITEM.LASTVALUE}, and {EVENT.OPDATA}.

Value mappings are set up on templates or hosts. Once configured, they are available for all items within the respective template or host. When **configuring items**, specify the name of a previously configured value mapping in the *Value mapping* parameter.

**Note:**

There is no value map inheritance - hosts and templates do not inherit value mappings from linked templates. Template items on a host will continue to use the value mappings configured on the template.

**Note:**

Value mappings can be used with items having *Numeric (unsigned)*, *Numeric (float)*, and *Character* types of information.

Value mappings are exported/imported with the respective template or host. They can also be mass-updated using the **host** and **template** mass update forms.

Configuration

To configure a value mapping, follow these steps:

1. Open the host or template configuration form.
2. In the *Value mapping* tab, click **Add** to add a new value mapping, or click on the name of an existing mapping to edit it.

### Value mapping

\* Name

\* Mappings

| Type  | Value                          | Mapped to  |
|---|--------------------------------|--|
| <div>⋮</div> <div>equals</div> <div>▼</div> | <input type="text" value="0"/> | <div>⇒</div> <input type="text" value="gray"/>   |
| <div>⋮</div> <div>equals</div> <div>▼</div> | <input type="text" value="1"/> | <div>⇒</div> <input type="text" value="green"/>  |
| <div>⋮</div> <div>equals</div> <div>▼</div> | <input type="text" value="2"/> | <div>⇒</div> <input type="text" value="yellow"/> |
| <div>⋮</div> <div>equals</div> <div>▼</div> | <input type="text" value="3"/> | <div>⇒</div> <input type="text" value="red"/>    |

Add

⋮

Update

Parameters of a value mapping:

| Parameter   | Description                                |
|-------------|--|
| <i>Name</i> | Unique name for the set of value mappings. |

| Parameter        | Description   |
|------------------|---|
| <i>Mappings</i>  | Individual rules for mapping numeric/string values to string representations.   |
| <i>Type</i>      | <p>Mapping is applied in the order of the rules that can be reordered by dragging.</p> <p>Mapping type:</p> <p><b>equals</b> - equal values will be mapped;</p> <p><b>is greater than or equals</b> - equal or greater values will be mapped;</p> <p><b>is less than or equals</b> - equal or smaller values will be mapped;</p> <p><b>in range</b> - values in range will be mapped; the range is expressed as &lt;number1&gt;-&lt;number2&gt; or &lt;number&gt;; multiple ranges are supported (for example, 1-10,101-110,201);</p> <p><b>regexp</b> - values corresponding to the <b>regular expression</b> will be mapped (global regular expressions are not supported);</p> <p><b>default</b> - all outstanding values will be mapped, other than those with specific mappings.</p> <p>For mapping ranges, only numeric value types (<i>is greater than or equals</i>, <i>is less than or equals</i>, <i>in range</i>) are supported.</p> |
| <i>Value</i>     | Incoming value (may contain a range or regular expression, depending on the mapping type).  |
| <i>Mapped to</i> | String representation (up to 64 characters) for the incoming value.   |

All mandatory input fields are marked with a red asterisk.

When viewing the value mapping in the list, only the first three mappings are visible, with three dots indicating that more mappings exist.

Template

Linked templates

Tags

Macros 4

Value mapping 1

| Name          | Value  |
|---------------|--|
| VMware status | <div>=0 ⇒ gray</div> <div>=1 ⇒ green</div> <div>=2 ⇒ yellow</div> <div>...</div> |

Add

Value mapping example

One of the predefined agent items *Zabbix agent ping* uses a template-level value mapping "Zabbix agent ping status" to display its values.

### Value mapping

\* Name

\* Mappings

| Type   | Value                          | Mapped to                         |
|--|--------------------------------|-----------------------------------|
| <div>⋮</div> <input type="text" value="equals"/> | <input type="text" value="1"/> | ⇒ <input type="text" value="Up"/> |

In the item **configuration form**, you can find a reference to this value mapping in the *Value mapping* field:

Value mapping

×

Select

This mapping is used in the *Monitoring* → *Latest data* section to display "Up" (with the raw value in parentheses).

| ▼ <input type="checkbox"/> Host ▲ | Name                      | Last check             | Last value |
|-----------------------------------|---------------------------|------------------------|------------|
| ▼ Zabbix server                   | Monitoring agent (1 item) |                        |            |
| <input type="checkbox"/>          | Zabbix agent ping ?       | 02/23/2021 04:27:07 PM | Up (1)     |

**Note:**

In the *Latest data* section, displayed values are shortened to 20 symbols. If value mapping is used, this shortening is not applied to the mapped value but only to the raw value (displayed in parentheses).

Without a predefined value mapping, you would only see "1", which might be challenging to understand.

| ▼ <input type="checkbox"/> Host ▲ | Name                      | Last check             | Last value |
|-----------------------------------|---------------------------|------------------------|------------|
| ▼ Zabbix server                   | Monitoring agent (1 item) |                        |            |
| <input type="checkbox"/>          | Zabbix agent ping ?       | 02/23/2021 06:00:07 PM | 1          |

## 10 Queue

### Overview

The queue displays items that are waiting for a refresh. The queue is just a **logical** representation of data. There is no IPC queue or any other queue mechanism in Zabbix.

Items monitored by proxies are also included in the queue - they will be counted as queued for the proxy history data update period.

Only items with scheduled refresh times are displayed in the queue. This means that the following item types are excluded from the queue:

- log, logrt and event log active Zabbix agent items
- SNMP trap items
- trapper items
- web monitoring items
- dependent items

Statistics shown by the queue is a good indicator of the performance of Zabbix server.

The queue is retrieved directly from Zabbix server using JSON protocol. The information is available only if Zabbix server is running.

**Attention:**

Items are not counted in the queue if the item interface becomes unavailable due to connection problems or agent not working properly.

### Reading the queue

To read the queue, go to *Administration* → *Queue*.

| Queue overview ▼      |           |            |            |          |           |                      |
|-----------------------|-----------|------------|------------|----------|-----------|----------------------|
| Items                 | 5 seconds | 10 seconds | 30 seconds | 1 minute | 5 minutes | More than 10 minutes |
| Zabbix agent          | 1         | 11         | 1          | 0        | 0         | 0                    |
| Zabbix agent (active) | 0         | 0          | 0          | 0        | 0         | 0                    |
| Simple check          | 0         | 0          | 0          | 0        | 0         | 0                    |
| SNMPv1 agent          | 0         | 0          | 0          | 0        | 0         | 0                    |
| SNMPv2 agent          | 0         | 0          | 0          | 0        | 0         | 0                    |
| SNMPv3 agent          | 0         | 0          | 0          | 0        | 0         | 0                    |
| Zabbix internal       | 0         | 0          | 0          | 0        | 0         | 0                    |
| Zabbix aggregate      | 0         | 0          | 0          | 0        | 0         | 0                    |
| External check        | 0         | 0          | 0          | 0        | 0         | 0                    |
| Database monitor      | 0         | 0          | 0          | 0        | 0         | 0                    |
| HTTP agent            | 0         | 0          | 0          | 0        | 0         | 0                    |

The picture here is generally "ok" so we may assume that the server is doing fine.

The queue shows some items waiting up to 30 seconds. It would be great to know what items these are. To do just that, select *Queue details* in the title dropdown. Now you can see a list of those delayed items.

☰ Queue details ▾

| Scheduled check     | Delayed by | Host    | Name               | Proxy        |
|---------------------|------------|---------|--------------------|--------------|
| 2019-09-02 11:46:40 | 58s        | My host | CPU idle time      | Remote proxy |
| 2019-09-02 11:46:41 | 57s        | My host | CPU interrupt time | Remote proxy |
| 2019-09-02 11:46:42 | 56s        | My host | CPU iowait time    | Remote proxy |
| 2019-09-02 11:46:43 | 55s        | My host | CPU nice time      | Remote proxy |
| 2019-09-02 11:46:44 | 54s        | My host | CPU softirq time   | Remote proxy |
| 2019-09-02 11:46:45 | 53s        | My host | CPU steal time     | Remote proxy |
| 2019-09-02 11:46:46 | 52s        | My host | CPU system time    | Remote proxy |

With these details provided it may be possible to find out why these items might be delayed. With one or two delayed items there perhaps is no cause for alarm. They might get updated in a second. However, if you see a bunch of items getting delayed for too long, there might be a more serious problem.

**See also:** Aligning time zones when using [scheduling intervals](#).

☰ Queue overview ▾

| Items                 | 5 seconds | 10 seconds | 30 seconds | 1 minute | 5 minutes | More than 10 minutes |
|-----------------------|-----------|------------|------------|----------|-----------|----------------------|
| Zabbix agent          | 0         | 1          | 1          | 26       | 0         | 0                    |
| Zabbix agent (active) | 0         | 0          | 0          | 0        | 0         | 0                    |
| Simple check          | 0         | 0          | 0          | 0        | 0         | 0                    |
| SNMPv1 agent          | 0         | 0          | 0          | 0        | 0         | 0                    |
| SNMPv2 agent          | 0         | 0          | 0          | 0        | 0         | 0                    |
| SNMPv3 agent          | 0         | 0          | 0          | 0        | 0         | 0                    |
| Zabbix internal       | 0         | 0          | 0          | 0        | 0         | 0                    |
| Zabbix aggregate      | 0         | 0          | 0          | 0        | 0         | 0                    |
| External check        | 0         | 0          | 0          | 0        | 0         | 0                    |
| Database monitor      | 0         | 0          | 0          | 0        | 0         | 0                    |
| HTTP agent            | 0         | 0          | 0          | 0        | 0         | 0                    |
| IPMI agent            | 0         | 0          | 0          | 0        | 0         | 0                    |
| SSH agent             | 0         | 0          | 0          | 0        | 0         | 0                    |
| TELNET agent          | 0         | 0          | 0          | 0        | 0         | 0                    |
| JMX agent             | 0         | 0          | 0          | 0        | 0         | 0                    |
| Calculated            | 0         | 0          | 0          | 0        | 0         | 0                    |

Queue item

A special internal item **zabbix[queue,<from>,<to>]** can be used to monitor the health of the queue in Zabbix. It will return the number of items delayed by the set amount of time. For more information see [Internal items](#).

11 Value cache

Overview

To make the calculation of trigger expressions, calculated items and some macros much faster, a value cache option is supported by the Zabbix server.

This in-memory cache can be used for accessing historical data, instead of making direct SQL calls to the database. If historical values are not present in the cache, the missing values are requested from the database and the cache updated accordingly.

To enable the value cache functionality, an optional **ValueCacheSize** parameter is supported by the Zabbix server [configuration](#) file.

Two internal items are supported for monitoring the value cache: **zabbix[vcache,buffer,<mode>]** and **zabbix[vcache,cache,<parameter>]**. See more details with [internal items](#).

12 Execute now

Overview

Checking for a new item value in Zabbix is a cyclic process that is based on configured update intervals. While for many items the update intervals are quite short, there are others (including low-level discovery rules) for which the update intervals are quite long, so in real-life situations there may be a need to check for a new value quicker - to pick up changes in discoverable resources, for example. To accommodate such a necessity, it is possible to reschedule a passive check and retrieve a new value immediately.

This functionality is supported for **passive** checks only. The following item types are supported:

- Zabbix agent (passive)
- SNMPv1/v2/v3 agent
- IPMI agent
- Simple check
- Zabbix internal
- External check
- Database monitor
- JMX agent
- SSH agent
- Telnet
- Calculated
- HTTP agent
- Script

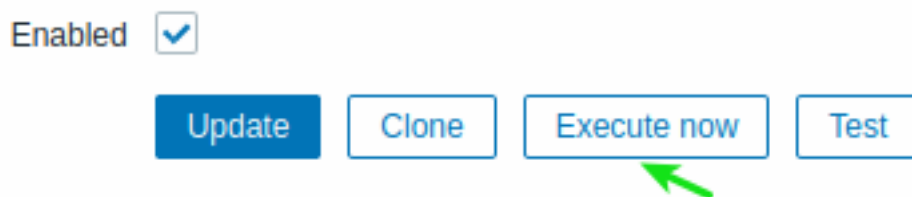
**Attention:**

The check must be present in the configuration cache in order to get executed; for more information see [CacheUpdateFrequency](#). Before executing the check, the configuration cache is **not** updated, thus very recent changes to item/discovery rule configuration will not be picked up. Therefore, it is also not possible to check for a new value for an item/rule that is being created or has been created just now; use the *Test* option while configuring an item for that.

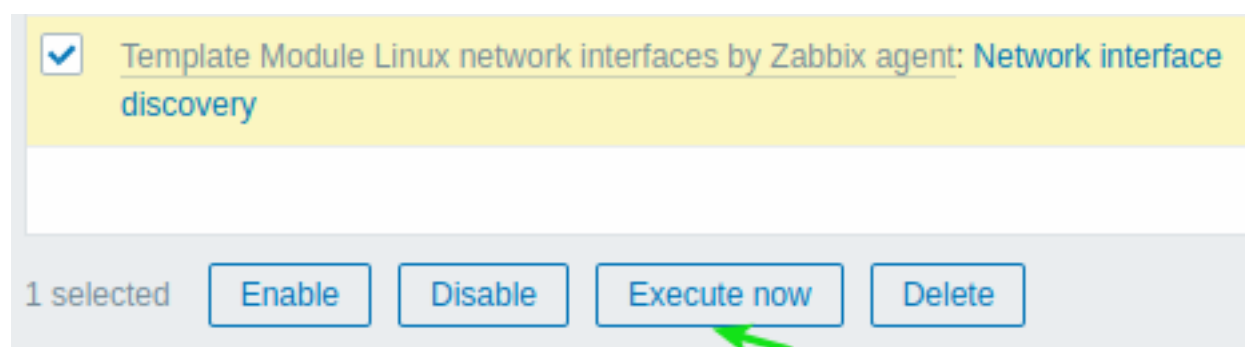
## Configuration

To execute a passive check immediately:

- click on *Execute now* in an existing item (or discovery rule) configuration form:



- click on *Execute now* for selected items/rules in the list of items/discovery rules:



In the latter case several items/rules can be selected and "executed now" at once.

## 13 Restricting agent checks

### Overview

It is possible to restrict checks on the agent side by creating an item blacklist, a whitelist, or a combination of whitelist/blacklist.

To do that use a combination of two agent [configuration](#) parameters:

- AllowKey=<pattern> - which checks are allowed; <pattern> is specified using a wildcard (\*) expression
- DenyKey=<pattern> - which checks are denied; <pattern> is specified using a wildcard (\*) expression

Note that:

- All `system.run[*]` items (remote commands, scripts) are disabled by default, even when no deny keys are specified;
- Since Zabbix 5.0.2 the `EnableRemoteCommands` agent parameter is:
  - deprecated by Zabbix agent
  - unsupported by Zabbix agent2

Therefore, to allow remote commands, specify an `AllowKey=system.run[<command>,*]` for each allowed command, `*` stands for wait and nowait mode. It is also possible to specify `AllowKey=system.run[*]` parameter to allow all commands with wait and nowait modes. To disallow specific remote commands, add `DenyKey` parameters with `system.run[]` commands before the `AllowKey=system.run[*]` parameter.

Important rules

- A whitelist without a deny rule is only allowed for `system.run[*]` items. For all other items, `AllowKey` parameters are not allowed without a `DenyKey` parameter; in this case Zabbix agent **will not start** with only `AllowKey` parameters.
- The order matters. The specified parameters are checked one by one according to their appearance order in the configuration file:
  - As soon as an item key matches an allow/deny rule, the item is either allowed or denied; and rule checking stops. So if an item matches both an allow rule and a deny rule, the result will depend on which rule comes first.
  - The order affects also `EnableRemoteCommands` parameter (if used).
- Unlimited numbers of `AllowKey`/`DenyKey` parameters is supported.
- `AllowKey`, `DenyKey` rules do not affect `HostnameItem`, `HostMetadataItem`, `HostInterfaceItem` configuration parameters.
- Key pattern is a wildcard expression where the wildcard (`*`) character matches any number of any characters in certain position. It might be used in both the key name and parameters.
- If a specific item key is disallowed in the agent configuration, the item will be reported as unsupported (no hint is given as to the reason);
- Zabbix agent with `--print (-p)` command line option will not show keys that are not allowed by configuration;
- Zabbix agent with `--test (-t)` command line option will return "Unsupported item key." status for keys that are not allowed by configuration;
- Denied remote commands will not be logged in the agent log (if `LogRemoteCommands=1`).

Use cases

Deny specific check

- Blacklist a specific check with `DenyKey` parameter. Matching keys will be disallowed. All non-matching keys will be allowed, except `system.run[]` items.

For example:

```
# Deny secure data access
DenyKey=vfs.file.contents[/etc/passwd,*]
```

**Attention:**

A blacklist may not be a good choice, because a new Zabbix version may have new keys that are not explicitly restricted by the existing configuration. This could cause a security flaw.

Deny specific command, allow others

- Blacklist a specific command with `DenyKey` parameter. Whitelist all other commands, with the `AllowKey` parameter.

```
# Disallow specific command
DenyKey=system.run[ls -l /]
```

```
# Allow other scripts
AllowKey=system.run[*]
```

Allow specific check, deny others

- Whitelist specific checks with `AllowKey` parameters, deny others with `DenyKey=*`

For example:

```
# Allow reading logs:
AllowKey=vfs.file.*[/var/log/*]
```

```
# Allow localtime checks
AllowKey=system.localtime[*]
```

# Deny all other keys

DenyKey=\*

Pattern examples

| Pattern  | Description   | Matches  | No match  |
|--|---|--|---|
| *  | Matches all possible keys with or without parameters.   | Any  | None  |
| <i>vfs.file.contents</i>                                 | Matches <i>vfs.file.contents</i> without parameters.  | <i>vfs.file.contents</i>   | <i>vfs.file.contents[/etc/passwd]</i>   |
| <i>vfs.file.contents[]</i>                               | Matches <i>vfs.file.contents</i> with empty parameters.   | <i>vfs.file.contents[]</i>   | <i>vfs.file.contents</i>  |
| <i>vfs.file.contents[*]</i>                              | Matches <i>vfs.file.contents</i> with any parameters; will not match <i>vfs.file.contents</i> without square brackets.  | <i>vfs.file.contents[]</i><br><i>vfs.file.contents[/path/to/file]</i>  | <i>vfs.file.contents</i>  |
| <i>vfs.file.contents[/etc/passwd]</i>                    | Matches <i>vfs.file.contents</i> with first parameters matching <i>/etc/passwd</i> and all other parameters having any value (also empty).                                      | <i>vfs.file.contents[/etc/passwd]</i><br><i>vfs.file.contents[/etc/passwd,utf8]</i>  | <i>vfs.file.contents[/etc/passwd]</i><br><i>vfs.file.contents[/var/log/zabbix_...]</i><br><i>vfs.file.contents[]</i>      |
| <i>vfs.file.contents[*passwd]</i>                        | Matches <i>vfs.file.contents</i> with first parameter matching <i>*passwd*</i> and no other parameters.   | <i>vfs.file.contents[/etc/passwd]</i><br><i>vfs.file.contents[/etc/passwd,utf8]</i>  | <i>vfs.file.contents[/etc/passwd,]</i><br><i>vfs.file.contents[/etc/passwd,utf8]</i>                                      |
| <i>vfs.file.contents[*passwd*]</i>                       | Matches <i>vfs.file.contents</i> with only first parameter matching <i>*passwd*</i> and all following parameters having any value (also empty).                                 | <i>vfs.file.contents[/etc/passwd]</i><br><i>vfs.file.contents[/etc/passwd,utf8]</i><br><i>vfs.file.contents[/tmp/test]</i> | <i>vfs.file.contents[/etc/passwd]</i><br><i>vfs.file.contents[/etc/passwd,utf8]</i>                                       |
| <i>vfs.file.contents[/var/log/zabbix_server.log,abc]</i> | Matches <i>vfs.file.contents</i> with first parameter matching <i>/var/log/zabbix_server.log</i> , third parameter matching <i>'abc'</i> and any (also empty) second parameter. | <i>vfs.file.contents[/var/log/zabbix_server.log,log]</i><br><i>vfs.file.contents[/var/log/zabbix_server.log,utf8,abc]</i>  | <i>vfs.file.contents[/var/log/zabbix_server.log,log]</i><br><i>vfs.file.contents[/var/log/zabbix_server.log,utf8,abc]</i> |
| <i>vfs.file.contents[/etc/passwd,utf8]</i>               | Matches <i>vfs.file.contents</i> with first parameter matching <i>/etc/passwd</i> , second parameter matching <i>'utf8'</i> and no other arguments.                             | <i>vfs.file.contents[/etc/passwd,utf8]</i><br><i>vfs.file.contents[/etc/passwd,]</i>                                       | <i>vfs.file.contents[/etc/passwd,]</i><br><i>vfs.file.contents[/etc/passwd,utf1]</i>                                      |
| <i>vfs.file.*</i>  | Matches any keys starting with <i>vfs.file.</i> without any parameters.   | <i>vfs.file.contents</i><br><i>vfs.file.size</i>   | <i>vfs.file.contents[]</i><br><i>vfs.file.size[/var/log/zabbix_server.log]</i>  |
| <i>vfs.file.*[*]</i>                                     | Matches any keys starting with <i>vfs.file.</i> with any parameters.  | <i>vfs.file.size.bytes[]</i><br><i>vfs.file.size[/var/log/zabbix_server.log,utf8]</i>                                      | <i>vfs.file.size.bytes</i><br><i>vfs.file.size[/var/log/zabbix_server.log,utf8]</i>                                       |
| <i>vfs.*.contents</i>                                    | Matches any key starting with <i>vfs.</i> and ending with <i>.contents</i> without any parameters.  | <i>vfs.mount.point.file.contents</i><br><i>vfs..contents</i>   | <i>vfs..contents</i>  |

system.run and AllowKey

A hypothetical script like 'myscript.sh' may be executed on a host via Zabbix agent in several ways:

1. As an item key in a passive or active check, for example:

- system.run[myscript.sh]
- system.run[myscript.sh,wait]
- system.run[myscript.sh.nowait]

Here the user may add "wait", "nowait" or omit the 2nd argument to use its default value in system.run[.].

2. As a global script (initiated by user in frontend or API).

A user configures this script in *Administration* → *Scripts*, sets "Execute on: Zabbix agent" and puts "myscript.sh" into the script's "Commands" input field. When invoked from frontend or API the Zabbix server sends to agent:

- system.run[myscript.sh,wait] - up to Zabbix 5.0.4
- system.run[myscript.sh] - since 5.0.5

Here the user does not control the "wait"/"nowait" parameters.

3. As a remote command from an action. The Zabbix server sends to agent:

- system.run[myscript.sh,nowait]

Here again the user does not control the "wait"/"nowait" parameters.

What that means is if we set AllowKey like:

AllowKey=system.run[myscript.sh]

then

- system.run[myscript.sh] - will be allowed

- `system.run[myscript.sh,wait]`, `system.run[myscript.sh,nowait]` will not be allowed - the script will not be run if invoked as a step of action

To allow all described variants you may add:

```
AllowKey=system.run[myscript.sh,*]
DenyKey=system.run[*]
```

to the `agent/agent2` parameters.

## 14 Plugins

### Overview

Plugins provide an option to extend the monitoring capabilities of Zabbix. Plugins are written in Go programming language and are supported by Zabbix agent 2 only.

Plugins provide an alternative to **loadable modules** (written in C), and other methods for extending Zabbix functionality, such as **user parameters** (agent metrics), **external checks** (agent-less monitoring), and `system.run[]` Zabbix **agent item**.

The following features are specific to Zabbix agent 2 and its plugins:

- support of scheduled and flexible intervals for both passive and active checks;
- task queue management with respect to schedule and task concurrency;
- plugin-level timeouts;
- compatibility check of Zabbix agent 2 and its plugin on start up.

Since Zabbix 6.0.0, plugins don't have to be integrated into the agent 2 directly and can be added as loadable plugins, thus making the creation process of additional plugins for gathering new monitoring metrics easier.

This page lists Zabbix native and loadable plugins, and describes plugin configuration principles from the user perspective. For instructions about writing your own plugins, see [Plugin development guidelines](#). For more information on the communication process between Zabbix agent 2 and a loadable plugin, as well as the metrics collection process, see [Connection diagram](#).

### Configuring plugins

This section provides common plugin configuration principles and best practices.

All plugins are configured using `Plugins.*` parameter, which can either be part of the Zabbix agent 2 **configuration file** or a plugin's own **configuration file**. If a plugin uses a separate configuration file, path to this file should be specified in the `Include` parameter of Zabbix agent 2 configuration file.

A typical plugin parameter has the following structure:

```
Plugins.<PluginName>.<Parameter>=<Value>
```

Additionally, there are two specific groups of parameters:

- `Plugins.<PluginName>.Default.<Parameter>=<Value>` used for defining **default parameter values**.
- `Plugins.<PluginName>.<SessionName>.<Parameter>=<Value>` used for defining separate sets of parameters for different monitoring targets via **named sessions**.

All parameter names should adhere to the following requirements:

- it is recommended to capitalize the names of your plugins;
- the parameter should be capitalized;
- special characters are not allowed;
- nesting isn't limited by a maximum level;
- the number of parameters is not limited.

### Default values

Since Zabbix 6.0.18, you can set default values for the connection-related parameters (URI, username, password, etc.) in the configuration file in the format:

```
Plugins.<PluginName>.Default.<Parameter>=<Value>
```

For example, `Plugins.Mysql.Default.Username=zabbix`, `Plugins.MongoDB.Default.Uri=tcp://127.0.0.1:27017`, etc.

If a value for such parameter is not provided in an item key or in the **named session** parameters, the plugin will use the default value. If a default parameter is also undefined, hardcoded defaults will be used.



**Note:**

If an item key does not have any parameters, Zabbix agent 2 will attempt to collect the metric using values defined in the default parameters section.

### Named sessions

Named sessions represent an additional level of plugin parameters and can be used to specify separate sets of authentication parameters for each of the instances being monitored. Each named session parameter should have the following structure:

*Plugins.<PluginName>.Sessions.<SessionName>.<Parameter>=<Value>*

A session name can be used as a connString item key parameter instead of specifying a URI, username, and/or password separately.

In item keys, the first parameter can be either a connString or a URI. If the first key parameter doesn't match any session name, it will be treated as a URI. Note that embedding credentials into a URI is not supported, use named session parameters instead.

The list of available **named session parameters** depends on the plugin.

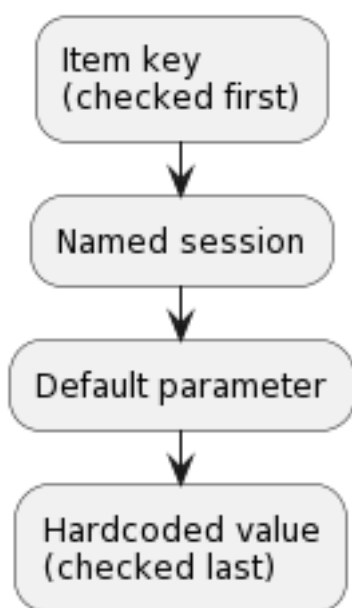
*In Zabbix versions before 6.0.17*, when providing a connString (session name) in key parameters, item key parameters for username and password must be empty. The values will be taken from the session parameters. If an authentication parameter is not specified for the named session, a hardcoded default value will be used.

*Since Zabbix 6.0.17*, it is possible to override session parameters by specifying new values in the item key parameters (see [example](#)).

*Since Zabbix 6.0.18*, if a parameter is not defined for the named session, Zabbix agent 2 will use the value defined in the **default plugin parameter**.

### Parameter priority

*Since version 6.0.18*, Zabbix agent 2 plugins search for connection-related parameter values in the following order:



1. The first item key parameter is compared to session names. If no match is found it is treated as an actual value; in this case, step 3 will be skipped. If a match is found, the parameter value (usually, a URI) must be defined in the named session.
2. Other parameters will be taken from the item key if defined.
3. If an item key parameter (for example, password) is empty, plugin will look for the corresponding named session parameter.
4. If the session parameter is also not specified, the value defined in the corresponding **default parameter** will be used.
5. If all else fails, the plugin will use the hardcoded default value.

### Example 1

Monitoring of two instances "MySQL1" and "MySQL2".

Configuration parameters:

```
Plugins.Mysql.Sessions.MySQL1.Uri=tcp://127.0.0.1:3306
Plugins.Mysql.Sessions.MySQL1.User=mysql1_user
Plugins.Mysql.Sessions.MySQL1.Password=unique_password
Plugins.Mysql.Sessions.MySQL2.Uri=tcp://192.0.2.0:3306
```

```
Plugins.MySQL.Sessions.MySQL2.User=mysql2_user
Plugins.MySQL.Sessions.MySQL2.Password=different_password
```

As a result of this configuration, each session name may be used as a connString in an **item key**, e.g., `mysql.ping[MySQL1]` or `mysql.ping[MySQL2]`.

#### Example 2

Providing some of the parameters in the item key (supported since Zabbix 6.0.17).

Configuration parameters:

```
Plugins.PostgreSQL.Sessions.Session1.Uri=tcp://192.0.2.234:5432
Plugins.PostgreSQL.Sessions.Session1.User=old_username
Plugins.PostgreSQL.Sessions.Session1.Password=session_password
```

**Item key:** `pgsql.ping[session1,new_username,,postgres]`

As a result of this configuration, the agent will connect to PostgreSQL using the following parameters:

- URI from session parameter: `192.0.2.234:5432`
- Username from the item key: `new_username`
- Password from session parameter (since it is omitted in the item key): `session_password`
- Database name from the item key: `postgres`

#### Example 3

Collecting a metric using default configuration parameters.

Configuration parameters:

```
Plugins.PostgreSQL.Default.Uri=tcp://192.0.2.234:5432
Plugins.PostgreSQL.Default.User=zabbix
Plugins.PostgreSQL.Default.Password=password
```

**Item key:** `pgsql.ping[,,,postgres]`

As a result of this configuration, the agent will connect to PostgreSQL using the parameters:

- Default URI: `192.0.2.234:5432`
- Default username: `zabbix`
- Default password: `password`
- Database name from the item key: `postgres`

#### Connections

Some plugins support gathering metrics from multiple instances simultaneously. Both local and remote instances can be monitored. TCP and Unix-socket connections are supported.

It is recommended to configure plugins to keep connections to instances in an open state. The benefits are reduced network congestion, latency, and CPU and memory usage due to the lower number of connections. The client library takes care of this.

##### Note:

Time period for which unused connections should remain open can be determined by `Plugins.<PluginName>.KeepAlive` parameter.

Example: `Plugins.Memcached.KeepAlive`

#### Plugins

All metrics supported by Zabbix agent 2 are collected by plugins.

##### Built-in

The following plugins for Zabbix agent 2 are available out-of-the-box. Click on the plugin name to go to the plugin repository with additional information.

| Plugin name | Description                             | Supported item keys                             | Comments  |
|-------------|---|---|---|
| Agent       | Metrics of the Zabbix agent being used. | agent.hostname,<br>agent.ping,<br>agent.version | Supported keys have the same parameters as Zabbix agent <b>keys</b> . |

| Plugin name               | Description  | Supported item keys  | Comments   |
|---------------------------|--|--|--|
| <a href="#">Ceph</a>      | Ceph monitoring.   | ceph.df.details,<br>ceph.osd.stats,<br>ceph.osd.discovery,<br>ceph.osd.dump,<br>ceph.ping,<br>ceph.pool.discovery,<br>ceph.status  |  |
| <a href="#">CPU</a>       | System CPU monitoring (number of CPUs/CPU cores, discovered CPUs, utilization percentage). | system.cpu.discovery,<br>system.cpu.num,<br>system.cpu.util  | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> .   |
| <a href="#">Docker</a>    | Monitoring of Docker containers.   | docker.container_info,<br>docker.container_stats,<br>docker.containers,<br>docker.containers.discovery,<br>docker.data_usage,<br>docker.images,<br>docker.images.discovery,<br>docker.info,<br>docker.ping | See also:<br><a href="#">Configuration parameters</a>  |
| <a href="#">File</a>      | File metrics collection.   | vfs.file.cksum,<br>vfs.file.contents,<br>vfs.file.exists,<br>vfs.file.md5sum,<br>vfs.file.regexp,<br>vfs.file.regmatch,<br>vfs.file.size,<br>vfs.file.time   | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> .   |
| <a href="#">Kernel</a>    | Kernel monitoring.   | kernel.maxfiles,<br>kernel.maxproc   | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> .   |
| <a href="#">Log</a>       | Log file monitoring.   | log, log.count, logrt,<br>logrt.count  | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> .<br><br>See also:<br>Plugin configuration parameters<br>( <a href="#">Unix/Windows</a> )   |
| <a href="#">Memcached</a> | Memcached server monitoring.   | memcached.ping,<br>memcached.stats   |  |
| <a href="#">Modbus</a>    | Reads Modbus data.   | modbus.get   | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> .   |
| <a href="#">MQTT</a>      | Receives published values of MQTT topics.  | mqtt.get   | To configure encrypted connection to the MQTT broker, specify the TLS parameters in the agent configuration file as <a href="#">named session</a> or <a href="#">default</a> parameters. Currently, TLS parameters cannot be passed as item key parameters.  |
| <a href="#">MySQL</a>     | Monitoring of MySQL and its forks.   | mysql.custom.query,<br>mysql.db.discovery,<br>mysql.db.size,<br>mysql.get_status_variables,<br>mysql.ping,<br>mysql.replication.discovery,<br>mysql.replication.get_slave_status,<br>mysql.version         | To configure encrypted connection to the database, specify the TLS parameters in the agent configuration file as <a href="#">named session</a> or <a href="#">default</a> parameters. Currently, TLS parameters cannot be passed as item key parameters.<br><br><code>mysql.custom.query</code> item key is supported since Zabbix 6.0.21. |
| <a href="#">Netif</a>     | Monitoring of network interfaces.  | net.if.collisions,<br>net.if.discovery,<br>net.if.in, net.if.out,<br>net.if.total  | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> .   |

| Plugin name | Description  | Supported item keys   | Comments   |
|-------------|--|---|--|
| Oracle      | Oracle Database monitoring.                                  | oracle.diskgroups.stats, ora-cle.diskgroups.discovery, oracle.archive.info, oracle.archive.discovery, oracle.cdb.info, oracle.custom.query, oracle.datafiles.stats, oracle.db.discovery, oracle.fra.stats, oracle.instance.info, oracle.pdb.info, oracle.pdb.discovery, oracle.pga.stats, oracle.ping, oracle.proc.stats, oracle.redolog.info, oracle.sga.stats, oracle.sessions.stats, oracle.sys.metrics, oracle.sys.params, oracle.ts.stats, oracle.ts.discovery, oracle.user.info, oracle.version | Install the <a href="#">Oracle Instant Client</a> before using the plugin.   |
| Proc        | Process CPU utilization percentage.                          | proc.cpu.util   | Supported key has the same parameters as Zabbix agent <a href="#">key</a> .  |
| Redis       | Redis server monitoring.                                     | redis.config, redis.info, redis.ping, redis.slowlog.count   |  |
| Smart       | S.M.A.R.T. monitoring.                                       | smart.attribute.discovery, smart.disk.discovery, smart.disk.get   | <p>The minimum required smartctl version is 7.1.</p> <p>Sudo/root access rights to smartctl are required for the user executing Zabbix agent 2. The plugin uses only the following commands:</p> <pre>/usr/sbin/smartctl -a * /usr/sbin/smartctl --scan * /usr/sbin/smartctl -j -V</pre> <p>Supported <a href="#">keys</a> can be used with Zabbix agent 2 only on Linux/Windows, both as a passive and active check.</p> <p>See also:</p> <p><a href="#">Configuration parameters</a></p> |
| Swap        | Swap space size in bytes/percentage.                         | system.swap.size  | Supported key has the same parameters as Zabbix agent <a href="#">key</a> .  |
| SystemRun   | Runs specified command.                                      | system.run  | <p>Supported key has the same parameters as Zabbix agent <a href="#">key</a>.</p> <p>See also:</p> <p>Plugin configuration parameters (<a href="#">Unix/Windows</a>)</p>   |
| Systemd     | Monitoring of systemd services.                              | systemd.unit.discovery, systemd.unit.get, systemd.unit.info   |  |
| TCP         | TCP connection availability check.                           | net.tcp.port  | Supported key has the same parameters as Zabbix agent <a href="#">key</a> .  |
| UDP         | Monitoring of the UDP services availability and performance. | net.udp.service, net.udp.service.perf   | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> .   |

| Plugin name                    | Description   | Supported item keys   | Comments   |
|--------------------------------|---|---|--|
| <a href="#">Uname</a>          | Retrieval of information about the system.                                  | system.hostname,<br>system.sw.arch,<br>system.uname   | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> . |
| <a href="#">Uptime</a>         | System uptime metrics collection.   | system.uptime   | Supported key has the same parameters as Zabbix agent <a href="#">key</a> .    |
| <a href="#">VFSDev</a>         | VFS metrics collection.   | vfs.dev.discovery,<br>vfs.dev.read,<br>vfs.dev.write  | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> . |
| <a href="#">WebCertificate</a> | Monitoring of TLS/SSL website certificates.                                 | web.certificate.get   |  |
| <a href="#">WebPage</a>        | Web page monitoring.  | web.page.get,<br>web.page.perf,<br>web.page.regexp  | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> . |
| <a href="#">ZabbixAsync</a>    | Asynchronous metrics collection.  | net.tcp.listen,<br>net.udp.listen, sensor,<br>system.boottime,<br>system.cpu.intr,<br>system.cpu.load,<br>system.cpu.switches,<br>system.hw.cpu,<br>system.hw.macaddr,<br>system.localtime,<br>system.sw.os,<br>system.swap.in,<br>system.swap.out,<br>vfs.fs.discovery                       | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> . |
| <a href="#">ZabbixStats</a>    | Zabbix server/proxy internal metrics or number of delayed items in a queue. | zabbix.stats  | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> . |
| <a href="#">ZabbixSync</a>     | Synchronous metrics collection.   | net.dns,<br>net.dns.record,<br>net.tcp.service,<br>net.tcp.service.perf,<br>proc.mem,<br>proc.num,<br>system.hw.chassis,<br>system.hw.devices,<br>system.sw.packages,<br>system.users.num,<br>vfs.dir.count,<br>vfs.dir.size, vfs.fs.get,<br>vfs.fs.inode,<br>vfs.fs.size,<br>vm.memory.size. | Supported keys have the same parameters as Zabbix agent <a href="#">keys</a> . |

#### Loadable

##### Note:

Loadable plugins, when launched with: `<br> - -V --version` - print plugin version and license information; `<br> - -h --help` - print help information.

Click on the plugin name to go to the plugin repository with additional information.

| Plugin name             | Description  | Supported item keys   | Comments  |
|-------------------------|--|---|---|
| <a href="#">Ember+</a>  | Monitoring of Ember+.  | ember.get   | <p>This plugin is supported since Zabbix 6.0.30. Currently only available to be built from the source (for both Unix and Windows).</p> <p>See also <a href="#">Ember+ plugin configuration parameters</a>.</p>  |
| <a href="#">MongoDB</a> | Monitoring of MongoDB servers and clusters (document-based, distributed database). | mongodb.collection.stats,<br>mon-godb.collections.discovery,<br>mon-godb.collections.usage,<br>mon-godb.connpool.stats,<br>mongodb.db.stats,<br>mon-godb.db.discovery,<br>mon-godb.jumbo_chunks.countand newer <sup>1</sup> ,<br>mongodb.oplog.stats,<br>mongodb.ping,<br>mongodb.rs.config,<br>mongodb.rs.status,<br>mon-godb.server.status,<br>mongodb.sh.discovery,<br>mongodb.version | <p>This plugin is loadable since Zabbix 6.0.6 (built-in previously). Pre-compiled plugin binaries for Windows are available since <a href="#">Zabbix 6.0.19</a> and are compatible with previous 6.0 versions.</p> <p>To configure encrypted connections to the database, specify the TLS parameters in the agent configuration file as <a href="#">named session</a> parameters.</p> <p>Supported in plugin versions 1.2.0, 6.0.13 and newer<sup>1</sup>.</p> <p>Currently, TLS parameters cannot be passed as item key parameters.</p> <p>See also <a href="#">MongoDB plugin configuration parameters</a>.</p> |
| <a href="#">MSSQL</a>   | Monitoring of MSSQL database.  | mssql.availability.group.get,<br>mssql.custom.query,<br>mssql.db.get,<br>mssql.job.status.get,<br>mssql.last.backup.get,<br>mssql.local.db.get,<br>mssql.mirroring.get,<br>mssql.nonlocal.db.get,<br>mssql.perfcounter.get,<br>mssql.ping,<br>mssql.quorum.get,<br>mssql.quorum.member.get,<br>mssql.replica.get,<br>mssql.version  | <p>This plugin is supported since Zabbix 6.0.27. Pre-compiled plugin binaries for Windows are available since <a href="#">Zabbix 6.0.28</a> and are compatible with 6.0.27 version.</p> <p>To configure encrypted connection to the database, specify the TLS parameters in the agent configuration file as <a href="#">named session</a> or <a href="#">default</a> parameters. Currently, TLS parameters cannot be passed as item key parameters.</p> <p>See also <a href="#">MSSQL plugin configuration parameters</a>.</p>  |

| Plugin name                | Description                             | Supported item keys   | Comments  |
|----------------------------|---|---|---|
| <a href="#">PostgreSQL</a> | Monitoring of PostgreSQL and its forks. | <p>pgsql.autovacuum.count,<br/> pgsql.archive,<br/> pgsql.bgwriter,<br/> pgsql.cache.hit,<br/> pgsql.connections,<br/> pgsql.custom.query,<br/> pgsql.dbstat,<br/> pgsql.dbstat.sum,<br/> pgsql.db.age,<br/> pgsql.db.bloating_tables,<br/> pgsql.db.discovery,<br/> pgsql.db.size,<br/> pgsql.locks,<br/> pgsql.oldest.xid,<br/> pgsql.ping,<br/> pgsql.queries,<br/> pgsql.replication.count,<br/> pgsql.replication.process,<br/> pgsql.replication.process.discovery,<br/> pgsql.replication.recovery_role,<br/> pgsql.replication.status,<br/> pgsql.replication_lag.b,<br/> pgsql.replication_lag.sec,<br/> pgsql.uptime,<br/> pgsql.version,<br/> pgsql.wal.stat</p> | <p>This plugin is loadable since Zabbix 6.0.10 (built-in previously). Pre-compiled plugin binaries for Windows are available since <a href="#">Zabbix 6.0.19</a> and are compatible with previous 6.0 versions.</p> <p>To configure encrypted connections to the database, specify the TLS parameters in the agent configuration file as <b>named session</b> or <b>default</b> parameters.</p> <p>Currently, TLS parameters cannot be passed as item key parameters.</p> <p>See also <a href="#">PostgreSQL plugin configuration parameters</a>.</p> |

See also: [Building loadable plugins](#).

#### Footnotes

<sup>1</sup> - Since Zabbix 6.0.13, loadable plugins started using the same versioning system as Zabbix itself. As a result, MongoDB plugin version has changed from 1.2.0 to 6.0.13 and PostgreSQL plugin version has changed from 1.2.1 to 6.0.13.

## 1 Building loadable plugins

### Overview

This page provides the steps required to build a loadable plugin binary from the sources.

If the source tarball is downloaded, it is possible to build the plugin offline, i.e. without the internet connection.

The PostgreSQL plugin is used as an example. Other loadable plugins can be built in a similar way.

### Steps

1. Download the plugin sources from [Zabbix Cloud Images and Appliances](#). The official download page will be available soon.
2. Transfer the archive to the machine where you are going to build the plugin.
3. Unarchive the tarball, e.g.:

```
tar xvf zabbix-agent2-plugin-postgresql-6.0.13.tar.gz
```

Make sure to replace "zabbix-agent2-plugin-postgresql-6.0.13.tar.gz" with the name of the downloaded archive.

4. Enter the extracted directory:

```
cd <path to directory>
```

5. Run:

```
make
```

6. The plugin executable may be placed anywhere as long as it is loadable by Zabbix agent 2. Specify the path to the plugin binary in the plugin configuration file, e.g. in postgresql.conf for the PostgreSQL plugin:

```
Plugins.PostgreSQL.System.Path=/path/to/executable/zabbix-agent2-plugin-postgresql
```

7. Path to the plugin configuration file must be specified in the Include parameter of the Zabbix agent 2 configuration file:

Include=/path/to/plugin/configuration/file/postgresql.conf

Makefile targets

Loadable plugins provided by Zabbix have simple makefiles with the following targets:

| Target      | Description  |
|-------------|--|
| make        | Build plugin.  |
| make clean  | Delete all files that are normally created by building the plugin.   |
| make check  | Perform self-tests. A real PostgreSQL database is required.  |
| make style  | Check Go code style with 'golangci-lint'.  |
| make format | Format Go code with 'go fmt'.  |
| make dist   | Create an archive containing the plugin sources and sources of all packages needed to build the plugin and its self-tests. |

### 3 Triggers

Overview

Triggers are logical expressions that "evaluate" data gathered by items and represent the current system state.

While items are used to gather system data, it is highly impractical to follow these data all the time waiting for a condition that is alarming or deserves attention. The job of "evaluating" data can be left to trigger expressions.

Trigger expressions allow to define a threshold of what state of data is "acceptable". Therefore, should the incoming data surpass the acceptable state, a trigger is "fired" - or changes its status to PROBLEM.

A trigger may have the following status:

| Status  | Description  |
|---------|--|
| OK      | This is a normal trigger status.   |
| Problem | Something has happened. For example, the processor load is too high.         |
| Unknown | The trigger value cannot be calculated. See <a href="#">Unknown status</a> . |

In a simple trigger we may want to set a threshold for a five-minute average of some data, for example, the CPU load. This is accomplished by defining a trigger expression where:

- the 'avg' function is applied to the value received in the item key
- a five minute period for evaluation is used
- a threshold of '2' is set

avg(/host/key,5m)>2

This trigger will "fire" (become PROBLEM) if the five-minute average is over 2.

In a more complex trigger, the expression may include a **combination** of multiple functions and multiple thresholds. See also: [Trigger expression](#).

#### Note:

After enabling a trigger (changing its configuration status from *Disabled* to *Enabled*), the trigger expression is evaluated as soon as an item in it receives a value or the time to handle [date and time](#) and/or [nodata\(\)](#) functions comes.

Most trigger functions are evaluated based on item value [history](#) data, while some trigger functions for long-term analytics, e.g. **trendavg()**, **trendcount()**, etc, use trend data.

Calculation time

A trigger is recalculated every time Zabbix server receives a new value that is part of the expression. When a new value is received, each function that is included in the expression is recalculated (not just the one that received the new value).

Additionally, a trigger is recalculated each time when a new value is received **and** every 30 seconds if [date and time](#) and/or [nodata\(\)](#) functions are used in the expression.



**Date and time** and/or `nodata()` functions are recalculated every 30 seconds by the Zabbix history syncer process.

Triggers that reference trend functions **only** are evaluated once per the smallest time period in the expression. See also **trend functions**.

#### Evaluation period

An evaluation period is used in functions referencing the item history. It allows to specify the interval we are interested in. It can be specified as time period (30s, 10m, 1h) or as a value range (#5 - for five latest values).

The evaluation period is measured up to "now" - where "now" is the latest recalculation time of the trigger (see **Calculation time** above); "now" is not the "now" time of the server.

The evaluation period specifies either:

- To consider all values between "now-time period" and "now" (or, with time shift, between "now-time shift-time period" and "now-time\_shift")
- To consider no more than the num count of values from the past, up to "now"
  - If there are 0 available values for the time period or num count specified - then the trigger or calculated item that uses this function becomes unsupported

Note that:

- If only a single function (referencing data history) is used in the trigger, "now" is always the latest received value. For example, if the last value was received an hour ago, the evaluation period will be regarded as up to the latest value an hour ago.
- A new trigger is calculated as soon as the first value is received (history functions); it will be calculated within 30 seconds for **date and time** and `nodata()` functions. Thus the trigger will be calculated even though perhaps the set evaluation period (for example, one hour) has not yet passed since the trigger was created. The trigger will also be calculated after the first value, even though the evaluation range was set, for example, to ten latest values.

#### Unknown status

It is possible that an unknown operand appears in a trigger expression if:

- an unsupported item is used
- the function evaluation for a supported item results in an error

In this case a trigger generally evaluates to "unknown" (although there are some exceptions). For more details, see **Expressions with unknown operands**.

It is possible to **get notified** on unknown triggers.

## 1 Configuring a trigger

### Overview

To configure a trigger, do the following:

- Go to: *Configuration* → *Hosts*
- Click on *Triggers* in the row of the host
- Click on *Create trigger* to the right (or on the trigger name to edit an existing trigger)
- Enter parameters of the trigger in the form

See also **general information** on triggers and their calculation times.

### Configuration

The **Trigger** tab contains all the essential trigger attributes.

Trigger
Tags
Dependencies 1

\* Name

High CPU utilization (over {CPU.UTIL.CRIT}% for 5m)

Event name

High CPU utilization (over {CPU.UTIL.CRIT}% for 5m)

Operational data

Current utilization: {ITEM.LASTVALUE1}

Severity

Not classified

Information

Warning

Average

High

Dis

\* Expression

min(/New host/system.cpu.util,5m)>{CPU.UTIL.CRIT}

Expression constructor

OK event generation

Expression

Recovery expression

None

PROBLEM event generation mode

Single

Multiple

OK event closes

All problems

All problems if tag values match

\* Tag for matching

Allow manual close

☐

URL

Description

CPU utilization is too high. The system might be slow to respond.

Enabled

☒

All mandatory input fields are marked with a red asterisk.

| Parameter         | Description   |
|-------------------|---|
| <i>Name</i>       | <p>Trigger name.</p> <p>Supported <b>macros</b> are: {HOST.HOST}, {HOST.NAME}, {HOST.PORT}, {HOST.CONN}, {HOST.DNS}, {HOST.IP}, {ITEM.VALUE}, {ITEM.LASTVALUE}, {ITEM.LOG.*} and {MACRO} user macros.</p> <p><b>\$1, \$2...\$9</b> macros can be used to refer to the first, second...ninth constant of the expression.</p> <p><i>Note:</i> \$1-\$9 macros will resolve correctly if referring to constants in relatively simple, straightforward expressions. For example, the name "Processor load above \$1 on {HOST.NAME}" will automatically change to "Processor load above 5 on New host" if the expression is last(/New host/system.cpu.load[percpu,avg1])&gt;5</p> |
| <i>Event name</i> | <p>If defined, this name will be used to create the problem event name, instead of the trigger name. The event name may be used to build meaningful alerts containing problem data (see <b>example</b>). The same set of macros is supported as in the trigger name, plus {TIME} and {EXPRESSION} expression macros.</p> <p>Supported since Zabbix 5.2.0.</p>   |

| Parameter                            | Description   |
|--------------------------------------|---|
| <i>Operational data</i>              | Operational data allow to define arbitrary strings along with macros. The macros will resolve dynamically to real time data in <i>Monitoring</i> → <i>Problems</i> . While macros in the trigger name (see above) will resolve to their values at the moment of a problem happening and will become the basis of a static problem name, the macros in the operational data maintain the ability to display the very latest information dynamically. If no operational data is configured on a trigger level, the latest values of all items from the expression will be displayed.<br>The same set of macros is supported as in the trigger name. |
| <i>Severity</i>                      | Set the required trigger <b>severity</b> by clicking the buttons.   |
| <i>Expression</i>                    | Logical <b>expression</b> used to define the conditions of a problem.<br>A problem is created after all the conditions included in the expression are met, i.e. the expression evaluates to TRUE. The problem will be resolved as soon as the expression evaluates to FALSE, unless additional recovery conditions are specified in <i>Recovery expression</i> .  |
| <i>OK event generation</i>           | OK event generation options:<br><b>Expression</b> - OK events are generated based on the same expression as problem events;<br><b>Recovery expression</b> - OK events are generated if the problem expression evaluates to FALSE and the recovery expression evaluates to TRUE;<br><b>None</b> - in this case the trigger will never return to an OK state on its own.  |
| <i>Recovery expression</i>           | Logical <b>expression</b> (optional) defining additional conditions that have to be met before the problem is resolved, after the original problem expression has already been evaluated as FALSE. Recovery expression is useful for trigger <b>hysteresis</b> . It is <b>not</b> possible to resolve a problem by recovery expression alone if the problem expression is still TRUE.<br>This field is only available if 'Recovery expression' is selected for <i>OK event generation</i> .   |
| <i>PROBLEM event generation mode</i> | Mode for generating problem events:<br><b>Single</b> - a single event is generated when a trigger goes into the 'Problem' state for the first time;<br><b>Multiple</b> - an event is generated upon every 'Problem' evaluation of the trigger.  |
| <i>OK event closes</i>               | Select if OK event closes:<br><b>All problems</b> - all problems of this trigger<br><b>All problems if tag values match</b> - only those trigger problems with matching event tag values  |
| <i>Tag for matching</i>              | Enter event tag name to use for event correlation.<br>This field is displayed if 'All problems if tag values match' is selected for the <i>OK event closes</i> property and is mandatory in this case.  |
| <i>Allow manual close</i>            | Check to allow <b>manual closing</b> of problem events generated by this trigger. Manual closing is possible when acknowledging problem events.   |
| <i>URL</i>                           | If not empty, the URL entered here is available as a link in several frontend locations, e.g. when clicking on the problem name in <i>Monitoring</i> → <i>Problems</i> (URL option in the <i>Trigger</i> menu) and <i>Problems</i> dashboard widget.<br>The same set of macros is supported as in the trigger name, plus {EVENT.ID}, {HOST.ID} and {TRIGGER.ID}. Note that user macros with secret values will not be resolved in the URL.  |
| <i>Description</i>                   | Text field used to provide more information about this trigger. May contain instructions for fixing specific problem, contact detail of responsible staff, etc.   |
| <i>Enabled</i>                       | The same set of macros is supported as in the trigger name.<br>Unchecking this box will disable the trigger if required.<br>Problems of a disabled trigger are no longer displayed in the frontend, but are not deleted.  |

The **Tags** tab allows you to define trigger-level **tags**. All problems of this trigger will be tagged with the values entered here.

Trigger
Tags
Dependencies

Trigger tags
Inherited and trigger tags

| Name | Value | Action | Parent |
|------|-------|--------|--------|
| App  | MySQL | Remove | Templa |
| tag  | value | Remove |        |

Add

In addition the *Inherited and trigger tags* option allows to view tags defined on template level, if the trigger comes from that template. If there are multiple templates with the same tag, these tags are displayed once and template names are separated with commas. A trigger does not "inherit" and display host-level tags.

| Parameter  | Description   |
|------------|---|
| Name/Value | <p>Set custom tags to mark trigger events.</p> <p>Tags are a pair of tag name and value. You can use only the name or pair it with a value. A trigger may have several tags with the same name, but different values.</p> <p>User macros, user macros with context, low-level discovery macros and macro <b>functions</b> with <code>{{ITEM.VALUE}}</code>, <code>{{ITEM.LASTVALUE}}</code> and low-level discovery macros are supported in event tags. Low-level discovery macros can be used inside macro context.</p> <p><code>{TRIGGER.ID}</code> macro is supported in trigger tag values. It may be useful for identifying triggers created from trigger prototypes and, for example, suppressing problems from these triggers during maintenance.</p> <p>If the total length of expanded value exceeds 255, it will be cut to 255 characters.</p> <p>See all <b>macros</b> supported for event tags.</p> <p><b>Event tags</b> can be used for event correlation, in action conditions and will also be seen in <i>Monitoring → Problems</i> or the <i>Problems</i> widget.</p> |

The **Dependencies** tab contains all the **dependencies** of the trigger.

Click on *Add* to add a new dependency.

Note:

You can also configure a trigger by opening an existing one, pressing the *Clone* button and then saving under a different name.

Testing expressions

It is possible to test the configured trigger expression as to what the expression result would be depending on the received value.

The following expression from an official template is taken as an example:

```
avg(/Cisco IOS SNMPv2/sensor.temp.value[ciscoEnvMonTemperatureValue.{#SNMPINDEX}],5m)>{$TEMP_WARN}  
or  
last(/Cisco IOS SNMPv2/sensor.temp.status[ciscoEnvMonTemperatureState.{#SNMPINDEX}])={$TEMP_WARN_STATUS}
```

To test the expression, click on *Expression constructor* under the expression field.

Trigger

Tags

Dependencies

\* Name

Cisco IOS SNMPv2: Temperatur is too high

Event name

Cisco IOS SNMPv2: Temperatur is too high

Operational data

Severity

Not classified

Information

Warning

Average

High

Disaster

\* Expression

avg(/Cisco IOS  
SNMPv2/sensor.temp.value[ciscoEnvMonTemperature  
Value.{#SNMPINDEX}],5m)>{\$TEMP\_WARN}  
or  
last(/Cisco IOS  
SNMPv2/sensor.temp.status[ciscoEnvMonTemperatur  
eState.{#SNMPINDEX}])={\$TEMP\_WARN\_STATUS}

Add

Expression constructor

In the Expression constructor, all individual expressions are listed. To open the testing window, click on **Test** below the expression list.

Target Expression

☒ Or

☐ A `avg(/Cisco IOS SNMPv2/sensor.temp.value[ciscoEnvMonTemperatureValue.{#SNMPINDEX}],5m)>{$TEMP_WARN}`

☐ B `last(/Cisco IOS SNMPv2/sensor.temp.status[ciscoEnvMonTemperatureState.{#SNMPINDEX}])={$TEMP_WARN_STATUS}`

[Test](#)

In the testing window you can enter sample values ('80', '70', '0', '1' in this example) and then see the expression result, by clicking on the **Test** button.

Test

| Expression Variable Elements   | Result type       | Value |
|--|-------------------|-------|
| <code>avg(/Cisco IOS SNMPv2/sensor.temp.value[ciscoEnvMonTemperatureValue.{#SNMPINDEX}],5m)</code> | Numeric (float)   | 80    |
| <code>{\$TEMP_WARN}</code>   | Any               | 70    |
| <code>last(/Cisco IOS SNMPv2/sensor.temp.status[ciscoEnvMonTemperatureState.{#SNMPINDEX}])</code>  | Numeric (integer) | 0     |
| <code>{\$TEMP_WARN_STATUS}</code>  | Any               | 1     |

| Expression  | Result | Error |
|---|--------|-------|
| Or  | TRUE   |       |
| A <code>avg(/Cisco IOS SNMPv2/sensor.temp.value[ciscoEnvMonTemperatureValue.{#SNMPINDEX}],...</code>  | TRUE   |       |
| B <code>last(/Cisco IOS SNMPv2/sensor.temp.status[ciscoEnvMonTemperatureState.{#SNMPINDEX}]...</code> | FALSE  |       |
| A or B  | TRUE   |       |

[Test](#) [Cancel](#)

The result of the individual expressions as well as the whole expression can be seen.

"TRUE" means that the specified expression is correct. In this particular case A, "80" is greater than the `{$TEMP_WARN}` specified value, "70" in this example. As expected, a "TRUE" result appears.

"FALSE" means that the specified expression is incorrect. In this particular case B, `{$TEMP_WARN_STATUS}` "1" needs to be equal with specified value, "0" in this example. As expected, a "FALSE" result appears.

The chosen expression type is "OR". If at least one of the specified conditions (A or B in this case) is TRUE, the overall result will be TRUE as well. Meaning that the current value exceeds the warning value and a problem has occurred.

## 2 Trigger expression

### Overview

The expressions used in **triggers** are very flexible. You can use them to create complex logical tests regarding monitored statistics.

A simple expression uses a **function** that is applied to the item with some parameters. The function returns a result that is compared to the threshold, using an operator and a constant.

The syntax of a simple useful expression is `function(/host/key,parameter)<operator><constant>`.

For example:

```
min(/Zabbix_server/net.if.in[eth0,bytes],5m)>100K
```

will trigger if the number of received bytes during the last five minutes was always over 100 kilobytes.

While the syntax is exactly the same, from the functional point of view there are two types of trigger expressions:

- problem expression - defines the conditions of the problem
- recovery expression (optional) - defines additional conditions of the problem resolution

When defining a problem expression alone, this expression will be used both as the problem threshold and the problem recovery threshold. As soon as the problem expression evaluates to TRUE, there is a problem. As soon as the problem expression evaluates to FALSE, the problem is resolved.

When defining both problem expression and the supplemental recovery expression, problem resolution becomes more complex: not only the problem expression has to be FALSE, but also the recovery expression has to be TRUE. This is useful to create **hysteresis** and avoid trigger flapping.

**Note:**

It is unproductive to use the {TRIGGER.VALUE} macro in a recovery expression because this expression is only evaluated when the trigger is in the "Problem" state. Consequently, {TRIGGER.VALUE} will always resolve to "1" (which indicates a "Problem" state) while evaluating the expression.

## Functions

Functions allow to calculate the collected values (average, minimum, maximum, sum), find strings, reference current time and other factors.

A complete list of **supported functions** is available.

Typically functions return numeric values for comparison. When returning strings, comparison is possible with the = and <> operators (see **example**).

### Function parameters

Function parameters allow to specify:

- host and item key (functions referencing the host item history only)
- function-specific parameters
- other expressions (not available for functions referencing the host item history, see **other expressions** for examples)

The host and item key can be specified as /host/key. The referenced item must be in a supported state (except for **nodata()** function, which is calculated for unsupported items as well).

While other trigger expressions as function parameters are limited to non-history functions in triggers, this limitation does not apply in **calculated items**.

### Function-specific parameters

Function-specific parameters are placed after the item key and are separated from the item key by a comma. See the **supported functions** for a complete list of these parameters.

Most of numeric functions accept time as a parameter. You may use seconds or **time suffixes** to indicate time. Preceded by a hash mark, the parameter has a different meaning:

| Expression                | Description                           |
|---------------------------|---------------------------------------|
| <b>sum(/host/key,10m)</b> | Sum of values in the last 10 minutes. |
| <b>sum(/host/key,#10)</b> | Sum of the last ten values.           |

Parameters with a hash mark have a different meaning with the function **last** - they denote the Nth previous value, so given the values 30, 70, 20, 60, 50 (from the most recent to the least recent):

- last(/host/key,#2) would return '70'
- last(/host/key,#5) would return '50'

### Time shift

An optional time shift is supported with time or value count as the function parameter. This parameter allows to reference data from a period of time in the past.

Time shift starts with now - specifying the current time, and is followed by +N<time unit> or -N<time unit> - to add or subtract N time units.

For example, avg(/host/key,1h:now-1d) will return the average value for an hour one day ago.

**Attention:**

Time shift specified in months (M) and years (y) is only supported for **trend functions**. Other functions support seconds (s), minutes (m), hours (h), days (d), and weeks (w).

### Time shift with absolute time periods

Absolute time periods are supported in the time shift parameter, for example, midnight to midnight for a day, Monday-Sunday for a week, first day-last day of the month for a month.

Time shift for absolute time periods starts with `now` - specifying the current time, and is followed by any number of time operations: `/<time unit>` - defines the beginning and end of the time unit, for example, midnight to midnight for a day, `+N<time unit>` or `-N<time unit>` - to add or subtract N time units.

Please note that the value of time shift can be greater or equal to 0, while the time period minimum value is 1.

| Parameter                | Description |
|--------------------------|-------------|
| <code>1d:now/d</code>    | Yesterday   |
| <code>1d:now/d+1d</code> | Today       |
| <code>2d:now/d+1d</code> | Last 2 days |
| <code>1w:now/w</code>    | Last week   |
| <code>1w:now/w+1w</code> | This week   |

#### Other expressions

Function parameters may contain other expressions, as in the following syntax:

```
min(min(/host/key,1h),min(/host2/key2,1h)*10)
```

Note that other expressions may not be used, if the function references item history. For example, the following syntax is not allowed:

```
min(/host/key,#5*10)
```

#### Operators

The following operators are supported for triggers **(in descending priority of execution)**:

| Priority | Operator     | Definition   | Notes for unknown values   | Force cast operand to float <sup>1</sup> |
|----------|--------------|--|--|--|
| <b>1</b> | <b>-</b>     | Unary minus  | -Unknown → Unknown   | Yes                                      |
| <b>2</b> | <b>not</b>   | Logical NOT  | <b>not</b> Unknown → Unknown   | Yes                                      |
| <b>3</b> | <b>*</b>     | Multiplication   | 0 * Unknown → Unknown<br>(yes, Unknown, not 0 - to not lose Unknown in arithmetic operations)<br>1.2 * Unknown → Unknown | Yes                                      |
|          | <b>/</b>     | Division   | Unknown / 0 → error<br>Unknown / 1.2 → Unknown<br>0.0 / Unknown → Unknown  | Yes                                      |
| <b>4</b> | <b>+</b>     | Arithmetical plus  | 1.2 + Unknown → Unknown  | Yes                                      |
|          | <b>-</b>     | Arithmetical minus   | 1.2 - Unknown → Unknown  | Yes                                      |
| <b>5</b> | <b>&lt;</b>  | Less than. The operator is defined as:<br><br>$A < B \Leftrightarrow (A < B - 0.000001)$                   | 1.2 < Unknown → Unknown  | Yes                                      |
|          | <b>&lt;=</b> | Less than or equal to. The operator is defined as:<br><br>$A \leq B \Leftrightarrow (A \leq B + 0.000001)$ | Unknown <= Unknown → Unknown   | Yes                                      |
|          | <b>&gt;</b>  | More than. The operator is defined as:<br><br>$A > B \Leftrightarrow (A > B + 0.000001)$                   |  | Yes                                      |

| Priority | Operator        | Definition  | Notes for unknown values   | Force cast operand to float <sup>1</sup> |
|----------|-----------------|---|--|--|
|          | <b>&gt;=</b>    | More than or equal to. The operator is defined as:<br><br>$A \geq B \Leftrightarrow (A \geq B - 0.000001)$                    |  | Yes                                      |
| <b>6</b> | <b>=</b>        | Is equal. The operator is defined as:<br><br>$A = B \Leftrightarrow (A \geq B - 0.000001) \text{ and } (A \leq B + 0.000001)$ |  | No <sup>1</sup>                          |
|          | <b>&lt;&gt;</b> | Not equal. The operator is defined as:<br><br>$A <> B \Leftrightarrow (A < B - 0.000001) \text{ or } (A > B + 0.000001)$      |  | No <sup>1</sup>                          |
| <b>7</b> | <b>and</b>      | Logical AND   | 0 <b>and</b> Unknown → 0<br>1 <b>and</b> Unknown → Unknown<br>Unknown <b>and</b> Unknown → Unknown | Yes                                      |
| <b>8</b> | <b>or</b>       | Logical OR  | 1 <b>or</b> Unknown → 1<br>0 <b>or</b> Unknown → Unknown<br>Unknown <b>or</b> Unknown → Unknown    | Yes                                      |

<sup>1</sup> String operand is still cast to numeric if:

- another operand is numeric
- operator other than = or <> is used on an operand

(If the cast fails - numeric operand is cast to a string operand and both operands get compared as strings.)

**not**, **and** and **or** operators are case-sensitive and must be in lowercase. They also must be surrounded by spaces or parentheses.

All operators, except unary - and **not**, have left-to-right associativity. Unary - and **not** are non-associative (meaning **-(1)** and **not (not 1)** should be used instead of **--1** and **not not 1**).

Evaluation result:

- **<**, **<=**, **>**, **>=**, **=**, **<>** operators shall yield '1' in the trigger expression if the specified relation is true and '0' if it is false. If at least one operand is Unknown the result is Unknown;
- **and** for known operands shall yield '1' if both of its operands compare unequal to '0'; otherwise, it yields '0'; for unknown operands **and** yields '0' only if one operand compares equal to '0'; otherwise, it yields 'Unknown';
- **or** for known operands shall yield '1' if either of its operands compare unequal to '0'; otherwise, it yields '0'; for unknown operands **or** yields '1' only if one operand compares unequal to '0'; otherwise, it yields 'Unknown';
- The result of the logical negation operator **not** for a known operand is '0' if the value of its operand compares unequal to '0'; '1' if the value of its operand compares equal to '0'. For unknown operand **not** yields 'Unknown'.

Value caching

Values required for trigger evaluation are cached by Zabbix server. Because of this trigger evaluation causes a higher database load for some time after the server restarts. The value cache is not cleared when item history values are removed (either manually or by housekeeper), so the server will use the cached values until they are older than the time periods defined in trigger functions or server is restarted.

Examples of triggers

Example 1



The processor load is too high on Zabbix server.

```
last(/Zabbix server/system.cpu.load[all,avg1])>5
```

By using the function 'last()', we are referencing the most recent value. /Zabbix server/system.cpu.load[all,avg1] gives a short name of the monitored parameter. It specifies that the host is 'Zabbix server' and the key being monitored is 'system.cpu.load[all,avg1]'. Finally, >5 means that the trigger is in the PROBLEM state whenever the most recent processor load measurement from Zabbix server is greater than 5.

#### Example 2

www.example.com is overloaded.

```
last(/www.example.com/system.cpu.load[all,avg1])>5 or min(/www.example.com/system.cpu.load[all,avg1],10m)>2
```

The expression is true when either the current processor load is more than 5 or the processor load was more than 2 during last 10 minutes.

#### Example 3

/etc/passwd has been changed.

```
last(/www.example.com/vfs.file.cksum[/etc/passwd],#1)<>last(/www.example.com/vfs.file.cksum[/etc/passwd],#1)
```

The expression is true when the previous value of /etc/passwd checksum differs from the most recent one.

Similar expressions could be useful to monitor changes in important files, such as /etc/passwd, /etc/inetd.conf, /kernel, etc.

#### Example 4

Someone is downloading a large file from the Internet.

Use of function min:

```
min(/www.example.com/net.if.in[eth0,bytes],5m)>100K
```

The expression is true when number of received bytes on eth0 is more than 100 KB within last 5 minutes.

#### Example 5

Both nodes of clustered SMTP server are down.

Note use of two different hosts in one expression:

```
last(/smtp1.example.com/net.tcp.service[smtp])=0 and last(/smtp2.example.com/net.tcp.service[smtp])=0
```

The expression is true when both SMTP servers are down on both smtp1.example.com and smtp2.example.com.

#### Example 6

Zabbix agent needs to be upgraded.

Use of function find():

```
find(/example.example.com/agent.version,,"like","beta8")=1
```

The expression is true if Zabbix agent has version beta8.

#### Example 7

Server is unreachable.

```
count(/example.example.com/icmpping,30m,,"0")>5
```

The expression is true if host "example.example.com" is unreachable more than 5 times in the last 30 minutes.

#### Example 8

No heartbeats within last 3 minutes.

Use of function nodata():

```
nodata(/example.example.com/tick,3m)=1
```

To make use of this trigger, 'tick' must be defined as a Zabbix **trapper** item. The host should periodically send data for this item using zabbix\_sender. If no data is received within 180 seconds, the trigger value becomes PROBLEM.

*Note* that 'nodata' can be used for any item type.

#### Example 9

CPU activity at night time.

Use of function time():

```
min(/Zabbix server/system.cpu.load[all,avg1],5m)>2 and time()<060000
```

The trigger may change its state to problem only at night time (00:00 - 06:00).

#### Example 10

CPU activity at any time with exception.

Use of function time() and **not** operator:

```
min(/zabbix/system.cpu.load[all,avg1],5m)>2
and not (dayofweek()=7 and time()>230000)
and not (dayofweek()=1 and time()<010000)
```

The trigger may change its state to problem at any time, except for 2 hours on a week change (Sunday, 23:00 - Monday, 01:00).

#### Example 11

Check if client local time is in sync with Zabbix server time.

Use of function fuzzytime():

```
fuzzytime(/MySQL_DB/system.localtime,10s)=0
```

The trigger will change to the problem state in case when local time on server MySQL\_DB and Zabbix server differs by more than 10 seconds. Note that 'system.localtime' must be configured as a **passive check**.

#### Example 12

Comparing average load today with average load of the same time yesterday (using time shift as now-1d).

```
avg(/server/system.cpu.load,1h)/avg(/server/system.cpu.load,1h:now-1d)>2
```

This trigger will fire if the average load of the last hour tops the average load of the same hour yesterday more than two times.

#### Example 13

Using the value of another item to get a trigger threshold:

```
last(/Template PfSense/hrStorageFree[{#SNMPVALUE}])<last(/Template PfSense/hrStorageSize[{#SNMPVALUE}])*0.1
```

The trigger will fire if the free storage drops below 10 percent.

#### Example 14

Using **evaluation result** to get the number of triggers over a threshold:

```
(last(/server1/system.cpu.load[all,avg1])>5) + (last(/server2/system.cpu.load[all,avg1])>5) + (last(/server3/system.cpu.load[all,avg1])>5)>2
```

The trigger will fire if at least two of the triggers in the expression are in a problem state.

#### Example 15

Comparing string values of two items - operands here are functions that return strings.

Problem: create an alert if Ubuntu version is different on different hosts

```
last(/NY Zabbix server/vfs.file.contents[/etc/os-release])<>last(/LA Zabbix server/vfs.file.contents[/etc/os-release])
```

#### Example 16

Comparing two string values - operands are:

- a function that returns a string
- a combination of macros and strings

Problem: detect changes in the DNS query

The item key is:

```
net.dns.record[8.8.8.8,{ $WEBSITE_NAME }, { $DNS_RESOURCE_RECORD_TYPE }, 2, 1]
```

with macros defined as

```
{ $WEBSITE_NAME } = example.com
{ $DNS_RESOURCE_RECORD_TYPE } = MX
```

and normally returns:

```
example.com          MX          0 mail.example.com
```

So our trigger expression to detect if the DNS query result deviated from the expected result is:

```
last(/Zabbix server/net.dns.record[8.8.8.8,{ $WEBSITE_NAME},{ $DNS_RESOURCE_RECORD_TYPE},2,1])<>"{$WEBSITE_NAME}
```

Notice the quotes around the second operand.

Example 17

Comparing two string values - operands are:

- a function that returns a string
- a string constant with special characters \ and "

Problem: detect if the /tmp/hello file content is equal to:

```
\ " //hello ?\"
```

Option 1) write the string directly

```
last(/Zabbix server/vfs.file.contents[/tmp/hello])="\ \" //hello ?\""
```

Notice how \ and " characters are escaped when the string gets compared directly.

Option 2) use a macro

```
{ $HELLO_MACRO} = \ " //hello ?\"
```

in the expression:

```
last(/Zabbix server/vfs.file.contents[/tmp/hello])={ $HELLO_MACRO}
```

Example 18

Comparing long-term periods.

Problem: Load of Exchange server increased by more than 10% last month

```
trendavg(/Exchange/system.cpu.load,1M:now/M)>1.1*trendavg(/Exchange/system.cpu.load,1M:now/M-1M)
```

You may also use the **Event name** field in trigger configuration to build a meaningful alert message, for example to receive something like

```
"Load of Exchange server increased by 24% in July (0.69) comparing to June (0.56)"
```

the event name must be defined as:

```
Load of { $HOST.HOST} server increased by {{ ?100*trendavg(/system.cpu.load,1M:now/M)/trendavg(/system.cpu.load,1M:now/M-1M)}}
```

It is also useful to allow manual closing in trigger configuration for this kind of problem.

Hysteresis

Sometimes an interval is needed between problem and recovery states, rather than a simple threshold. For example, if we want to define a trigger that reports a problem when server room temperature goes above 20°C and we want it to stay in the problem state until the temperature drops below 15°C, a simple trigger threshold at 20°C will not be enough.

Instead, we need to define a trigger expression for the problem event first (temperature above 20°C). Then we need to define an additional recovery condition (temperature below 15°C). This is done by defining an additional *Recovery expression* parameter when **defining** a trigger.

In this case, problem recovery will take place in two steps:

- First, the problem expression (temperature above 20°C) will have to evaluate to FALSE
- Second, the recovery expression (temperature below 15°C) will have to evaluate to TRUE

The recovery expression will be evaluated only when the problem event is resolved first.

**Warning:**

The recovery expression being TRUE alone does not resolve a problem if the problem expression is still TRUE!

Example 1

Temperature in server room is too high.

Problem expression:

```
last(/server/temp)>20
```

Recovery expression:

```
last(/server/temp)<=15
```

#### Example 2

Free disk space is too low.

Problem expression: it is less than 10GB for last 5 minutes

```
max(/server/vfs.fs.size[/,free],5m)<10G
```

Recovery expression: it is more than 40GB for last 10 minutes

```
min(/server/vfs.fs.size[/,free],10m)>40G
```

#### Expressions with unknown operands

Generally an unknown operand (such as an unsupported item) in the expression will immediately render the trigger value to `Unknown`.

However, in some cases unknown operands (unsupported items, function errors) are admitted into expression evaluation:

- The `nodata()` function is evaluated regardless of whether the referenced item is supported or not.
- Logical expressions with OR and AND can be evaluated to known values in two cases regardless of unknown operands:
  - **Case 1:** "1 or some\_function(unsupported\_item1) or some\_function(unsupported\_item2) or ..." can be evaluated to known result ('1' or "Problem"),
  - **Case 2:** "0 and some\_function(unsupported\_item1) and some\_function(unsupported\_item2) and ..." can be evaluated to known result ('0' or "OK").Zabbix tries to evaluate such logical expressions by taking unsupported items as unknown operands. In the two cases above a known value will be produced ("Problem" or "OK", respectively); in **all other** cases the trigger will evaluate to `Unknown`.
- If the function evaluation for a supported item results in error, the function value becomes `Unknown` and it takes part as unknown operand in further expression evaluation.

Note that unknown operands may "disappear" only in logical expressions as described above. In arithmetic expressions unknown operands always lead to the result `Unknown` (except division by 0).

#### Attention:

An expression that results in `Unknown` does not change the trigger state ("Problem/OK"). So, if it was "Problem" (see Case 1), it stays in the same problem state even if the known part is resolved ('1' becomes '0'), because the expression is now evaluated to `Unknown` and that does not change the trigger state.

If a trigger expression with several unsupported items evaluates to `Unknown` the error message in the frontend refers to the last unsupported item evaluated.

## 3 Trigger dependencies

### Overview

Sometimes the availability of one host depends on another. A server that is behind a router will become unreachable if the router goes down. With triggers configured for both, you might get notifications about two hosts down - while only the router was the guilty party.

This is where some dependency between hosts might be useful. With dependency set, notifications of the dependents could be withheld and only the notification on the root problem sent.

While Zabbix does not support dependencies between hosts directly, they may be defined with another, more flexible method - trigger dependencies. A trigger may have one or more triggers it depends on.

So in our simple example we open the server trigger configuration form and set that it depends on the respective trigger of the router. With such dependency, the server trigger will not change its state as long as the trigger it depends on is in the 'PROBLEM' state - and thus no dependent actions will be taken and no notifications sent.

If both the server and the router are down and dependency is there, Zabbix will not execute actions for the dependent trigger.

While the parent trigger is in the PROBLEM state, its dependents may report values that cannot be trusted. Therefore dependent triggers will not be re-evaluated until the parent trigger (the router in the example above):

- goes back from 'PROBLEM' to 'OK' state;
- changes its state from 'PROBLEM' to 'UNKNOWN';
- is closed manually, by correlation or with the help of **date and time** and/or `nodata()` functions;
- is resolved by a value of an item not involved in the dependent trigger;

- is disabled, has a disabled item or a disabled item host

In all of the cases mentioned above, the dependent trigger (server) will be re-evaluated only when a new metric for it is received. This means that the dependent trigger may not be updated immediately.

Also:

- Trigger dependency may be added from any host trigger to any other host trigger, as long as it doesn't result in a circular dependency.
- Trigger dependency may be added from one template to another. If some trigger from template A depends on some trigger from template B, template A may only be linked to a host (or another template) together with template B, but template B may be linked to a host (or another template) alone.
- Trigger dependency may be added from a template trigger to a host trigger. In this case, linking such a template to a host will create a host trigger that depends on the same trigger template that the trigger was depending on. This allows to, for example, have a template where some triggers depend on the router (host) triggers. All hosts linked to this template will depend on that specific router.
- Trigger dependency may not be added from a host trigger to a template trigger.
- Trigger dependency may be added from a trigger prototype to another trigger prototype (within the same low-level discovery rule) or a real trigger. A trigger prototype may not depend on a trigger prototype from a different LLD rule or on a trigger created from trigger prototype. A host trigger prototype cannot depend on a trigger from a template.

## Configuration

To define a dependency, open the Dependencies tab in the trigger **configuration form**. Click on *Add* in the 'Dependencies' block and select one or more triggers that the trigger will depend on.

| Trigger  | Tags | Dependencies 1 |
|--|------|----------------|
| <div> <div>Dependencies</div> <div> <div>Name</div> <div>My host: Load average is too high (per CPU load over { \$LOAD_AVG_PER_CPU.MAX.WARN } for 5m)</div> <div>Add</div> </div> </div> |      |                |

Click *Update*. Now the trigger has the indication of its dependency in the list.

Template Module Linux CPU by Zabbix agent: High CPU utilization  
(over { \$CPU.UTIL.CRIT }% for 5m)  
**Depends on:**  
My host: Load average is too high (per CPU load over  
{ \$LOAD\_AVG\_PER\_CPU.MAX.WARN } for 5m)

## Example of several dependencies

For example, the Host is behind the Router2 and the Router2 is behind the Router1.

Zabbix - Router1 - Router2 - Host

If the Router1 is down, then obviously the Host and the Router2 are also unreachable, yet receiving three notifications about the Host, the Router1 and the Router2 all being down is excessive.

So in this case we define two dependencies:

the 'Host is down' trigger depends on the 'Router2 is down' trigger  
the 'Router2 is down' trigger depends on the 'Router1 is down' trigger

Before changing the status of the 'Host is down' trigger, Zabbix will check for the corresponding trigger dependencies. If such are found and one of those triggers is in the 'Problem' state, then the trigger status will not be changed, the actions will not be executed and no notifications will be sent.

Zabbix performs this check recursively. If the Router1 or the Router2 is unreachable, the Host trigger won't be updated.

## 4 Trigger severity

Trigger severity represents the level of importance of a trigger.

Severity Not classified Information Warning Average High Disaster

Zabbix supports the following default trigger severities.

| Severity       | Color      | Description   |
|----------------|------------|---|
| Not classified | Gray       | Can be used where the severity level of an event is unknown, has not been determined, is not part of the regular monitoring scope, etc., for example, during initial configuration, as a placeholder for future assessment, or as part of an integration process. |
| Information    | Light blue | Can be used for informational events that do not require immediate attention, but can still provide valuable insights.  |
| Warning        | Yellow     | Can be used to indicate a potential issue that might require investigation or action, but that is not critical.   |
| Average        | Orange     | Can be used to indicate a significant issue that should be addressed relatively soon to prevent further problems.   |
| High           | Light red  | Can be used to indicate critical issues that need immediate attention to avoid significant disruptions.   |
| Disaster       | Red        | Can be used to indicate a severe incident that requires immediate action to prevent, for example, system outages or data loss.  |

**Note:**

Trigger severity names and colors can be **customized**.

Trigger severities are used for:

- visual representation of triggers - different colors for different severities;
- audio in global alarms - different audio for different severities;
- user media - different media (notification channel) for different severities (for example, SMS for triggers of *High* and *Disaster* severity, and Email for triggers of other severities);
- limiting actions by conditions against trigger severities.

## 5 Customizing trigger severities

Trigger severity names and colors for severity related GUI elements can be configured in *Administration* → *General* → *Trigger displaying options*. Colors are shared among all GUI themes.

Translating customized severity names

**Attention:**

If Zabbix frontend translations are used, custom severity names will override translated names by default.

Default trigger severity names are available for translation in all locales. If a severity name is changed, a custom name is used in all locales and additional manual translation is needed.

Custom severity name translation procedure:

- set required custom severity name, for example, 'Important'
- edit `<frontend_dir>/locale/<required_locale>/LC_MESSAGES/frontend.po`
- add 2 lines:

```
msgid "Important"
msgstr "<translation string>"
```

and save file.

- create .mo files as described in `<frontend_dir>/locale/README`

Here **msgid** should match the new custom severity name and **msgstr** should be the translation for it in the specific language.

This procedure should be performed after each severity name change.

## 6 Mass update

### Overview

With mass update you may change some attribute for a number of triggers at once, saving you the need to open each individual trigger for editing.

### Using mass update

To mass-update some triggers, do the following:

- Mark the checkboxes of the triggers you want to update in the list
- Click on *Mass update* below the list
- Navigate to the tab with required attributes (*Trigger*, *Tags* or *Dependencies*)
- Mark the checkboxes of any attribute to update

### Mass update

[Trigger](#) [Tags](#) [Dependencies](#)

Severity ☒ Not classified Information Warning Average High Disaster

Allow manual close ☐ Original

### Mass update

[Trigger](#) [Tags](#) [Dependencies](#)

Tags ☒ Add Replace Remove

Name

Value

tag

value

Add

The following options are available when selecting the respective button for tag update:

- *Add* - allows to add new tags for the triggers;
- *Replace* - will remove any existing tags from the trigger and replace them with the one(s) specified below;
- *Remove* - will remove specified tags from triggers.

Note that tags with the same name but different values are not considered 'duplicates' and can be added to the same trigger.

### Mass update

[Trigger](#) [Tags](#) [Dependencies](#)

Replace dependencies ☒

Name

Zabbix server: Lack of available memory ( < 20M of 7.72 GB)

Add

*Replace dependencies* - will remove any existing dependencies from the trigger and replace them with the one(s) specified.

Click on *Update* to apply the changes.

7 Predictive trigger functions

Overview

Sometimes there are signs of the upcoming problem. These signs can be spotted so that actions may be taken in advance to prevent or at least minimize the impact of the problem.

Zabbix has tools to predict the future behavior of the monitored system based on historic data. These tools are realized through predictive trigger functions.

Functions

Before setting a trigger, it is necessary to define what a problem state is and how much time is needed to take action. Then there are two ways to set up a trigger signaling about a potential unwanted situation. First: the trigger must fire when the system is expected to be in a problem state after the "time to act". Second: the trigger must fire when the system is going to reach the problem state in less than "time to act". Corresponding trigger functions to use are **forecast** and **timeleft**. Note that underlying statistical analysis is basically identical for both functions. You may set up a trigger whichever way you prefer with similar results.

Parameters

Both functions use almost the same set of parameters. Use the list of [supported functions](#) for reference.

Time interval

First of all, you should specify the historic period Zabbix should analyze to come up with the prediction. You do it in a familiar way by means of the `time period` parameter and optional time shift like you do it with **avg**, **count**, **delta**, **max**, **min** and **sum** functions.

Forecasting horizon

(**forecast** only)

Parameter `time` specifies how far in the future Zabbix should extrapolate dependencies it finds in historic data. No matter if you use `time_shift` or not, `time` is always counted starting from the current moment.

Threshold to reach

(**timeleft** only)

Parameter `threshold` specifies a value the analyzed item has to reach, no difference if from above or from below. Once we have determined  $f(t)$  (see below), we should solve equation  $f(t) = \text{threshold}$  and return the root which is closer to now and to the right from now or 9999999999.9999 if there is no such root.

**Note:**  
When item values approach the threshold and then cross it, **timeleft** assumes that intersection is already in the past and therefore switches to the next intersection with `threshold` level, if any. Best practice should be to use predictions as a complement to ordinary problem diagnostics, not as a substitution.<sup>1</sup>

Fit functions

Default `fit` is the *linear* function. But if your monitored system is more complicated you have more options to choose from.

| fit                      | $x = f(t)$  |
|--------------------------|---|
| linear                   | $x = a + b \cdot t$   |
| polynomialN <sup>2</sup> | $x = a_0 + a_1 \cdot t + a_2 \cdot t^2 + \dots + a_n \cdot t^n$ |
| exponential              | $x = a \cdot \exp(b \cdot t)$                                   |
| logarithmic              | $x = a + b \cdot \log(t)$                                       |
| power                    | $x = a \cdot t^b$   |

Modes

(**forecast** only)

Every time a trigger function is evaluated, it gets data from the specified history period and fits a specified function to the data. So, if the data is slightly different, the fitted function will be slightly different. If we simply calculate the value of the fitted function at a specified time in the future, you will know nothing about how the analyzed item is expected to behave between now and that moment in the future. For some `fit` options (like *polynomial*) a simple value from the future may be misleading.

| mode  | <b>forecast</b> result        |
|-------|-------------------------------|
| value | $f(\text{now} + \text{time})$ |



| mode         | forecast result   |
|--------------|---|
| <i>max</i>   | $\max_{\text{now} \leq t \leq \text{now} + \text{time}} f(t)$   |
| <i>min</i>   | $\min_{\text{now} \leq t \leq \text{now} + \text{time}} f(t)$   |
| <i>delta</i> | $\text{max} - \text{min}$   |
| <i>avg</i>   | average of $f(t)$ ( $\text{now} \leq t \leq \text{now} + \text{time}$ ) according to <a href="#">definition</a> |

## Details

To avoid calculations with huge numbers, we consider the timestamp of the first value in specified period plus 1 ns as a new zero-time (current epoch time is of order  $10^9$ , epoch squared is  $10^{18}$ , double precision is about  $10^{-16}$ ). 1 ns is added to provide all positive time values for *logarithmic* and *power* fits which involve calculating  $\log(t)$ . Time shift does not affect *linear*, *polynomial*, *exponential* (apart from easier and more precise calculations) but changes the shape of *logarithmic* and *power* functions.

## Potential errors

Functions return -1 in such situations:

- specified evaluation period contains no data;
- result of mathematical operation is not defined<sup>3</sup>;
- numerical complications (unfortunately, for some sets of input data range and precision of double-precision floating-point format become insufficient)<sup>4</sup>.

### Note:

No warnings or errors are flagged if chosen fit poorly describes provided data or there is just too few data for accurate prediction.

## Examples and dealing with errors

To get a warning when you are about to run out of free disk space on your host, you may use a trigger expression like this:

```
timeleft(/host/vfs.fs.size[/,free],1h,0)<1h
```

However, error code -1 may come into play and put your trigger in a problem state. Generally it's good because you get a warning that your predictions don't work correctly and you should look at them more thoroughly to find out why. But sometimes it's bad because -1 can simply mean that there was no data about the host free disk space obtained in the last hour. If you are getting too many false positive alerts, consider using more complicated trigger expression<sup>5</sup>:

```
timeleft(/host/vfs.fs.size[/,free],1h,0)<1h and timeleft(/host/vfs.fs.size[/,free],1h,0)<>-1
```

The situation is a bit more difficult with **forecast**. First of all, -1 may or may not put the trigger in a problem state depending on whether you have expression like `forecast(/host/item,...)<...` or like `forecast(/host/item,...)>...`

Furthermore, -1 may be a valid forecast if it's normal for the item value to be negative. But probability of this situation in the real world situation is negligible (see [how](#) the operator = works). So add `... or forecast(/host/item,...)=-1` or `... and forecast(/host/item,...)<>-1` if you want or don't want to treat -1 as a problem respectively.

## Footnotes

<sup>1</sup> For example, a simple trigger like `timeleft(/host/item,1h,X) < 1h` may go into problem state when the item value approaches X and then suddenly recover once value X is reached. If the problem is item value being below X, use: `last(/host/item) < X` or `timeleft(/host/item,1h,X) < 1h` If the problem is item value being above X, use: `last(/host/item) > X` or `timeleft(/host/item,1h,X) < 1h`

<sup>2</sup> Polynomial degree can be from 1 to 6, *polynomial1* is equivalent to *linear*. However, use higher degree polynomials [with caution](#). If the evaluation period contains less points than needed to determine polynomial coefficients, polynomial degree will be lowered (e.g., *polynomial5* is requested, but there are only 4 points, therefore *polynomial3* will be fitted).

<sup>3</sup> For example, fitting *exponential* or *power* functions involves calculating  $\log()$  of item values. If data contains zeros or negative numbers, you will get an error since  $\log()$  is defined for positive values only.

<sup>4</sup> For *linear*, *exponential*, *logarithmic* and *power* fits all necessary calculations can be written explicitly. For *polynomial* only *value* can be calculated without any additional steps. Calculating *avg* involves computing polynomial antiderivative (analytically). Computing *max*, *min* and *delta* involves computing polynomial derivative (analytically) and finding its roots (numerically). Solving  $f(t) = 0$  involves finding polynomial roots (numerically).

<sup>5</sup> But in this case -1 can cause your trigger to recover from the problem state. To be fully protected use: `timeleft(/host/vfs.fs.size[/,free],1h,0)<1h and ({TRIGGER.VALUE}=0 and timeleft(/host/vfs.fs.size[/,free],1h,0)<>-1 or {TRIGGER.VALUE}=1)`

## 4 Events

### Overview

There are several types of events generated in Zabbix:

- trigger events - whenever a trigger changes its status (*OK*→*PROBLEM*→*OK*)
- service events - whenever a service changes its status (*OK*→*PROBLEM*→*OK*)
- discovery events - when hosts or services are detected
- autoregistration events - when active agents are auto-registered by server
- internal events - when an item/low-level discovery rule becomes unsupported or a trigger goes into an unknown state

#### Note:

Internal events are supported starting with Zabbix 2.2 version.

Events are time-stamped and can be the basis of actions such as sending notification e-mail etc.

To view details of events in the frontend, go to *Monitoring* → *Problems*. There you can click on the event date and time to view details of an event.

More information is available on:

- [trigger events](#)
- [other event sources](#)

### 1 Trigger event generation

#### Overview

Change of trigger status is the most frequent and most important source of events. Each time the trigger changes its state, an event is generated. The event contains details of the trigger state's change - when it happened and what the new state is.

Two types of events are created by triggers - Problem and OK.

#### Problem events

A problem event is created:

- when a trigger expression evaluates to TRUE if the trigger is in OK state;
- each time a trigger expression evaluates to TRUE if multiple problem event generation is enabled for the trigger.

#### OK events

An OK event closes the related problem event(s) and may be created by 3 components:

- triggers - based on 'OK event generation' and 'OK event closes' settings;
- event correlation
- task manager - when an event is **manually closed**

#### Triggers

Triggers have an 'OK event generation' setting that controls how OK events are generated:

- *Expression* - an OK event is generated for a trigger in problem state when its expression evaluates to FALSE. This is the simplest setting, enabled by default.
- *Recovery expression* - an OK event is generated for a trigger in problem state when its expression evaluates to FALSE and the recovery expression evaluates to TRUE. This can be used if trigger recovery criteria is different from problem criteria.
- *None* - an OK event is never generated. This can be used in conjunction with multiple problem event generation to simply send a notification when something happens.

Additionally triggers have an 'OK event closes' setting that controls which problem events are closed:

- *All problems* - an OK event will close all open problems created by the trigger
- *All problems if tag values match* - an OK event will close open problems created by the trigger and having at least one matching tag value. The tag is defined by 'Tag for matching' trigger setting. If there are no problem events to close then OK event is not generated. This is often called trigger level event correlation.

## Event correlation

Event correlation (also called global event correlation) is a way to set up custom event closing (resulting in OK event generation) rules.

The rules define how the new problem events are paired with existing problem events and allow to close the new event or the matched events by generating corresponding OK events.

However, event correlation must be configured very carefully, as it can negatively affect event processing performance or, if misconfigured, close more events than intended (in the worst case even all problem events could be closed). A few configuration tips:

1. always reduce the correlation scope by setting a unique tag for the control event (the event that is paired with old events) and use the 'new event tag' correlation condition
2. don't forget to add a condition based on the old event when using 'close old event' operation, or all existing problems could be closed
3. avoid using common tag names used by different correlation configurations

## Task manager

If the 'Allow manual close' setting is enabled for trigger, then it's possible to manually close problem events generated by the trigger. This is done in the frontend when **updating a problem**. The event is not closed directly – instead a 'close event' task is created, which is handled by the task manager shortly. The task manager will generate a corresponding OK event and the problem event will be closed.

## 2 Other event sources

### Service events

Service events are generated only if service actions for these events are enabled. In this case, each service status change creates a new event:

- Problem event - when service status is changed from OK to PROBLEM
- OK event - when service status is changed from PROBLEM to OK

The event contains details of the service state change - when it happened and what the new state is.

### Discovery events

Zabbix periodically scans the IP ranges defined in network discovery rules. Frequency of the check is configurable for each rule individually. Once a host or a service is discovered, a discovery event (or several events) are generated.

Zabbix generates the following events:

| Event              | When generated  |
|--------------------|---|
| Service Up         | Every time Zabbix detects active service.                               |
| Service Down       | Every time Zabbix cannot detect service.                                |
| Host Up            | If at least one of the services is UP for the IP.                       |
| Host Down          | If all services are not responding.                                     |
| Service Discovered | If the service is back after downtime or discovered for the first time. |
| Service Lost       | If the service is lost after being up.                                  |
| Host Discovered    | If host is back after downtime or discovered for the first time.        |
| Host Lost          | If host is lost after being up.   |

### Active agent autoregistration events

Active agent autoregistration creates events in Zabbix.

If configured, active agent autoregistration event is created when a previously unknown active agent asks for checks or if the host metadata has changed. The server adds a new auto-registered host, using the received IP address and port of the agent.

For more information, see the **active agent autoregistration** page.

### Internal events

Internal events happen when:

- an item changes state from 'normal' to 'unsupported'
- an item changes state from 'unsupported' to 'normal'
- a low-level discovery rule changes state from 'normal' to 'unsupported'

- a low-level discovery rule changes state from 'unsupported' to 'normal'
- a trigger changes state from 'normal' to 'unknown'
- a trigger changes state from 'unknown' to 'normal'

Internal events are supported since Zabbix 2.2. The aim of introducing internal events is to allow users to be notified when any internal event takes place, for example, an item becomes unsupported and stops gathering data.

Internal events are only created when internal actions for these events are enabled. To stop generation of internal events (for example, for items becoming unsupported), disable all actions for internal events in Configuration → Actions → Internal actions.

**Note:**

If internal actions are disabled, while an object is in the 'unsupported' state, recovery event for this object will still be created.

If internal actions are enabled, while an object is in the 'unsupported' state, recovery event for this object will be created, even though 'problem event' has not been created for the object.

See also: [Receiving notification on unsupported items](#)

### 3 Manual closing of problems

#### Overview

While generally problem events are resolved automatically when trigger status goes from 'Problem' to 'OK', there may be cases when it is difficult to determine if a problem has been resolved by means of a trigger expression. In such cases, the problem needs to be resolved manually.

For example, *syslog* may report that some kernel parameters need to be tuned for optimal performance. In this case the issue is reported to Linux administrators, they fix it and then close the problem manually.

Problems can be closed manually only for triggers with the *Allow manual close* option enabled.

When a problem is "manually closed", Zabbix generates a new internal task for Zabbix server. Then the *task manager* process executes this task and generates an OK event, therefore closing problem event.

A manually closed problem does not mean that the underlying trigger will never go into a 'Problem' state again. The trigger expression is re-evaluated and may result in a problem:

- When new data arrive for any item included in the trigger expression (note that the values discarded by a throttling preprocessing step are not considered as received and will not cause trigger expression to be re-evaluated);
- When **date and time** and/or `nodata()` functions are used in the expression.

#### Configuration

Two steps are required to close a problem manually.

#### Trigger configuration

In trigger configuration, enable the *Allow manual close* option.

**Allow manual close** ☒

#### Problem update window

If a problem arises for a trigger with the *Manual close* flag, you can open the **problem update** popup window of that problem and close the problem manually.

To close the problem, check the *Close problem* option in the form and click on *Update*.

Update problem

Message

Fixed, closing.

History

Time User User action Message

Scope

☒ Only selected problem
 ☐ Selected and all other problems of related triggers 1 event

Change severity

☐ Not classified
 ☐ Information
 ☐ Warning
 ☐ Average
 ☐ High
 ☐ Disaster

Acknowledge

☐

Close problem

☒

\* At least one update operation or message must exist.

Update

Cancel

All mandatory input fields are marked with a red asterisk.

The request is processed by Zabbix server. Normally it will take a few seconds to close the problem. During that process *CLOSING* is displayed in *Monitoring* → *Problems* as the status of the problem.

#### Verification

It can be verified that a problem has been closed manually:

- in event details, available through *Monitoring* → *Problems*;
- by using the {EVENT.UPDATE.HISTORY} macro in notification messages that will provide this information.

## 5 Event correlation

### Overview

Event correlation allows to correlate problem events to their resolution in a manner that is very precise and flexible.

Event correlation can be defined:

- **on trigger level** - one trigger may be used to relate separate problems to their solution
- **globally** - problems can be correlated to their solution from a different trigger/polling method using global correlation rules

### 1 Trigger-based event correlation

#### Overview

Trigger-based event correlation allows to correlate separate problems reported by one trigger.

While generally an OK event can close all problem events created by one trigger, there are cases when a more detailed approach is needed. For example, when monitoring log files you may want to discover certain problems in a log file and close them individually rather than all together.

This is the case with triggers that have *PROBLEM event generation mode* parameter set to *Multiple*. Such triggers are normally used for log monitoring, trap processing, etc.

It is possible in Zabbix to relate problem events based on **tagging**. Tags are used to extract values and create identification for problem events. Taking advantage of that, problems can also be closed individually based on matching tag.

In other words, the same trigger can create separate events identified by the event tag. Therefore problem events can be identified one-by-one and closed separately based on the identification by the event tag.

How it works

In log monitoring you may encounter lines similar to these:

```
Line1: Application 1 stopped
Line2: Application 2 stopped
Line3: Application 1 was restarted
Line4: Application 2 was restarted
```

The idea of event correlation is to be able to match the problem event from Line1 to the resolution from Line3 and the problem event from Line2 to the resolution from Line4, and close these problems one by one:

```
Line1: Application 1 stopped
Line3: Application 1 was restarted #problem from Line 1 closed
```

```
Line2: Application 2 stopped
Line4: Application 2 was restarted #problem from Line 2 closed
```

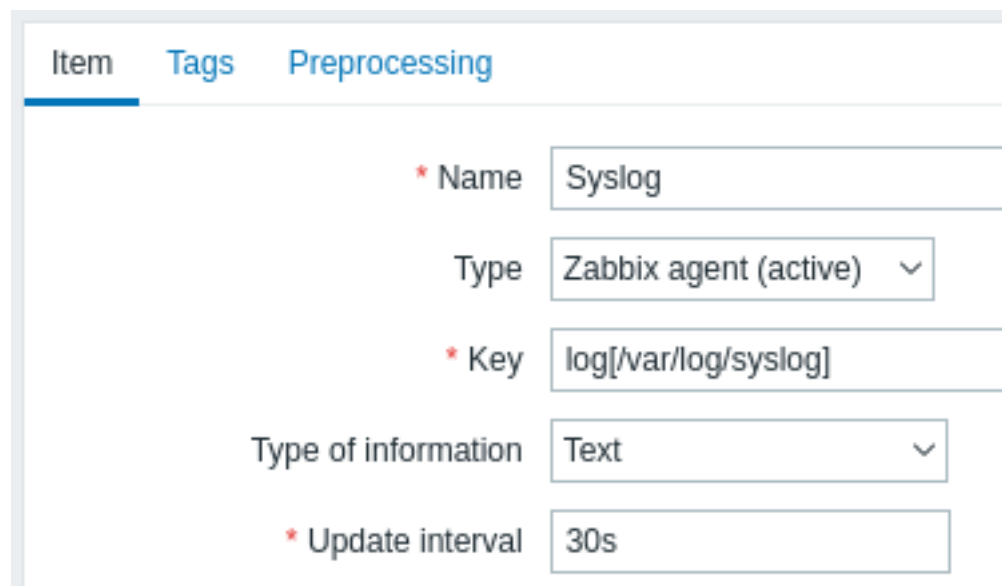
To do this you need to tag these related events as, for example, "Application 1" and "Application 2". That can be done by applying a regular expression to the log line to extract the tag value. Then, when events are created, they are tagged "Application 1" and "Application 2" respectively and problem can be matched to the resolution.

Configuration

Item

To begin with, you may want to set up an item that monitors a log file, for example:

```
log[/var/log/syslog]
```



The screenshot shows the Zabbix Item configuration form. The 'Item' tab is selected. The form contains the following fields:

- Name:** Syslog
- Type:** Zabbix agent (active) (dropdown menu)
- Key:** log[/var/log/syslog]
- Type of information:** Text (dropdown menu)
- Update interval:** 30s

With the item set up, wait a minute for the configuration changes to be picked up and then go to **Latest data** to make sure that the item has started collecting data.

Trigger

With the item working you need to configure the **trigger**. It's important to decide what entries in the log file are worth paying attention to. For example, the following trigger expression will search for a string like 'Stopping' to signal potential problems:

```
find(/My host/log[/var/log/syslog],,"regex","Stopping")=1
```

**Attention:**

To make sure that each line containing the string "Stopping" is considered a problem also set the *Problem event generation mode* in trigger configuration to 'Multiple'.

Then define a recovery expression. The following recovery expression will resolve all problems if a log line is found containing the string "Starting":

```
find(/My host/log[/var/log/syslog],,"regexp","Starting")=1
```

Since we do not want that it's important to make sure somehow that the corresponding root problems are closed, not just all problems. That's where tagging can help.

Problems and resolutions can be matched by specifying a tag in the trigger configuration. The following settings have to be made:

- *Problem event generation mode*: Multiple
- *OK event closes*: All problems if tag values match
- Enter the name of the tag for event matching

Trigger

Tags

Dependencies

\*

Name

Service {{ITEM.VALUE}.regsub("^.\* service ([a-zA-Z]\*) .\*\$", "\1")} stopped

Event name

Service {{ITEM.VALUE}.regsub("^.\* service ([a-zA-Z]\*) .\*\$", "\1")} stopped

Operational data

Severity

Not classified

Information

Warning

Average

High

Disas

\*

Problem expression

find(/My host/log[/var  
/log/syslog],,"regexp","Stopping")=1

Add

[Expression constructor](#)

OK event generation

Expression

Recovery expression

None

\*

Recovery expression

find(/My host/log[/var  
/log/syslog],,"regexp","Starting")=1

Add

[Expression constructor](#)

PROBLEM event generation mode

Single

Multiple

OK event closes

All problems

All problems if tag values match

\*

Tag for matching

Service

- configure the **tags** to extract tag values from log lines

Trigger

Tags 2

Dependencies

Trigger tags

Inherited and trigger tags

Name

Value

Datacenter

value

Service

{{ITEM.VALUE}.regsub("^.\* service ([a-zA-Z]\*) .\*\$", "\1")}

[Add](#)

If configured successfully you will be able to see problem events tagged by application and matched to their resolution in *Monitoring* → *Problems*.

|          |          |               |          |      |               |                        |          |     |         |                 |           |
|----------|----------|---------------|----------|------|---------------|------------------------|----------|-----|---------|-----------------|-----------|
| Problems |          |               |          |      |               |                        |          |     |         | Export to CSV   |           |
|          |          |               |          |      |               |                        |          |     |         | Filter          |           |
| Time     | Severity | Recovery time | Status   | Info | Host          | Problem                | Duration | Ack | Actions | Tags            |           |
| 15:28:13 | High     | 15:28:25      | RESOLVED |      | Zabbix server | Service Apache stopped | 12s      | No  |         | Service: Apache | Webserver |

### Warning:

Because misconfiguration is possible, when similar event tags may be created for **unrelated** problems, please review the cases outlined below!

- With two applications writing error and recovery messages to the same log file a user may decide to use two *Application* tags in the same trigger with different tag values by using separate regular expressions in the tag values to extract the names of, say, application A and application B from the {ITEM.VALUE} macro (e.g. when the message formats differ). However, this may not work as planned if there is no match to the regular expressions. Non-matching regexps will yield empty tag values and a single empty tag value in both problem and OK events is enough to correlate them. So a recovery message from application A may accidentally close an error message from application B.
- Actual tags and tag values only become visible when a trigger fires. If the regular expression used is invalid, it is silently replaced with an \*UNKNOWN\* string. If the initial problem event with an \*UNKNOWN\* tag value is missed, there may appear subsequent OK events with the same \*UNKNOWN\* tag value that may close problem events which they shouldn't have closed.
- If a user uses the {ITEM.VALUE} macro without macro functions as the tag value, the 255-character limitation applies. When log messages are long and the first 255 characters are non-specific, this may also result in similar event tags for unrelated problems.

## 2 Global event correlation

### Overview

Global event correlation allows to reach out over all metrics monitored by Zabbix and create correlations.

It is possible to correlate events created by completely different triggers and apply the same operations to them all. By creating intelligent correlation rules it is actually possible to save yourself from thousands of repetitive notifications and focus on root causes of a problem!

Global event correlation is a powerful mechanism, which allows you to untie yourself from one-trigger based problem and resolution logic. So far, a single problem event was created by one trigger and we were dependent on that same trigger for the problem resolution. We could not resolve a problem created by one trigger with another trigger. But with event correlation based on event tagging, we can.

For example, a log trigger may report application problems, while a polling trigger may report the application to be up and running. Taking advantage of event tags you can tag the log trigger as *Status: Down* while tag the polling trigger as *Status: Up*. Then, in a global correlation rule you can relate these triggers and assign an appropriate operation to this correlation such as closing the old events.

In another use, global correlation can identify similar triggers and apply the same operation to them. What if we could get only one problem report per network port problem? No need to report them all. That is also possible with global event correlation.

Global event correlation is configured in **correlation rules**. A correlation rule defines how the new problem events are paired with existing problem events and what to do in case of a match (close the new event, close matched old events by generating corresponding OK events). If a problem is closed by global correlation, it is reported in the *Info* column of *Monitoring* → *Problems*.

Configuring global correlation rules is available to Super Admin level users only.

### Attention:

Event correlation must be configured very carefully, as it can negatively affect event processing performance or, if misconfigured, close more events than was intended (in the worst case even all problem events could be closed).

To configure global correlation **safely**, observe the following important tips:

- Reduce the correlation scope. Always set a unique tag for the new event that is paired with old events and use the *New event tag* correlation condition;
- Add a condition based on the old event when using the *Close old event* operation (or else all existing problems could be closed);



- Avoid using common tag names that may end up being used by different correlation configurations;
- Keep the number of correlation rules limited to the ones you really need.

See also: [known issues](#).

## Configuration

To configure event correlation rules globally:

- Go to *Configuration* → *Event correlation*
- Click on *Create correlation* to the right (or on the correlation name to edit an existing rule)
- Enter parameters of the correlation rule in the form

\* Name

Close old events

Type of calculation

And

▼

A and (B and C) and D

\* Conditions

| Label               | Name   |
|---------------------|--|
| A                   | Value of old event tag <i>Application</i> equals value of new event tag <i>Application</i> |
| B                   | Value of old event tag <i>Application</i> equals <i>ABC</i>                                |
| C                   | Value of old event tag <i>State</i> equals <i>Down</i>                                     |
| D                   | Value of new event tag <i>State</i> equals <i>Up</i>                                       |
| <a href="#">Add</a> |  |

Description

Close old events for application ABC if an event with State=Up happens.

Operations

☒ Close old events  
☐ Close new event

\* At least one operation must be selected.

Enabled

☒

All mandatory input fields are marked with a red asterisk.

| Parameter                  | Description  |
|----------------------------|--|
| <i>Name</i>                | Unique correlation rule name.  |
| <i>Type of calculation</i> | <p>The following options of calculating conditions are available:</p> <p><b>And</b> - all conditions must be met</p> <p><b>Or</b> - enough if one condition is met</p> <p><b>And/Or</b> - AND with different condition types and OR with the same condition type</p> <p><b>Custom expression</b> - a user-defined calculation formula for evaluating action conditions. It must include all conditions (represented as uppercase letters A, B, C, ...) and may include spaces, tabs, brackets ( ), <b>and</b> (case sensitive), <b>or</b> (case sensitive), <b>not</b> (case sensitive).</p> |
| <i>Conditions</i>          | List of conditions. See below for details on configuring a condition.  |
| <i>Description</i>         | Correlation rule description.  |

| Parameter         | Description   |
|-------------------|---|
| <i>Operations</i> | <p>Mark the checkbox of the operation to perform when event is correlated. The following operations are available:</p> <p><b>Close old events</b> - close old events when a new event happens. Always add a condition based on the old event when using the <i>Close old events</i> operation or all existing problems could be closed.</p> <p><b>Close new event</b> - close the new event when it happens</p> |
| <i>Enabled</i>    | If you mark this checkbox, the correlation rule will be enabled.  |

To configure details of a new condition, click on [Add](#) in the Conditions block. A popup window will open where you can edit the condition details.

| Parameter            | Description  |
|----------------------|--|
| <i>New condition</i> | <p>Select a condition for correlating events.</p> <p><i>Note</i> that if no old event condition is specified, all old events may be matched and closed. Similarly if no new event condition is specified, all new events may be matched and closed. The following conditions are available:</p> <p><b>Old event tag</b> - specify the old event tag for matching.</p> <p><b>New event tag</b> - specify the new event tag for matching.</p> <p><b>New event host group</b> - specify the new event host group for matching.</p> <p><b>Event tag pair</b> - specify new event tag and old event tag for matching. In this case there will be a match if the <b>values</b> of the tags in both events match. Tag <i>names</i> need not match. This option is useful for matching runtime values, which may not be known at the time of configuration (see also <a href="#">Example 1</a>).</p> <p><b>Old event tag value</b> - specify the old event tag name and value for matching, using the following operators:</p> <p><i>equals</i> - has the old event tag value</p> <p><i>does not equal</i> - does not have the old event tag value</p> <p><i>contains</i> - has the string in the old event tag value</p> <p><i>does not contain</i> - does not have the string in the old event tag value</p> <p><b>New event tag value</b> - specify the new event tag name and value for matching, using the following operators:</p> <p><i>equals</i> - has the new event tag value</p> <p><i>does not equal</i> - does not have the new event tag value</p> <p><i>contains</i> - has the string in the new event tag value</p> <p><i>does not contain</i> - does not have the string in the new event tag value</p> |

**Warning:**

Because misconfiguration is possible, when similar event tags may be created for **unrelated** problems, please review the cases outlined below!

- Actual tags and tag values only become visible when a trigger fires. If the regular expression used is invalid, it is silently replaced with an *\*UNKNOWN\** string. If the initial problem event with an *\*UNKNOWN\** tag value is missed, there may appear subsequent OK events with the same *\*UNKNOWN\** tag value that may close problem events which they shouldn't have closed.
- If a user uses the {ITEM.VALUE} macro without macro functions as the tag value, the 255-character limitation applies. When log messages are long and the first 255 characters are non-specific, this may also result in similar event tags for unrelated problems.

Example

Stop repetitive problem events from the same network port.

|                     |  |  |
|---------------------|--|--|
| * Name              | Correlate network port problems  |  |
| Type of calculation | And  | A and B  |
| * Conditions        | Label  | Name   |
|                     | A  | Value of old event tag <i>Port</i> equals value of new event tag <i>Port</i> |
|                     | B  | Value of old event tag <i>Host</i> equals value of new event tag <i>Host</i> |
|                     | <a href="#">Add</a>  |  |
| Description         | Keep only one problem per port. No need to report all of them.                                   |  |
| Operations          | <input type="checkbox"/> Close old events<br><input checked="" type="checkbox"/> Close new event |  |
|                     | * At least one operation must be selected.   |  |
| Enabled             | <input checked="" type="checkbox"/>  |  |
|                     | <a href="#">Add</a>  | <a href="#">Cancel</a>   |

This global correlation rule will correlate problems if *Host* and *Port* tag values exist on the trigger and they are the same in the original event and the new one.

The operation will close new problem events on the same network port, keeping only the original problem open.

## 6 Tagging

Overview

There is an option to tag various entities in Zabbix. Tags can be defined for:

- templates
- hosts
- items
- web scenarios

- triggers
- services
- template items and triggers
- host, item and trigger prototypes

Tags have several uses, most notably, to mark events. If entities are tagged, the corresponding new events get marked accordingly:

- with tagged templates - any host problems created by relevant entities (items, triggers, etc) from this template will be marked
- with tagged hosts - any problem of the host will be marked
- with tagged items, web scenarios - any data/problem of this item or web scenario will be marked
- with tagged triggers - any problem of this trigger will be marked

A problem event inherits all tags from the whole chain of templates, hosts, items, web scenarios, triggers. Completely identical tag:value combinations (after resolved macros) are merged into one rather than being duplicated, when marking the event.

Having custom event tags allows for more flexibility. Importantly, events can be **correlated** based on event tags. In other uses, actions can be defined based on tagged events. Item problems can be grouped based on tags. Problem tags can also be used to map problems to **services**.

Tagging is realized as a pair of *tag name* and *value*. You can use only the name or pair it with a value:

MySQL, Service:MySQL, Services, Services:Customer, Applications, Application:Java, Priority:High

An entity (template, host, item, web scenario, trigger or event) may be tagged with the same name, but different values - these tags will not be considered 'duplicates'. Similarly, a tag without value and the same tag with value can be used simultaneously.

Use cases

Some use cases for this functionality are as follows:

1. Mark trigger events in the frontend:
  - Define a tag at the trigger level, for example `scope:performance`;
  - All problems created by this trigger will be marked with this tag.
2. Mark all template-inherited problems:
  - Define a tag at the template level, for example `target:MySQL`;
  - All host problems created by triggers from this template will be marked with this tag.
3. Mark all host problems:
  - Define a tag at the host level, for example `service:Jira`;
  - All problems of the host triggers will be marked with this tag.
4. Group related items:
  - Define a tag at the item level, for example `component:cpu`;
  - In the *Latest data* section, use the tag filter to view all items tagged as `component:cpu`.
5. Identify problems in a log file and close them separately:
  - Define tags in the log trigger that will identify events using value extraction by the `{{ITEM.VALUE<N>}}.regsub()` macro;
  - In the trigger configuration, set multiple problem event generation mode;
  - In the trigger configuration, use **event correlation**: select the option that OK event closes only matching events and choose the tag for matching;
  - See problem events created with a tag and closed individually.
6. Use it to filter notifications:
  - Define tags at the trigger level to mark events by different tags;
  - Use tag filtering in action conditions to receive notifications only on the events that match tag data.
7. Use information extracted from item value as tag value:
  - Use an `{{ITEM.VALUE<N>}}.regsub()` macro in the tag value;
  - See tag values in *Monitoring* → *Problems* as extracted data from the item value.
8. Identify problems better in notifications:
  - Define tags at the trigger level;
  - Use an `{EVENT.TAGS}` macro in the problem notification;
  - Easier identify which application/service the notification belongs to.
9. Simplify configuration tasks by using tags at the template level:
  - Define tags at the template trigger level;
  - See these tags on all triggers created from template triggers.
10. Create triggers with tags from low-level discovery (LLD):
  - Define tags on trigger prototypes;
  - Use LLD macros in the tag name or value;
  - See these tags on all triggers created from trigger prototypes.
11. Match services using **service tags**:

- Define **service actions** for services with matching tags;
  - Use service tags to map a service to an SLA for **SLA calculations**.
- Map services to problems using **problem tags**:
    - In the service configuration, specify **problem tag**, for example `target:MySQL`;
    - Problems with the matching tag will be automatically correlated to the service;
    - Service status will change to the status of the problem with the highest severity.
  - Suppress problems when a host is in maintenance mode:
    - Define tags in **Maintenance periods** to suppress only problems with matching tags.
  - Grant access to user groups:
    - Specify tags in the **user group** configuration to allow viewing only problems with matching tags.

## Configuration

Tags can be entered in a dedicated tab, for example, in trigger configuration:

| Name      | Value                                    | Action                 |
|-----------|--|------------------------|
| Cloud     | value                                    | <a href="#">Remove</a> |
| Service   | MySQL                                    | <a href="#">Remove</a> |
| Customers | value                                    | <a href="#">Remove</a> |
| Host      | {{ITEM.VALUE2}.iregsub(pattern, output)} | <a href="#">Remove</a> |

[Add](#)

## Macro support

Built-in and user macros in tags are resolved at the time of the event. Until the event has occurred these macros will be shown in Zabbix frontend unresolved. Low-level discovery macros are resolved during discovery process.

The following macros may be used in trigger tags:

- `{ITEM.VALUE}`, `{ITEM.LASTVALUE}`, `{HOST.HOST}`, `{HOST.NAME}`, `{HOST.CONN}`, `{HOST.DNS}`, `{HOST.IP}`, `{HOST.PORT}` and `{HOST.ID}` macros can be used to populate the tag name or tag value.
- `{INVENTORY.*}` **macros** can be used to reference host inventory values from one or several hosts in a trigger expression.
- **User macros** and user macros with context are supported for the tag name/value; context may include low-level discovery macros.
- Low-level discovery macros can be used for the tag name/value in trigger prototypes.

The following macros may be used in trigger-based notifications:

- `{EVENT.TAGS}` and `{EVENT.RECOVERY.TAGS}` macros will resolve to a comma separated list of event tags or recovery event tags
- `{EVENT.TAGSJSON}` and `{EVENT.RECOVERY.TAGSJSON}` macros will resolve to a JSON array containing event tag **objects** or recovery event tag objects

The following macros may be used in template, host, item and web scenario tags:

- `{HOST.HOST}`, `{HOST.NAME}`, `{HOST.CONN}`, `{HOST.DNS}`, `{HOST.IP}`, `{HOST.PORT}` and `{HOST.ID}` macros
- `{INVENTORY.*}` **macros**
- **User macros**
- Low-level discovery macros can be used in item prototype tags

The following macros may be used in host prototype tags:

- `{HOST.HOST}`, `{HOST.NAME}`, `{HOST.CONN}`, `{HOST.DNS}`, `{HOST.IP}`, `{HOST.PORT}` and `{HOST.ID}` macros
- `{INVENTORY.*}` **macros**
- **User macros**
- **Low-level discovery macros** will be resolved during discovery process and then added to the discovered host

## Substring extraction in trigger tags

Substring extraction is supported for populating the tag name or tag value, using a macro **function** - applying a regular expression to the value obtained by the {ITEM.VALUE}, {ITEM.LASTVALUE} macro or a low-level discovery macro. For example:

```
{{ITEM.VALUE}.regsub(pattern, output)}  
{{ITEM.VALUE}.iregsub(pattern, output)}
```

```
{{#LLDMACRO}.regsub(pattern, output)}  
{{#LLDMACRO}.iregsub(pattern, output)}
```

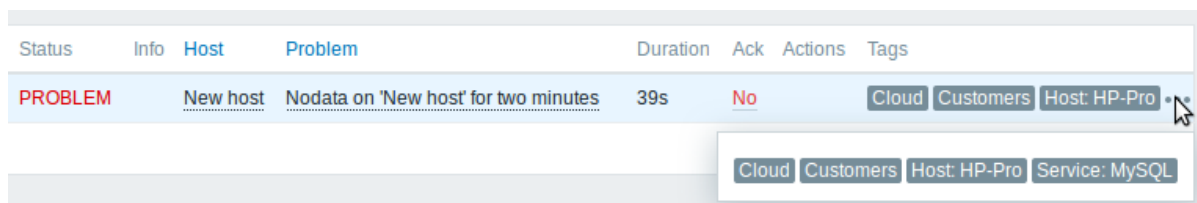
Tag name and value will be cut to 255 characters if their length exceeds 255 characters after macro resolution.

See also: Using macro functions in **low-level discovery macros** for event tagging.

## Viewing event tags

Tagging, if defined, can be seen with new events in:

- *Monitoring → Problems*
- *Monitoring → Problems → Event details*
- *Monitoring → Dashboard → Problems widget*



Only the first three tag entries can be displayed. If there are more than three tag entries, it is indicated by three dots. If you roll your mouse over these three dots, all tag entries are displayed in a pop-up window.

Note that the order in which tags are displayed is affected by tag filtering and the *Tag display priority* option in the filter of *Monitoring → Problems* or the *Problems* dashboard widget.

## 7 Visualization

### 1 Graphs

#### Overview

With lots of data flowing into Zabbix, it becomes much easier for the users if they can look at a visual representation of what is going on rather than only numbers.

This is where graphs come in. Graphs allow to grasp the data flow at a glance, correlate problems, discover when something started or make a presentation of when something might turn into a problem.

Zabbix provides users with:

- built-in **simple graphs** of one item data
- the possibility to create more complex **customized graphs**
- access to a comparison of several items quickly in **ad-hoc graphs**
- modern customizable **vector graphs**

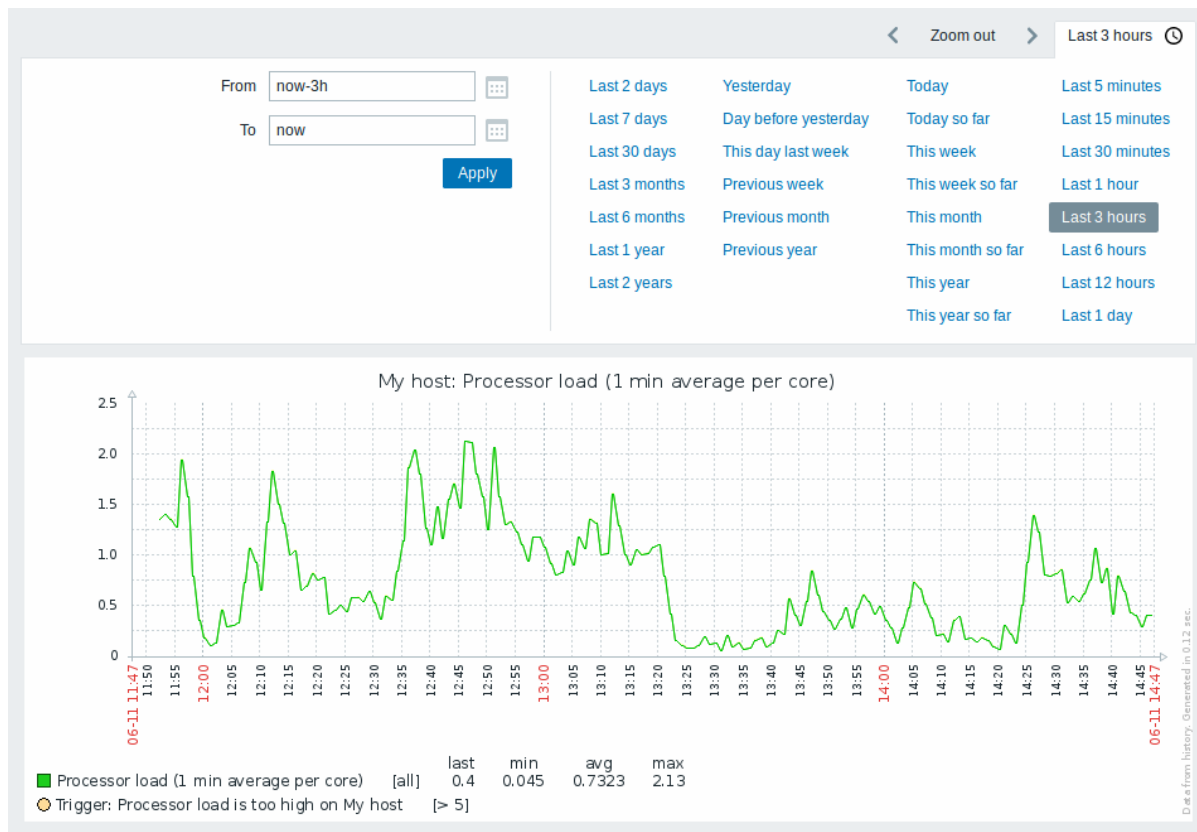
#### 1 Simple graphs

#### Overview

Simple graphs are provided for the visualization of data gathered by items.

No configuration effort is required on the user part to view simple graphs. They are freely made available by Zabbix.

Just go to *Monitoring → Latest data* and click on the Graph link for the respective item and a graph will be displayed.




#### Note:

Simple graphs are provided for all numeric items. For textual items, a link to History is available in *Monitoring* → *Latest data*.

#### Time period selector

Take note of the time period selector above the graph. It allows to select often required periods with one mouse click.

Note that such options as *Today*, *This week*, *This month*, *This year* display the whole period, including the hours/days in the future. *Today so far*, in contrast, only displays the hours passed.

Once a period is selected, it can be moved back and forth in time by clicking on the  arrow buttons. The *Zoom out* button allows to zoom out the period two times or by 50% in each direction. Zoom out is also possible by double-clicking in the graphs. The whole time period selector can be collapsed by clicking on the tab label containing the selected period string.

The *From/To* fields display the selected period in either:

- absolute time syntax in format `Y-m-d H:i:s`
- relative time syntax, e.g.: `now-1d`

A date in **relative** format can contain one or several mathematical operations (- or +), e.g. `now-1d` or `now-1d-2h+5m`. For relative time the following abbreviations are supported:

- `now`
- `s` (seconds)
- `m` (minutes)
- `h` (hours)
- `d` (days)
- `w` (weeks)
- `M` (months)
- `y` (years)

**Precision** is supported in the time filter (e. g., an expression like `now-1d/M`). Details of precision:

| Precision | From                        | To                          |
|-----------|-----------------------------|-----------------------------|
| <i>m</i>  | Y-m-d H:m:00                | Y-m-d H:m:59                |
| <i>h</i>  | Y-m-d H:00:00               | Y-m-d H:59:59               |
| <i>d</i>  | Y-m-d 00:00:00              | Y-m-d 23:59:59              |
| <i>w</i>  | Monday of the week 00:00:00 | Sunday of the week 23:59:59 |

| Precision | From                                | To                                    |
|-----------|-------------------------------------|---------------------------------------|
| <i>M</i>  | First day of the month 00:00:00     | Last day of the month 23:59:59        |
| <i>y</i>  | 1st of January of the year 00:00:00 | 31st of December of the year 23:59:59 |

For example:

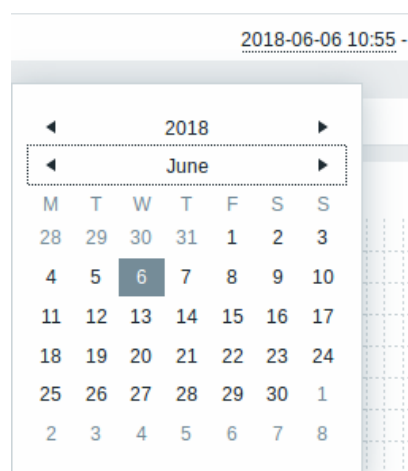
| From            | To              | Selected period  |
|-----------------|-----------------|--|
| <i>now/d</i>    | <i>now/d</i>    | 00:00 - 23:59 today  |
| <i>now/d</i>    | <i>now/d+1d</i> | 00:00 today - 23:59 tomorrow                               |
| <i>now/w</i>    | <i>now/w</i>    | Monday 00:00:00 - Sunday 23:59:59 this week                |
| <i>now-1y/w</i> | <i>now-1y/w</i> | The week of Monday 00:00:00 - Sunday 23:59:59 one year ago |

#### Attention:

Using "*now/M+1M*" for the *To* parameter may add 31 days, which can result in the date shifting by 1-3 days depending on the number of days in the month. For example, if used in January, the result may be 02 March instead of the expected 28 February. To avoid this issue, use "*now/M-3d+1M/M*", which adjusts for month length accurately. Similarly, if configuring *From* to go backward, use "*now/M+3d-1M/M*".

#### Date picker

It is possible to pick a specific start/end date by clicking on the calendar icon next to the *From/To* fields. In this case, the date picker pop up will open.



Within the date picker, it is possible to navigate between the blocks of year/month/date using Tab and Shift+Tab. Keyboard arrows or arrow buttons allow to select the desired value. Pressing Enter (or clicking on the desired value) activates the choice.

Another way of controlling the displayed time is to highlight an area in the graph with the left mouse button. The graph will zoom into the highlighted area once you release the left mouse button.

In case no time value is specified or field is left blank, time value will be set to "00:00:00". This doesn't apply to today's date selection: in that case time will be set to current value.

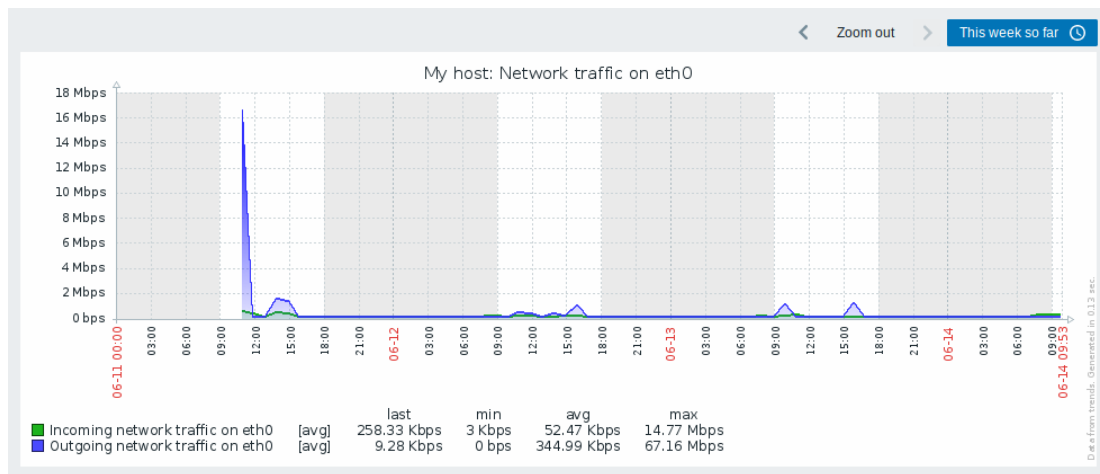
#### Recent data vs longer periods

For very recent data a **single** line is drawn connecting each received value. The single line is drawn as long as there is at least one horizontal pixel available for one value.

For data that show a longer period **three lines** are drawn - a dark green one shows the average, while a light pink and a light green line shows the maximum and minimum values at that point in time. The space between the highs and the lows is filled with yellow background.

Working time (working days) is displayed in graphs as a white background, while non-working time is displayed in gray (with the *Original blue* default frontend theme).





Working time is always displayed in simple graphs, whereas displaying it in **custom graphs** is a user preference.

Working time is not displayed if the graph shows more than 3 months.

### Trigger lines

Simple triggers are displayed as lines with black dashes over trigger severity color -- take note of the blue line on the graph and the trigger information displayed in the legend. Up to 3 trigger lines can be displayed on the graph; if there are more triggers then the triggers with lower severity are prioritized. Triggers are always displayed in simple graphs, whereas displaying them in **custom graphs** is a user preference.



Generating from history/trends

Graphs can be drawn based on either item **history** or **trends**.

For the users who have frontend **debug mode** activated, a gray, vertical caption is displayed at the bottom right of a graph indicating where the data come from.

Several factors influence whether history of trends is used:

- longevity of item history. For example, item history can be kept for 14 days. In that case, any data older than the fourteen days will be coming from trends.
- data congestion in the graph. If the amount of seconds to display in a horizontal graph pixel exceeds 3600/16, trend data are displayed (even if item history is still available for the same period).

- if trends are disabled, item history is used for graph building - if available for that period. This is supported starting with Zabbix 2.2.1 (before, disabled trends would mean an empty graph for the period even if item history was available).

#### Absence of data

For items with a regular update interval, nothing is displayed in the graph if item data are not collected.

However, for trapper items and items with a scheduled update interval (and regular update interval set to 0), a straight line is drawn leading up to the first collected value and from the last collected value to the end of graph; the line is on the level of the first/last value respectively.

#### Switching to raw values

A dropdown on the upper right allows to switch from the simple graph to the *Values/500 latest values* listings. This can be useful for viewing the numeric values making up the graph.

The values represented here are raw, i.e. no units or postprocessing of values is used. Value mapping, however, is applied.

#### Known issues

See [known issues](#) for graphs.

## 2 Custom graphs

### Overview

Custom graphs, as the name suggests, offer customization capabilities.

While simple graphs are good for viewing data of a single item, they do not offer configuration capabilities.

Thus, if you want to change graph style or the way lines are displayed or compare several items, for example, incoming and outgoing traffic in a single graph, you need a custom graph.

Custom graphs are configured manually.

They can be created for a host or several hosts or for a single template.

### Configuring custom graphs

To create a custom graph, do the following:

- Go to *Configuration* → *Hosts (or Templates)*
- Click on *Graphs* in the row next to the desired host or template
- In the Graphs screen click on *Create graph*
- Edit graph attributes

Graph

Preview

Name

Network utilization

Width

900

Height

200

Graph type

Normal

Show legend

☒

Show working time

☒

Show triggers

☒

Percentile line (left)

☐

Percentile line (right)

☐

Y axis MIN value

Fixed

0

Y axis MAX value

Calculated

Items

| Name   | Function | Draw style    | Y axis side | Color  | Action                 |
|--|----------|---------------|-------------|--------|------------------------|
| 1: My host: Outgoing network traffic on eth0 | avg      | Filled region | Left        | 00C800 | <a href="#">Remove</a> |
| 2: My host: Incoming network traffic on eth0 | avg      | Bold line     | Left        | C80000 | <a href="#">Remove</a> |
| <a href="#">Add</a>                          |          |               |             |        |                        |

Add

Cancel

All mandatory input fields are marked with a red asterisk.

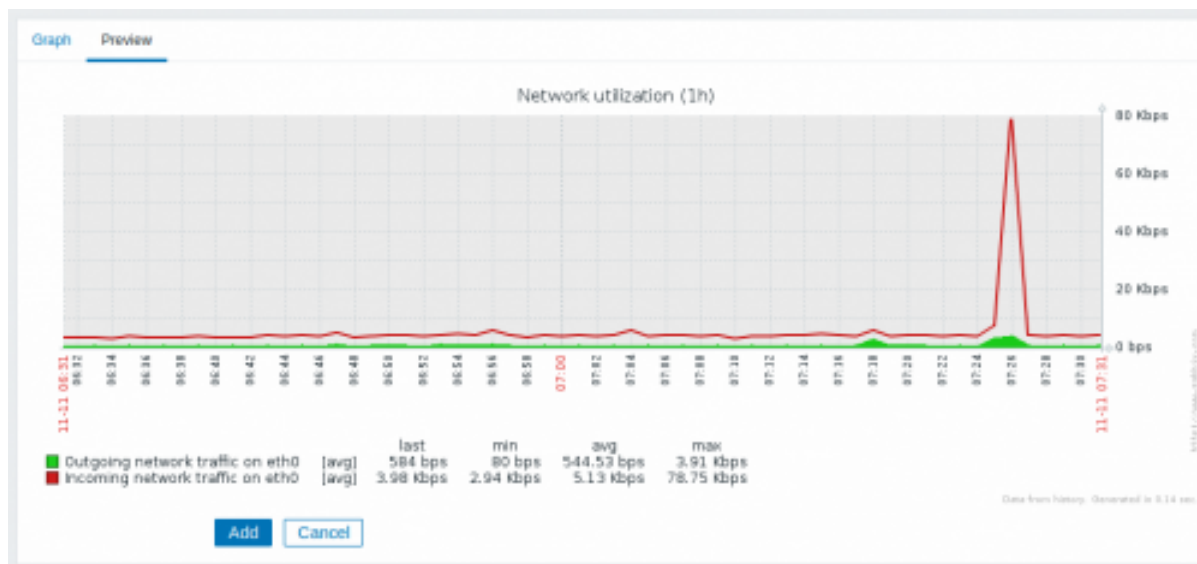
Graph attributes:

| Parameter                      | Description   |
|--------------------------------|---|
| <i>Name</i>                    | Unique graph name.<br>Expression <b>macros</b> are supported in this field, but only with avg, last, min and max functions, with time as parameter (for example, {?avg(/host/key,1h)}).<br>{HOST.HOST<1-9>} macros are supported for the use within this macro, referencing the first, second, third, etc. host in the graph, for example {?avg(/{HOST.HOST2}/key,1h)}. Note that referencing the first host with this macro is redundant, as the first host can be referenced implicitly, for example {?avg(/key,1h)}. |
| <i>Width</i>                   | Graph width in pixels (for preview and pie/exploded graphs only).   |
| <i>Height</i>                  | Graph height in pixels.   |
| <i>Graph type</i>              | Graph type:<br><b>Normal</b> - normal graph, values displayed as lines<br><b>Stacked</b> - stacked graph, filled areas displayed<br><b>Pie</b> - pie graph<br><b>Exploded</b> - "exploded" pie graph, portions displayed as "cut out" of the pie  |
| <i>Show legend</i>             | Checking this box will set to display the graph legend.   |
| <i>Show working time</i>       | If selected, non-working hours will be shown with a gray background. This parameter is not available for pie and exploded pie graphs.   |
| <i>Show triggers</i>           | If selected, simple triggers will be displayed as lines with black dashes over trigger severity color. This parameter is not available for pie and exploded pie graphs.   |
| <i>Percentile line (left)</i>  | Display percentile for left Y-axis. If, for example, 95% percentile is set, then the percentile line will be at the level where 95 percent of the values fall under. Displayed as a bright green line. Only available for normal graphs.  |
| <i>Percentile line (right)</i> | Display percentile for right Y-axis. If, for example, 95% percentile is set, then the percentile line will be at the level where 95 percent of the values fall under. Displayed as a bright red line. Only available for normal graphs.   |
| <i>Y axis MIN value</i>        | Minimum value of Y-axis:<br><b>Calculated</b> - Y axis minimum value will be automatically calculated.<br><b>Fixed</b> - fixed minimum value for Y-axis.<br><b>Item</b> - last value of the selected item will be the minimum value.  |
| <i>Y axis MAX value</i>        | This parameter is not available for pie and exploded pie graphs.<br>Maximum value of Y-axis:<br><b>Calculated</b> - Y axis maximum value will be automatically calculated.<br><b>Fixed</b> - fixed maximum value for Y-axis.<br><b>Item</b> - last value of the selected item will be the maximum value   |
| <i>3D view</i>                 | This parameter is not available for pie and exploded pie graphs.<br>Enable 3D style. For pie and exploded pie graphs only.  |
| <i>Items</i>                   | Items, data of which are to be displayed in this graph. Click on <i>Add</i> to select items. You can also select various displaying options (function, draw style, left/right axis display, color).   |
| <i>Sort order (0→100)</i>      | Draw order. 0 will be processed first. Can be used to draw lines or regions behind (or in front of) another.<br>You can drag and drop items using the icon at the beginning of a line to set the sort order or which item is displayed in front of the other.   |
| <i>Name</i>                    | Name of the selected item is displayed as a link. Clicking on the link opens the list of other available items.   |
| <i>Type</i>                    | Type (only available for pie and exploded pie graphs):<br><b>Simple</b> - the value of the item is represented proportionally on the pie<br><b>Graph sum</b> - the value of the item represents the whole pie<br>Note that coloring of the "graph sum" item will only be visible to the extent that it is not taken up by "proportional" items.   |

| Parameter          | Description   |
|--------------------|---|
| <i>Function</i>    | Select what values will be displayed when more than one value exists per vertical graph pixel for an item:<br><b>all</b> - display all possible values (minimum, maximum, average) in the graph. Note that for shorter periods this setting has no effect; only for longer periods, when data congestion in a vertical graph pixel increases, 'all' starts displaying minimum, maximum, and average values. This function is only available for <i>Normal</i> graph type. See also: <a href="#">Generating graphs from history/trends</a> .<br><b>avg</b> - display the average values<br><b>last</b> - display the latest values. This function is only available if either <i>Pie/Exploded pie</i> is selected as graph type.<br><b>max</b> - display the maximum values<br><b>min</b> - display the minimum values |
| <i>Draw style</i>  | Select the draw style (only available for normal graphs; for stacked graphs filled region is always used) to apply to the item data - <i>Line, Bold line, Filled region, Dot, Dashed line, Gradient line</i> .  |
| <i>Y axis side</i> | Select the Y axis side to show the item data - <i>Left, Right</i> .   |
| <i>Color</i>       | Select the color to apply to the item data.   |

## Graph preview

In the *Preview* tab, a preview of the graph is displayed so you can immediately see what you are creating.



Note that the preview will not show any data for template items.



In this example, pay attention to the dashed bold line displaying the trigger level and the trigger information displayed in the

legend.

**Note:**

No more than 3 trigger lines can be displayed. If there are more triggers then the triggers with lower severity are prioritized for display.

If graph height is set as less than 120 pixels, no trigger will be displayed in the legend.

3 Ad-hoc graphs

Overview

While a **simple graph** is great for accessing data of one item and **custom graphs** offer customization options, none of the two allow to quickly create a comparison graph for multiple items with little effort and no maintenance.

To address this issue, since Zabbix 2.4 it is possible to create ad-hoc graphs for several items in a very quick way.

Configuration

To create an ad-hoc graph, do the following:

- Go to *Monitoring* → *Latest data*
- Use filter to display items that you want
- Mark checkboxes of the items you want to graph
- Click on *Display stacked graph* or *Display graph* buttons

Latest data

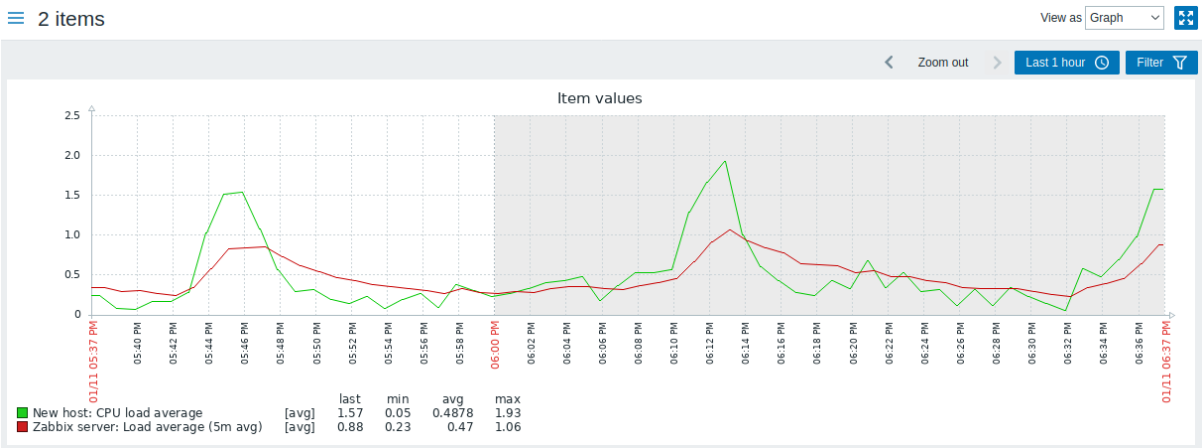
| <input type="checkbox"/>            | Host ▲        | Name                   | Last check            | Last value |
|-------------------------------------|---------------|------------------------|-----------------------|------------|
| <input checked="" type="checkbox"/> | New host      | CPU load average       | 05/24/2021 10:46:5... | 0.86       |
| <input type="checkbox"/>            | Zabbix server | Load average (1m avg)  | 05/24/2021 10:47:1... | 0.73       |
| <input type="checkbox"/>            | Zabbix server | Load average (15m avg) | 05/24/2021 10:47:1... | 0.93       |
| <input checked="" type="checkbox"/> | Zabbix server | Load average (5m avg)  | 05/24/2021 10:47:1... | 0.93       |

2 selected

Display stacked graph

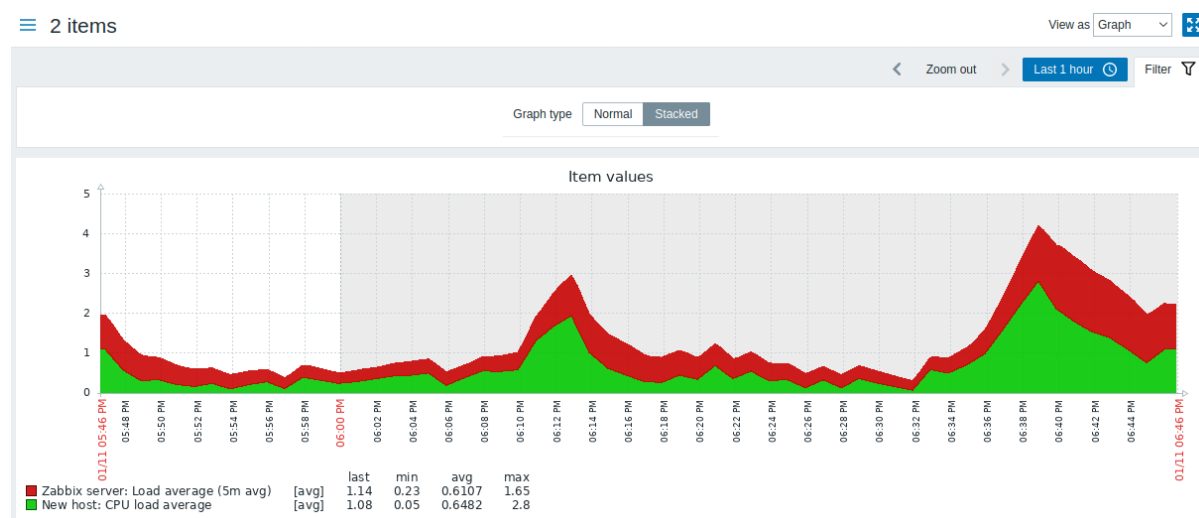
Display graph

Your graph is created instantly:



Note that to avoid displaying too many lines in the graph, only the average value for each item is displayed (min/max value lines are not displayed). Triggers and trigger information is not displayed in the graph.

In the created graph window you have the **time period selector** available and the possibility to switch from the "normal" line graph to a stacked one (and back).



## 4 Aggregation in graphs

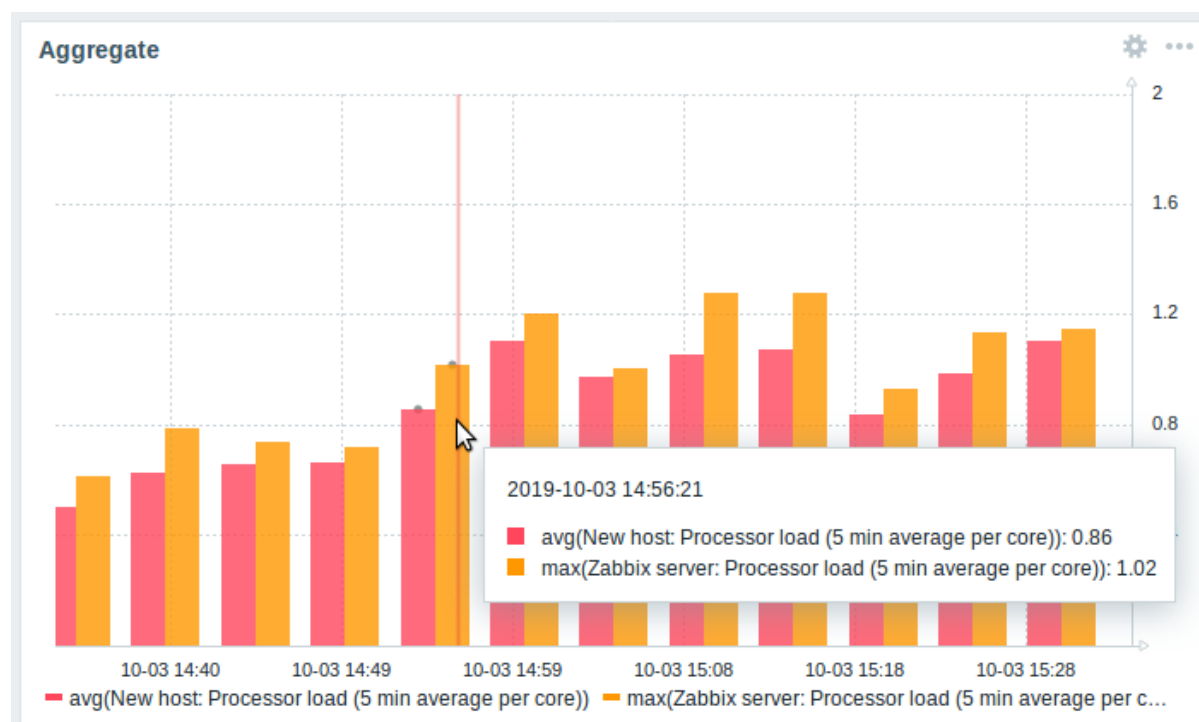
### Overview

The aggregation functions, available in the graph widget of the dashboard, allow displaying an aggregated value for the chosen interval (5 minutes, an hour, a day), instead of all values.

The aggregation options are as follows:

- min
- max
- avg
- count
- sum
- first (first value displayed)
- last (last value displayed)

The most exciting use of data aggregation is the possibility to create nice side-by-side comparisons of data for some period:



When hovering over a point in time in the graph, date and time is displayed, in addition to items and their aggregated values. Items are displayed in parentheses, prefixed by the aggregation function used. Note that this is the date and time of the point in the graph, not of the actual values.

## Configuration

The options for aggregation are available in data set settings when configuring a **graph widget**.

Missing data:

Y-axis:

Time shift:

Aggregation function:

Aggregation interval:

Aggregate:

You may pick the aggregation function and the time interval. As the data set may comprise several items, there is also another option allowing to show aggregated data for each item separately or for all data set items as one aggregated value.

### Use cases

#### Average request count to Nginx server

View the average request count per second per day to the Nginx server:

- add the request count per second item to the data set
- select the aggregate function `avg` and specify interval `1d`
- a bar graph is displayed, where each bar represents the average number of requests per second per day

#### Minimum weekly disk space among clusters

View the lowest disk space among clusters over a week.

- add to the data set: hosts `cluster*`, key `"Free disk space on /data"`
- select the aggregate function `min` and specify interval `1w`
- a bar graph is displayed, where each bar represents the minimum disk space per week for each `/data` volume of the cluster

## 2 Network maps

### Overview

If you have a network to look after, you may want to have an overview of your infrastructure somewhere. For that purpose, you can create maps in Zabbix - of networks and of anything you like.

All users can create network maps. The maps can be public (available to all users) or private (available to selected users).

Proceed to **configuring a network map**.

### 1 Configuring a network map

#### Overview

Configuring a map in Zabbix requires that you first create a map by defining its general parameters and then you start filling the actual map with elements and their links.

You can populate the map with elements that are a host, a host group, a trigger, an image, or another map.

Icons are used to represent map elements. You can define the information that will be displayed with the icons and set that recent problems are displayed in a special way. You can link the icons and define information to be displayed on the links.

You can add custom URLs to be accessible by clicking on the icons. Thus you may link a host icon to host properties or a map icon to another map.

Maps are managed in *Monitoring* → *Maps*, where they can be configured, managed and viewed. In the monitoring view, you can click on the icons and take advantage of the links to some scripts and URLs.

Network maps are based on vector graphics (SVG) since Zabbix 3.4.

#### Public and private maps

All users in Zabbix (including non-admin users) can create network maps. Maps have an owner - the user who created them. Maps can be made public or private.

- *Public* maps are visible to all users, although to see it the user must have read access to at least one map element. Public maps can be edited in case a user/ user group has read-write permissions for this map and at least read permissions to all elements of the corresponding map including triggers in the links.
- *Private* maps are visible only to their owner and the users/user groups the map is *shared* with by the owner. Regular (non-Super admin) users can only share with the groups and users they are members of. Admin level users can see private maps regardless of being the owner or belonging to the shared user list. Private maps can be edited by the owner of the map and in case a user/ user group has read-write permissions for this map and at least read permissions to all elements of the corresponding map including triggers in the links.

Map elements that the user does not have read permission to are displayed with a grayed-out icon and all textual information on the element is hidden. However, the trigger label is visible even if the user has no permission to the trigger.

To add an element to the map the user must also have at least read permission to the element.

#### Creating a map

To create a map, do the following:

- Go to *Monitoring* → *Maps*
- Go to the view with all maps
- Click on *Create map*

You can also use the *Clone* and *Full clone* buttons in the configuration form of an existing map to create a new map. Clicking on *Clone* will retain general layout attributes of the original map, but no elements. *Full clone* will retain both the general layout attributes and all elements of the original map.

The **Map** tab contains general map attributes:



Map
Sharing

\* Owner
Admin (Zabbix Administrator) X

\* Name
Local network

\* Width
680

\* Height
600

Background image
No image v

Automatic icon mapping
<manual> v
[show icon mappings](#)

Icon highlight
☒

Mark elements on trigger status change
☒

Display problems
Expand single problem
Number of problems
Number of p

Advanced labels
☒

Host group label type
Label v

Host label type
Label v

Trigger label type
Status only v

Map label type
Label v

Image label type
Nothing v

Map element label location
Bottom v

Problem display
All v

Minimum severity
Not classified
Information
Warning
Average
High

Show suppressed problems
☐

URLs

Name
URL

Latest data
https://localhost/zabbix/latest.php

Add
.....

Add
Cancel

All mandatory input fields are marked with a red asterisk.

General map attributes:

| Parameter                                     | Description   |
|---|---|
| <i>Owner</i>                                  | Name of map owner.  |
| <i>Name</i>                                   | Unique map name.  |
| <i>Width</i>                                  | Map width in pixels.  |
| <i>Height</i>                                 | Map height in pixels.   |
| <i>Background image</i>                       | Use background image:<br><b>No image</b> - no background image (white background)<br><b>Image</b> - selected image to be used as a background image. No scaling is performed. You may use a geographical map or any other image to enhance your map.  |
| <i>Automatic icon mapping</i>                 | You can set to use an automatic icon mapping, configured in <i>Administration</i> → <i>General</i> → <i>Icon mapping</i> . Icon mapping allows mapping certain icons against certain host inventory fields.   |
| <i>Icon highlight</i>                         | If you check this box, map elements will be highlighted.<br>Elements with an active trigger will receive a round background, in the same color as the highest severity trigger. Moreover, a thick green line will be displayed around the circle, if all problems are acknowledged.<br>Elements with "disabled" or "in maintenance" status will get a square background, gray and orange respectively.<br>See also: <a href="#">Viewing maps</a>  |
| <i>Mark elements on trigger status change</i> | A recent change of trigger status (recent problem or resolution) will be highlighted with markers (inward-pointing red triangles) on the three sides of the element icon that are free of the label. Markers are displayed for 30 minutes.  |
| <i>Display problems</i>                       | Select how problems are displayed with a map element:<br><b>Expand single problem</b> - if there is only one problem, the problem name is displayed. Otherwise, the total number of problems is displayed.<br><b>Number of problems</b> - the total number of problems is displayed<br><b>Number of problems and expand most critical one</b> - the name of the most critical problem and the total number of problems is displayed.<br>'Most critical' is determined based on problem severity and, if equal, problem event ID (higher ID or later problem displayed first). For a <i>trigger map element</i> it is based on problem severity and if equal, trigger position in the trigger list. In case of multiple problems of the same trigger, the most recent one will be displayed. |
| <i>Advanced labels</i>                        | If you check this box you will be able to define separate label types for separate element types.   |
| <i>Map element label type</i>                 | Label type used for map elements:<br><b>Label</b> - map element label<br><b>IP address</b> - IP address<br><b>Element name</b> - element name (for example, host name)<br><b>Status only</b> - status only (OK or PROBLEM)<br><b>Nothing</b> - no labels are displayed  |
| <i>Map element label location</i>             | Label location in relation to the map element:<br><b>Bottom</b> - beneath the map element<br><b>Left</b> - to the left<br><b>Right</b> - to the right<br><b>Top</b> - above the map element   |
| <i>Problem display</i>                        | Display problem count as:<br><b>All</b> - full problem count will be displayed<br><b>Separated</b> - unacknowledged problem count will be displayed separated as a number of the total problem count<br><b>Unacknowledged only</b> - only the unacknowledged problem count will be displayed  |
| <i>Minimum trigger severity</i>               | Problems below the selected minimum severity level will not be displayed on the map. For example, with <i>Warning</i> selected, changes with <i>Information</i> and <i>Not classified</i> level triggers will not be reflected in the map.<br>This parameter is supported starting with Zabbix 2.2.   |
| <i>Show suppressed problems</i>               | Mark the checkbox to display problems that would otherwise be suppressed (not shown) because of host maintenance.   |
| <i>URLs</i>                                   | URLs for each element type can be defined (with a label). These will be displayed as links when a user clicks on the element in the map viewing mode.<br>Macros can be used in map URL names and values. For a full list, see <a href="#">supported macros</a> and search for 'map URL names and values'.   |

## Sharing

The **Sharing** tab contains the map type as well as sharing options (user groups, users) for private maps:

Map
Sharing ●

Type
Private Public

List of user group shares

User groups
MySQL administrators
Add
Permissions
Read-only Read-write

List of user shares

Users
Admin (Zabbix Administrator)
Add
Permissions
Read-only Read-write

| Parameter                 | Description   |
|---------------------------|---|
| Type                      | Select map type:<br><b>Private</b> - map is visible only to selected user groups and users<br><b>Public</b> - map is visible to all |
| List of user group shares | Select user groups that the map is accessible to.<br>You may allow read-only or read-write access.                                  |
| List of user shares       | Select users that the map is accessible to.<br>You may allow read-only or read-write access.  |

When you click on *Add* to save this map, you have created an empty map with a name, dimensions, and certain preferences. Now you need to add some elements. For that, click on *Constructor* in the map list to open the editable area.

#### Adding elements

To add an element, click on *Add* next to Map element. The new element will appear at the top left corner of the map. Drag and drop it wherever you like.

Note that with the Grid option "On", elements will always align to the grid (you can pick various grid sizes from the dropdown, also hide/show the grid). If you want to put elements anywhere without alignment, turn the option to "Off". (You can align random elements to the grid later, by clicking on *Align map elements*.)

Now that you have some elements in place, you may want to start differentiating them by giving names, etc. By clicking on the element, a form is displayed and you can set the element type, give a name, choose a different icon, etc.

Map element: [Add / Remove](#) Shape: [Add / Remove](#) Link: [Add / Remove](#) Expand macros: [Off](#) Grid: [Shown / On](#) 50x50 [Align map elements](#) [Update](#)

**Map element**

Type: Host

Label: New element

Label location: Default

\* Host: My host Select

Tags:

- And/Or Or
- tag Contains value Remove
- [Add](#)

Automatic icon selection ☐

Icons:

- Default: Server\_(64)
- Problem: Default
- Maintenance: Default
- Disabled: Default

Coordinates X: 224 Y: 91

| URLs | Name | URL | Action                 |
|------|------|-----|------------------------|
|      |      |     | <a href="#">Remove</a> |

Map element attributes:

| Parameter             | Description  |
|-----------------------|--|
| <i>Type</i>           | <p>Type of the element:</p> <p><b>Host</b> - icon representing status of all triggers of the selected host</p> <p><b>Map</b> - icon representing status of all elements of a map</p> <p><b>Trigger</b> - icon representing status of one or more triggers</p> <p><b>Host group</b> - icon representing status of all triggers of all hosts belonging to the selected group</p> <p><b>Image</b> - an icon, not linked to any resource</p> |
| <i>Label</i>          | <p>Icon label, any string.</p> <p>Macros and multiline strings can be used.</p> <p>Expression <b>macros</b> are supported in this field, but only with <code>avg</code>, <code>last</code>, <code>min</code> and <code>max</code> functions, with time as parameter (for example, <code>{?avg(/host/key,1h)}</code>).</p> <p>For a full list of supported macros, see <b>supported macros</b> and search for 'map element labels'.</p>   |
| <i>Label location</i> | <p>Label location in relation to the icon:</p> <p><b>Default</b> - map's default label location</p> <p><b>Bottom</b> - beneath the icon</p> <p><b>Left</b> - to the left</p> <p><b>Right</b> - to the right</p> <p><b>Top</b> - above the icon</p>   |

| Parameter                                       | Description  |
|---|--|
| <i>Host</i>                                     | Enter the host if the element type is 'Host'. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts. Scroll down to select. Click on 'x' to remove the selected.  |
| <i>Map</i>                                      | Select the map if the element type is 'Map'.<br>This field is auto-complete so starting to type the name of a map will offer a dropdown of matching maps. Scroll down to select. Click on 'x' to remove the selected.  |
| <i>Triggers</i>                                 | If the element type is 'Trigger', select one or more triggers in the <i>New triggers</i> field below and click on <i>Add</i> .<br>The order of selected triggers can be changed, but only within the same severity of triggers. Multiple trigger selection also affects {HOST.*} macro resolution both in the construction and view modes.<br>// 1 In construction mode// the first displayed {HOST.*} macros will be resolved depending on the first trigger in the list (based on trigger severity).<br>// 2 View mode// depends on the <b>Display problems</b> parameter in General map attributes.<br>* If <i>Expand single problem</i> mode is chosen the first displayed {HOST.*} macros will be resolved depending on the latest detected problem trigger (not mattering the severity) or the first trigger in the list (in case no problem detected);<br>* If <i>Number of problems and expand most critical one</i> mode is chosen the first displayed {HOST.*} macros will be resolved depending on the trigger severity.  |
| <i>Host group</i>                               | Enter the host group if the element type is 'Host group'. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups. Scroll down to select. Click on 'x' to remove the selected.  |
| <i>Tags</i>                                     | Specify tags to limit the number of problems displayed in the widget. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.<br>There are several operators available for each condition:<br><b>Exists</b> - include the specified tag names<br><b>Equals</b> - include the specified tag names and values (case-sensitive)<br><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br><b>Does not exist</b> - exclude the specified tag names<br><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)<br><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br>There are two calculation types for conditions:<br><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition<br><b>Or</b> - enough if one condition is met<br>This field is available for host and host group element types. |
| <i>Automatic icon selection</i><br><i>Icons</i> | In this case an icon mapping will be used to determine which icon to display.<br>You can choose to display different icons for the element in these cases: default, problem, maintenance, disabled.  |
| <i>Coordinate X</i>                             | X coordinate of the map element.   |
| <i>Coordinate Y</i>                             | Y coordinate of the map element.   |
| <i>URLs</i>                                     | Element-specific URLs can be set for the element. These will be displayed as links when a user clicks on the element in the map viewing mode. If the element has its own URLs and there are map level URLs for its type defined, they will be combined in the same menu.<br>Macros can be used in map element names and values. For a full list, see <b>supported macros</b> and search for 'map URL names and values'.  |

#### Attention:

Added elements are not automatically saved. If you navigate away from the page, all changes may be lost. Therefore it is a good idea to click on the **Update** button in the top right corner. Once clicked, the changes are saved regardless of what you choose in the following popup.  
Selected grid options are also saved with each map.

#### Selecting elements

To select elements, select one and then hold down *Ctrl* to select the others.

You can also select multiple elements by dragging a rectangle in the editable area and selecting all elements in it.

Once you select more than one element, the element property form shifts to the mass-update mode so you can change attributes of selected elements in one go. To do so, mark the attribute using the checkbox and enter a new value for it. You may use macros here (for example, {HOST.NAME} for the element label).

Map element: [Add](#) / [Remove](#) Shape: [Add](#) / [Remove](#) Link: [Add](#) / [Remove](#) Expand macros: [Off](#) Grid: [Shown](#) / [On](#) 50x50 [Align map elements](#) [Update](#)

Y X: 50 100 150 200 250 300 350 400 450 500 550 600 650 700

(MAP.NAME)

50

100

150

200

250

300

350

400

450

500

550

600

650

700

New element

(HOST.NAME)  
(HOST.CONN)

Mass update elements

Selected elements

| Type | Name               |
|------|--------------------|
| Host | My host            |
| Host | vcenter.zabbix.ian |

☒ Label

{HOST.NAME}  
{HOST.CONN}

☒ Label location

Top

☐ Automatic icon selection

☐ Icon (default)

Cloud\_(24)

☐ Icon (problem)

Default

☐ Icon (maintenance)

Default

☐ Icon (disabled)

Default

[Apply](#)

[Remove](#)

[Close](#)

Linking elements

Once you have put some elements on the map, it is time to start linking them. To link two elements you must first select them. With the elements selected, click on *Add* next to Link.

With a link created, the single element form now contains an additional *Links* section. Click on *Edit* to edit link attributes.

Map element: [Add / Remove](#) Shape: [Add / Remove](#) Link: [Add / Remove](#) Expand macros: [Off](#) Grid: [Shown / On](#) 50x50 [Align map elements](#) [Update](#)

Y X: 50 100 150 200 250 300 350 400 450 500 550 600 650 700  

{MAP.NAME}

### Map element

Type: Host

Label:

Label location: Default

\* Host:  [Select](#)

Application:  [Select](#)

Automatic icon selection: ☐

Icons

Default Server\_(96)

Problem Default

Maintenance Default

Disabled Default

Coordinates X:  Y:

URLs

| Name                 | URL                  | Action                 |
|----------------------|----------------------|------------------------|
| <input type="text"/> | <input type="text"/> | <a href="#">Remove</a> |

[Add](#)

[Apply](#) [Remove](#) [Close](#)

Links

| Element name       | Link indicators | Action               |
|--------------------|-----------------|----------------------|
| vcenter.zabbix.lan |                 | <a href="#">Edit</a> |

Label:

Connect to: vcenter.zabbix.lan

Type (OK): Bold line

Color (OK): 00CC00

Link indicators

| Trigger             | Type | Color | Action |
|---------------------|------|-------|--------|
| <a href="#">Add</a> |      |       |        |

[Apply](#) [Remove](#) [Close](#)

Link attributes:

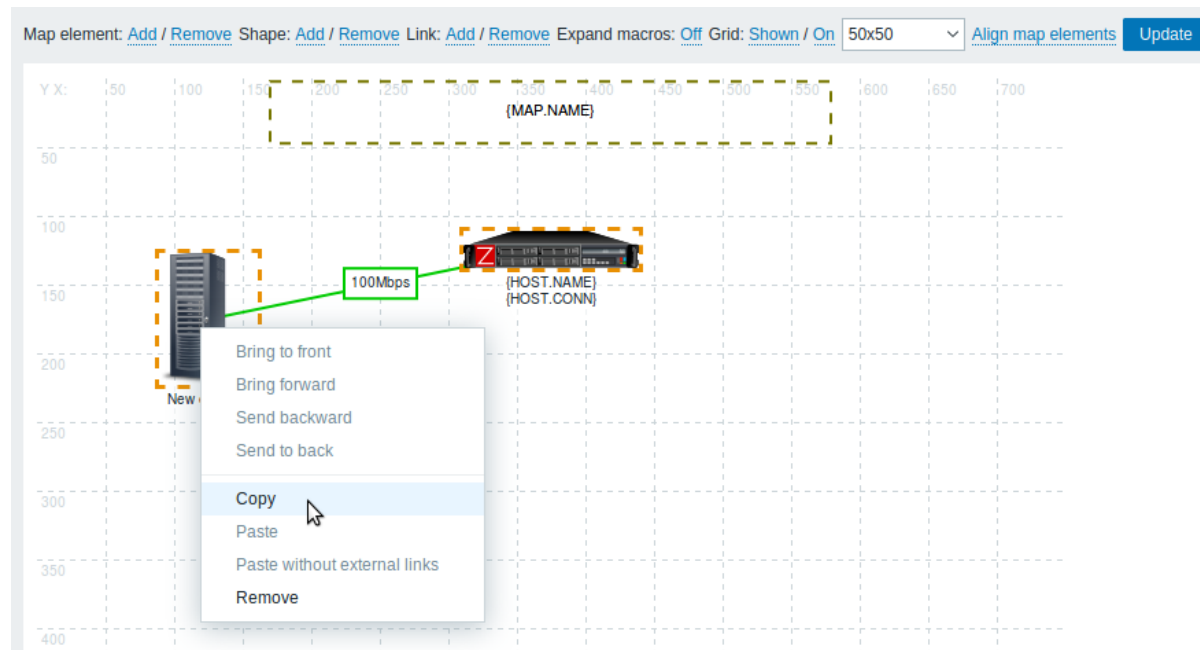
| Parameter    | Description  |
|--------------|--|
| <i>Label</i> | <p>Label that will be rendered on top of the link.</p> <p>Expression <b>macros</b> are supported in this field, but only with <code>avg</code>, <code>last</code>, <code>min</code> and <code>max</code> functions, with time as parameter (for example, <code>{?avg(/host/key,1h)}</code>).</p> |

| Parameter               | Description   |
|-------------------------|---|
| Connect to<br>Type (OK) | The element that the link connects to.<br>Default link style:<br><b>Line</b> - single line<br><b>Bold line</b> - bold line<br><b>Dot</b> - dots<br><b>Dashed line</b> - dashed line |
| Color (OK)              | Default link color.   |
| Link indicators         | List of triggers linked to the link. In case a trigger has status PROBLEM, its style is applied to the link.  |

### Moving and copy-pasting elements

Several selected elements can be **moved** to another place in the map by clicking on one of the selected elements, holding down the mouse button, and moving the cursor to the desired location.

One or more elements can be **copied** by selecting the elements, then clicking on a selected element with the right mouse button and selecting *Copy* from the menu.



To paste the elements, click on a map area with the right mouse button and select *Paste* from the menu. The *Paste without external links* option will paste the elements retaining only the links that are between the selected elements.

Copy-pasting works within the same browser window. Keyboard shortcuts are not supported.

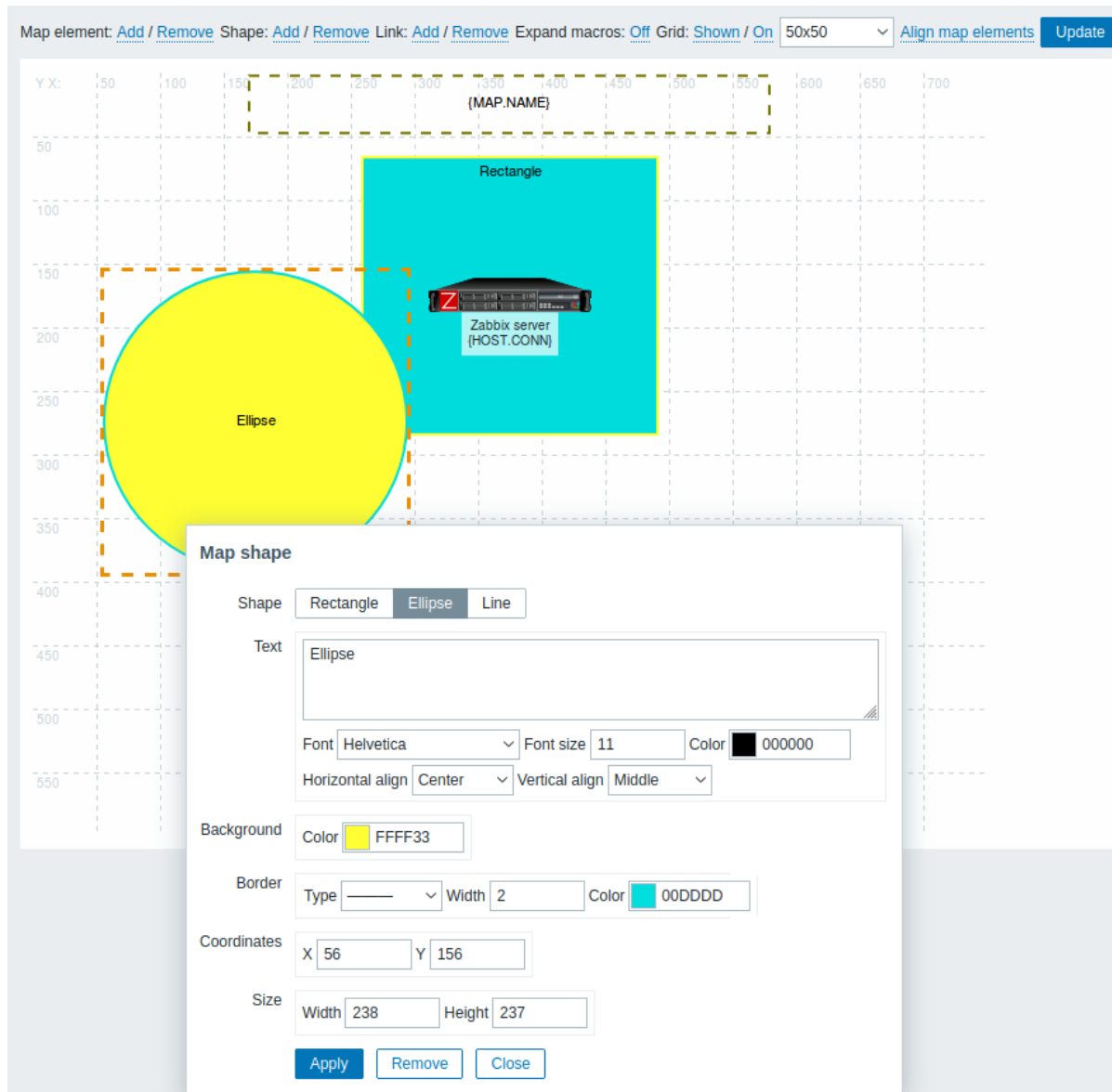
### Adding shapes

In addition to map elements, it is also possible to add some shapes. Shapes are not map elements; they are just a visual representation. For example, a rectangle shape can be used as a background to group some hosts. Rectangle and ellipse shapes can be added.

To add a shape, click on *Add* next to Shape. The new shape will appear at the top left corner of the map. Drag and drop it wherever you like.

A new shape is added with default colors. By clicking on the shape, a form is displayed and you can customize the way a shape looks, add text, etc.

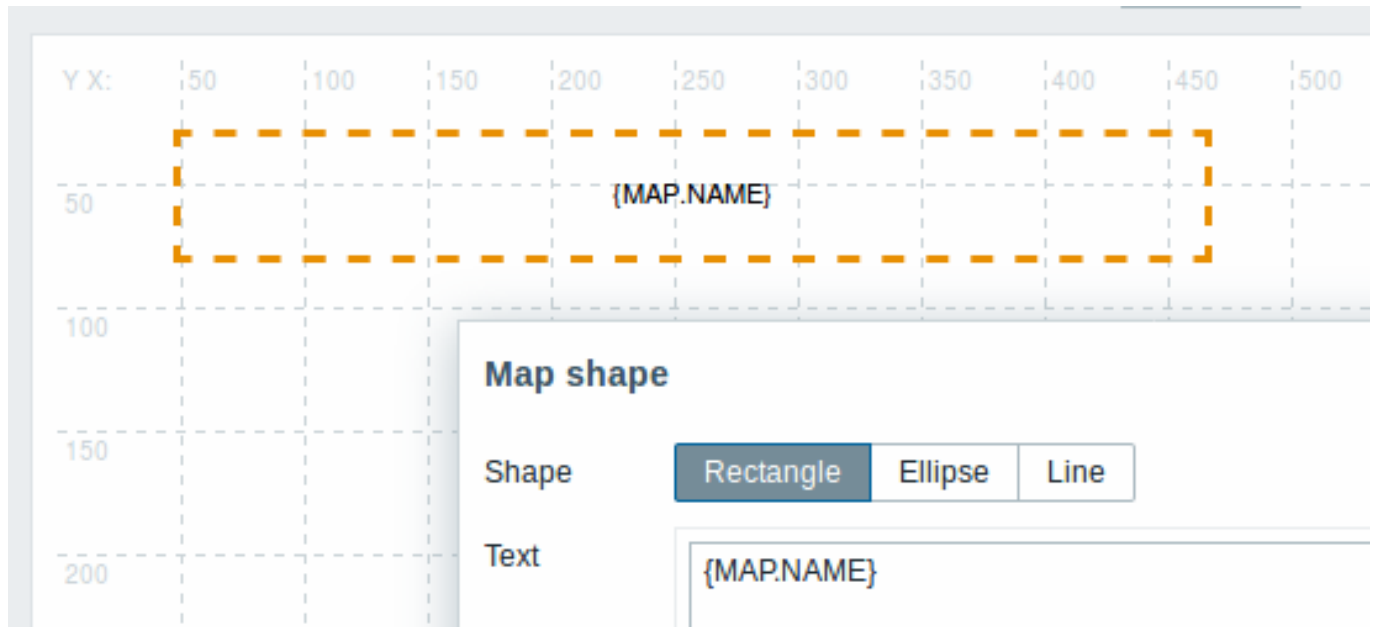




To select shapes, select one and then hold down *Ctrl* to select the others. With several shapes selected, common properties can be mass updated, similarly as with elements.

Text can be added in the shapes. Expression **macros** are supported in the text, but only with `avg`, `last`, `min` and `max` functions, with time as parameter (for example, `{?avg(/host/key, 1h)}`).

To display text only the shape can be made invisible by removing the shape border (select 'None' in the *Border* field). For example, take note of how the `{MAP.NAME}` macro, visible in the screenshot above, is actually a rectangle shape with text, which can be seen when clicking on the macro:



{MAP.NAME} resolves to the configured map name when viewing the map.

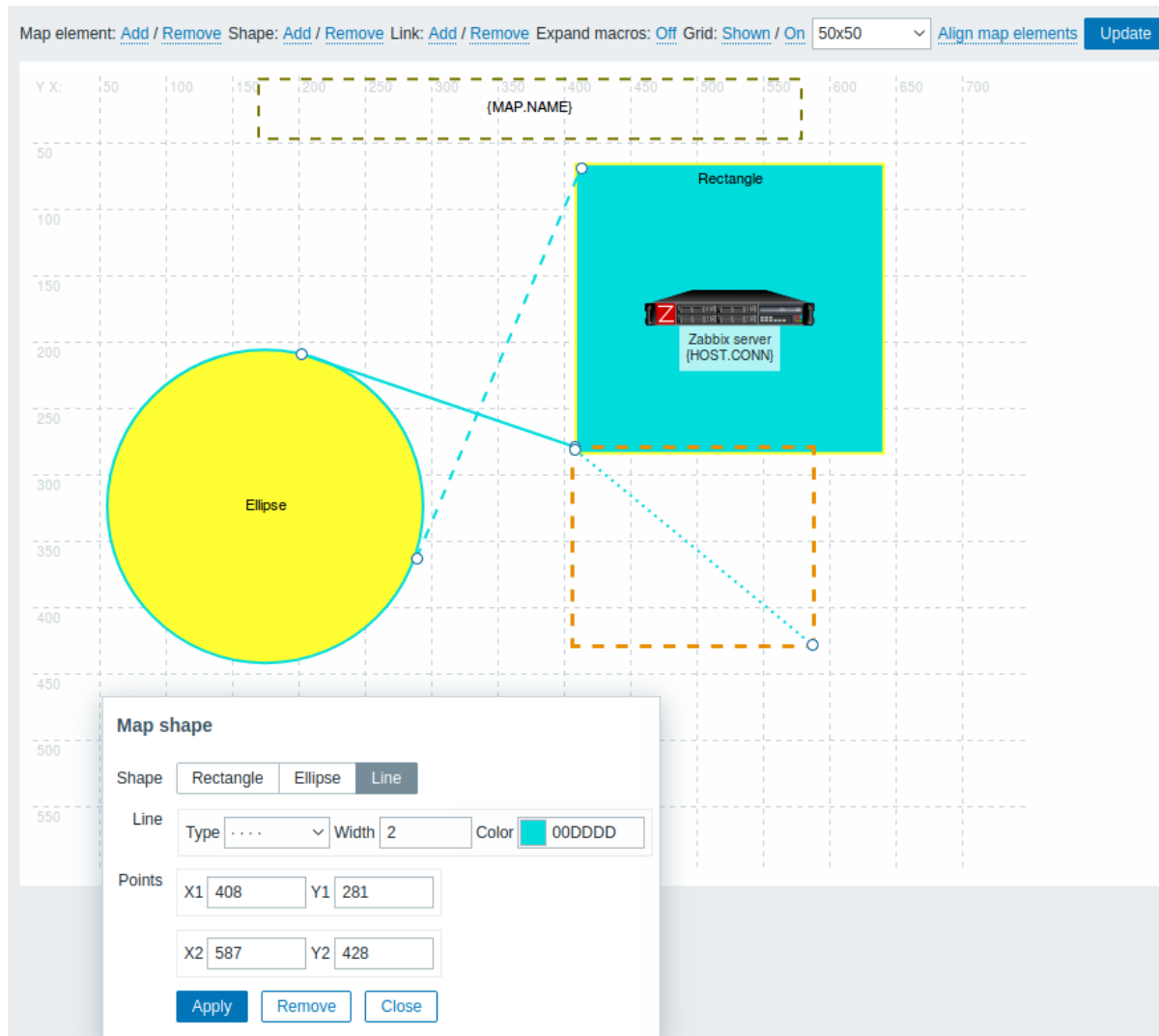
If hyperlinks are used in the text, they become clickable when viewing the map.

Line wrapping for text is always "on" within shapes. However, within an ellipse, the lines are wrapped as though the ellipse were a rectangle. Word wrapping is not implemented, so long words (words that do not fit the shape) are not wrapped, but are masked (constructor page) or clipped (other pages with maps).

#### Adding lines

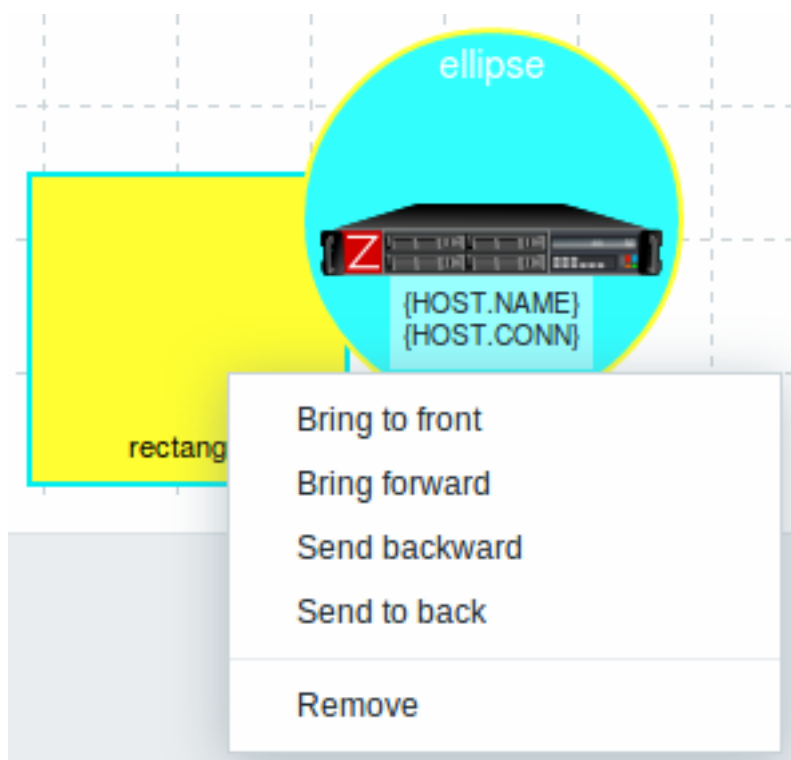
In addition to shapes, it is also possible to add some lines. Lines can be used to link elements or shapes in a map.

To add a line, click on *Add* next to Shape. A new shape will appear at the top left corner of the map. Select it and click on *Line* in the editing form to change the shape into a line. Then adjust line properties, such as line type, width, color, etc.



### Ordering shapes and lines

To bring one shape in front of the other (or vice versa) click on the shape with the right mouse button bringing up the map shape menu.



2 Host group elements

Overview

This section explains how to add a “Host group” type element when configuring a **network map**.

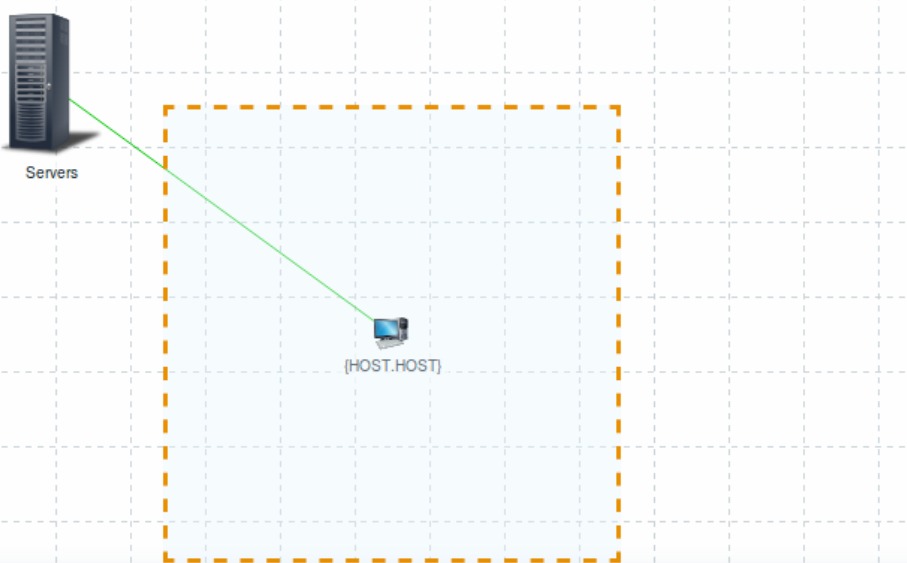
Configuration

Map element: [Add](#) / [Remove](#) Shape: [Add](#) / [Remove](#) Link: [Add](#) / [Remove](#) Expand macros: [Off](#) Grid: [Shown](#) / [On](#) 50x50 [Align map elements](#)

Y X: 50 100 150 200 250 300 350 400

Local network 2

50 100 150 200 250 300 350 400



Map element

Type 

Host group

Show 

Host group

Host group elements

Area type 

Fit to map

Custom size

Area size Width 

300

 Height 

300

Placing algorithm 

Grid

Label 

{HOST.HOST}

Label location 

Default

\* Host group 

Linux servers

Select

Application 

Select

All mandatory input fields are marked with a red asterisk.

This table consists of parameters typical for *Host group* element type:

| Parameter | Description  |
|-----------|--|
| Type      | Select Type of the element:<br><b>Host group</b> - icon representing the status of all triggers of all hosts belonging to the selected group   |
| Show      | Show options:<br><b>Host group</b> - selecting this option will result as one single icon displaying corresponding information about the certain host group<br><b>Host group elements</b> - selecting this option will result as multiple icons displaying corresponding information about every single element (host) of the certain host group |

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| Parameter         | Description   |
|-------------------|---|
| Area type         | This setting is available if the “Host group elements” parameter is selected:<br><b>Fit to map</b> - all host group elements are equally placed within the map<br><b>Custom size</b> - a manual setting of the map area for all the host group elements to be displayed   |
| Area size         | This setting is available if “Host group elements” parameter and “Area type” parameter are selected:<br><b>Width</b> - numeric value to be entered to specify map area width<br><b>Height</b> - numeric value to be entered to specify map area height  |
| Placing algorithm | <b>Grid</b> - only available option of displaying all the host group elements   |
| Label             | Icon label, any string.<br><b>Macros</b> and multiline strings can be used in labels.<br>If the type of the map element is “Host group” specifying certain macros has an impact on the map view displaying corresponding information about every single host. For example, if {HOST.IP} macro is used, the edit map view will only display the macro {HOST.IP} itself while map view will include and display each host’s unique IP address |

Viewing host group elements

This option is available if the “Host group elements” show option is chosen. When selecting “Host group elements” as the *show* option, you will at first see only one icon for the host group. However, when you save the map and then go to the map view, you will see that the map includes all the elements (hosts) of the certain host group:

Map editing view

Network maps

Map element:

Add / Remove

Shape:

Add / Remove

Link:

Add / Remove

Expand macros:

On

Y X:

50

100

150

200

250

Local network 2

400

450

50

Servers

100

150

200

250

(HOST.HOST)

300

350

400

Map view

Maps

All maps / Local network 2

Servers

OK

Server\_1

OK

Server\_4

OK

Zabbix se

DISABL

Notice how the {HOST.NAME} macro is used. In map editing, the macro name is unresolved, while in map view all the unique names of the hosts are displayed.

3 Link indicators

Overview

You can assign some triggers to a **link** between elements in a network map. When these triggers go into a problem state, the link can reflect that.

When you configure a link, you set the default link type and color. When you assign triggers to a link, you can assign different link types and colors with these triggers.

Should any of these triggers go into a problem state, their link style and color will be displayed on the link. So maybe your default link was a green line. Now, with the trigger in the problem state, your link may become bold red (if you have defined it so).

## Configuration

To assign triggers as link indicators, do the following:

- select a map element
- click on *Edit* in the *Links* section for the appropriate link
- click on *Add* in the *Link indicators* block and select one or more triggers

### Network maps

Map element: [Add](#) / [Remove](#) Shape: [Add](#) / [Remove](#) Link: [Add](#) / [Remove](#)

### Map element

Type: Host

Label:

Label location: Default

\* Host:

Tags

And/Or Or

Tag  Contains Contains  [Re](#)

Tag  Equals Equals  [Re](#)

[Add](#)

Automatic icon selection ☐

Icons

Default Server\_(64)

Problem Default

Maintenance Default

Disabled Default

Coordinates X  Y

URLs

Name  URL

[Add](#)

Apply Remove Close

Links

| Element name  | Link indicators                                    |
|---------------|--|
| Zabbix server | New host (former tech name: Server4): Trap trigger |

Label:

Connect to: Zabbix server

Type (OK): Bold line

Color (OK): 00CC00

Link indicators

| Trigger  | Type              | Color               |
|--|-------------------|---------------------|
| New host (former tech name: Server4): Trap trigger | <span>Line</span> | <span>DD0000</span> |

[Add](#)

Apply Remove Close

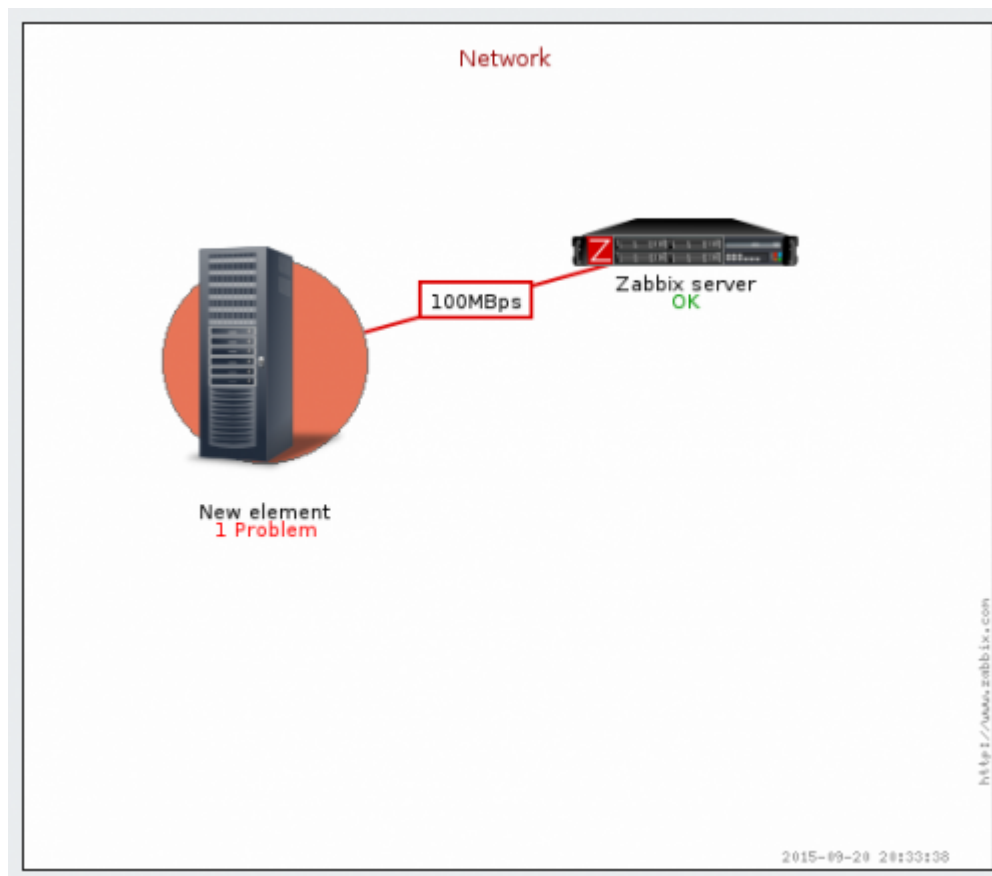
All mandatory input fields are marked with a red asterisk.

Added triggers can be seen in the *Link indicators* list.

You can set the link type and color for each trigger directly from the list. When done, click on *Apply*, close the form and click on *Update* to save the map changes.

## Display

In *Monitoring* → *Maps* the respective color will be displayed on the link if the trigger goes into a problem state.



#### Note:

If multiple triggers go into a problem state, the problem with the highest severity will determine the link style and color. If multiple triggers with the same severity are assigned to the same map link, the one with the lowest ID takes precedence. Note also that:

1. *Minimum trigger severity* and *Show suppressed problem* settings from map configuration affect which problems are taken into account.
2. In the case of triggers with multiple problems (multiple problem generation), each problem may have a severity that differs from trigger severity (changed manually), may have different tags (due to macros), and may be suppressed.

### 3 Dashboards

**Dashboards** and their widgets provide a strong visualization platform with such tools as modern graphs, maps, slideshows, and many more.



### 4 Host dashboards

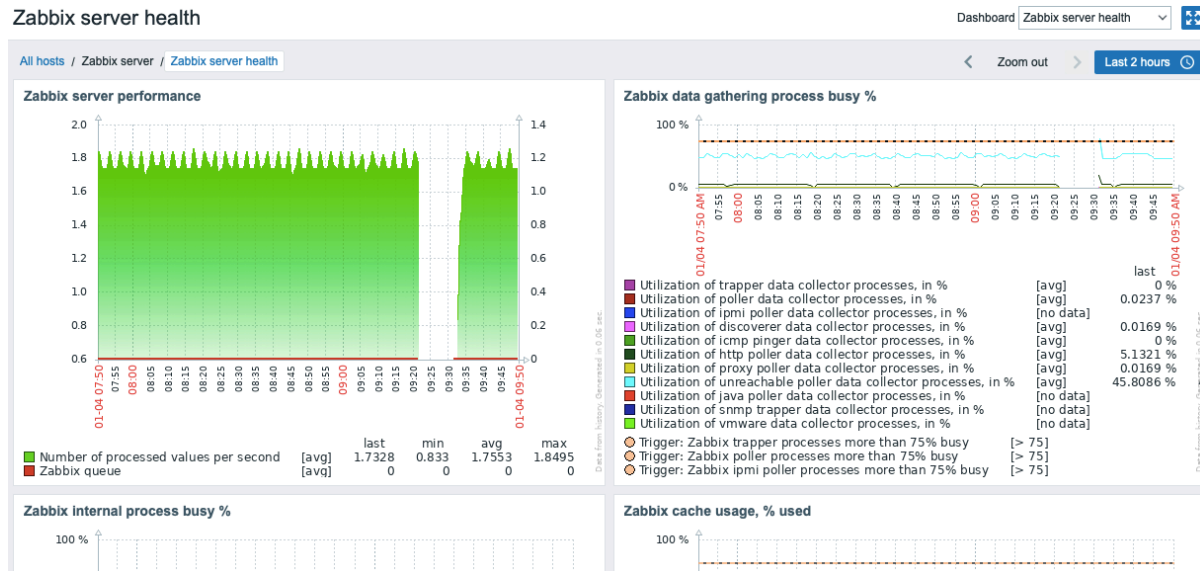
## Overview

Host dashboards look similar to [global dashboards](#), however, host dashboards display data about the host only. Host dashboards have no owner.

Host dashboards are configured on the [template](#) level and then are generated for a host, once the template is linked to the host. Widgets of host dashboards can only be copied to host dashboards of the same template. Widgets from global dashboards cannot be copied onto host dashboards.

Host dashboards *cannot* be configured or directly accessed in the *Monitoring* → *Dashboard* section, which is reserved for global dashboards. The ways to access host dashboards are listed below in this section.

### Zabbix server health



When viewing host dashboards you may switch between the configured dashboards using the dropdown in the upper right corner. To switch to *Monitoring→Hosts* section, click *All hosts* navigation link below the dashboard name in the upper left corner.

Widgets of the host dashboards cannot be edited.

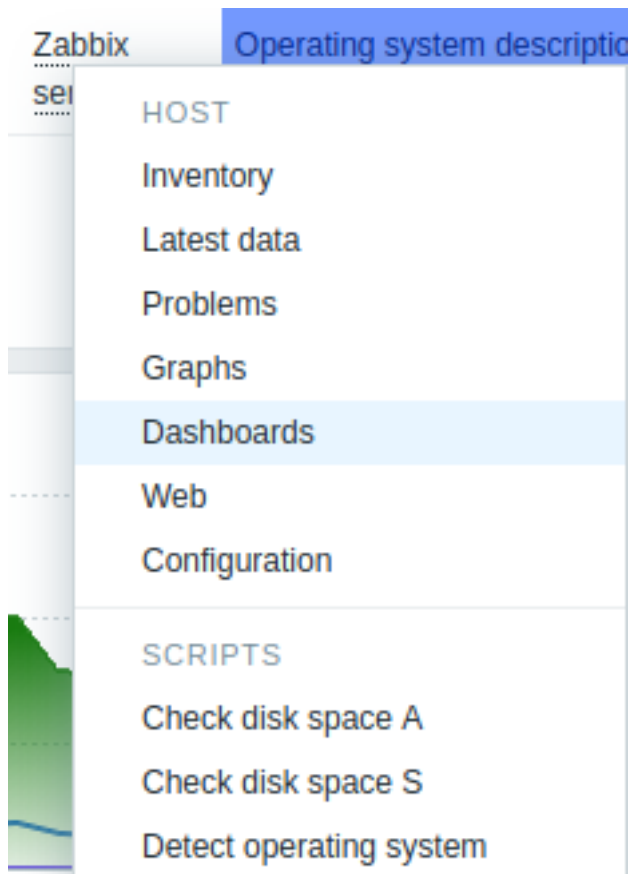
Note that host dashboards used to be host screens before Zabbix 5.2. When importing an older template containing screens, the screen import will be ignored.

### Accessing host dashboards

Access to host dashboards is provided:

- From the [host menu](#) that is available in many frontend locations:
  - click on the host name and then select *Dashboards* from the drop-down menu





- When searching for a host name in **global search**:
  - click on the *Dashboards* link provided in search results
- When clicking on a host name in *Inventory* → **Hosts**:
  - click on the *Dashboards* link provided

## 8 Templates

### Overview

A template is a set of entities that can be conveniently applied to multiple hosts.

The entities may be:

- items
- triggers
- graphs
- dashboards
- low-level discovery rules
- web scenarios

As many hosts in real life are identical or fairly similar so it naturally follows that the set of entities (items, triggers, graphs,...) you have created for one host, may be useful for many. Of course, you could copy them to each new host, but that would be a lot of manual work. Instead, with templates you can copy them to one template and then apply the template to as many hosts as needed.

When a template is linked to a host, all entities (items, triggers, graphs,...) of the template are added to the host. Templates are assigned to each individual host directly (and not to a host group).

Templates are often used to group entities for particular services or applications (like Apache, MySQL, PostgreSQL, Postfix...) and then applied to hosts running those services.

Another benefit of using templates is when something has to be changed for all the hosts. Changing something on the template level once will propagate the change to all the linked hosts.

Thus, the use of templates is an excellent way of reducing one's workload and streamlining the Zabbix configuration.

Proceed to **creating and configuring a template**.

## 9 Templates out of the box

### Overview

Zabbix strives to provide a growing list of useful out-of-the-box **templates**. Out-of-the-box templates come preconfigured and thus are a useful way for speeding up the deployment of monitoring jobs.

The templates are available:

- In new installations - in *Configuration* → *Templates*;
- If you are upgrading Zabbix, the upgraded installation might lack newer templates. You can find them in the Zabbix [Git repository](#) - select the version you upgraded to. To add a new template, download the template file, open Zabbix frontend, go to *Configuration* → *Templates*, and import the file.

Please use the sidebar to access information about specific template types and operation requirements.

See also:

- [Template import](#)
- [Linking a template](#)
- [Known issues](#)

### 1 Zabbix agent template operation

Steps to ensure correct operation of templates that collect metrics with **Zabbix agent**:

1. Make sure that Zabbix agent is installed on the host. For active checks, also make sure that the host is added to the 'ServerActive' parameter of the agent **configuration file**.
2. [Link](#) the template to a target host (if the template is not available in your Zabbix installation, you may need to import the template's .xml file first - see [Templates out-of-the-box](#) section for instructions).
3. If necessary, adjust the values of template macros.
4. Configure the instance being monitored to allow sharing data with Zabbix.

A detailed description of a template, including the full list of macros, items and triggers, is available in the template's Readme.md file (accessible by clicking on a template name).

The following templates are available:

- [Apache by Zabbix agent](#)
- [HAProxy by Zabbix agent](#)
- [IIS by Zabbix agent](#)
- [IIS by Zabbix agent active](#)
- [Microsoft Exchange Server 2016 by Zabbix agent](#)
- [Microsoft Exchange Server 2016 by Zabbix agent active](#)
- [MySQL by Zabbix agent](#)
- [Nginx by Zabbix agent](#)
- [PHP-FPM by Zabbix agent](#)
- [PostgreSQL by Zabbix agent](#)
- [RabbitMQ cluster by Zabbix agent](#)

### 2 Zabbix agent 2 template operation

Steps to ensure correct operation of templates that collect metrics with **Zabbix agent 2**:

1. Make sure that agent 2 is installed on the host and that the installed version contains the required plugin. In some cases, you may need to **upgrade** agent 2 first.
2. [Link](#) the template to a target host (if the template is not available in your Zabbix installation, you may need to import the template's import file first - see [Templates out-of-the-box](#) section for instructions).
3. If necessary, adjust the values of template macros. Note that user macros can be used to override configuration parameters.
4. Configure the instance being monitored to allow sharing data with Zabbix.

**Attention:**

Zabbix agent 2 templates work in conjunction with the plugins. While the basic configuration can be done by simply adjusting user macros, the deeper customization can be achieved by **configuring the plugin** itself. For example, if a plugin supports named sessions, it is possible to monitor several entities of the same kind (e.g., MySQL1 and MySQL2) by specifying named session with own URI, username and password for each entity in the configuration file.

A detailed description of a template, including the full list of macros, items and triggers, is available in the template's Readme.md file (accessible by clicking on a template name).

The following templates are available:

- [Ceph by Zabbix agent 2](#)
- [Docker](#)
- [Memcached](#)
- [MongoDB cluster by Zabbix agent 2](#)
- [MongoDB node by Zabbix agent 2](#)
- [MySQL by Zabbix agent 2](#)
- [Oracle by Zabbix agent 2](#)
- [PostgreSQL by Zabbix agent 2](#)
- [Redis](#)
- [SMART by Zabbix agent 2](#)
- [SMART by Zabbix agent 2 active](#)
- [Systemd by Zabbix agent 2](#)
- [Website certificate by Zabbix agent 2](#)

### 3 HTTP template operation

Steps to ensure correct operation of templates that collect metrics with **HTTP agent**:

1. Create a host in Zabbix and specify an IP address or DNS name of the monitoring target as the main interface. This is needed for the {HOST.CONN} macro to resolve properly in the template items.
2. [Link](#) the template to the host created in step 1 (if the template is not available in your Zabbix installation, you may need to import the template's .xml file first - see [Templates out-of-the-box](#) section for instructions).
3. If necessary, adjust the values of template macros.
4. Configure the instance being monitored to allow sharing data with Zabbix.

A detailed description of a template, including the full list of macros, items and triggers, is available in the template's Readme.md file (accessible by clicking on a template name).

The following templates are available:

- [Acronis Cyber Protect Cloud by HTTP](#)
- [Apache by HTTP](#)
- [Asterisk by HTTP](#)
- [AWS by HTTP](#)
- [AWS Cost Explorer by HTTP](#)
- [AWS EC2 by HTTP](#)
- [AWS ECS Cluster by HTTP](#)
- [AWS ECS Serverless Cluster by HTTP](#)
- [AWS ELB Application Load Balancer by HTTP](#)
- [AWS ELB Network Load Balancer by HTTP](#)
- [AWS Lambda by HTTP](#)
- [AWS RDS instance by HTTP](#)
- [AWS S3 bucket by HTTP](#)
- [Azure by HTTP](#)
- [Cisco Meraki organization by HTTP](#)
- [Cisco SD-WAN by HTTP](#)
- [ClickHouse by HTTP](#)
- [Cloudflare by HTTP](#)
- [CockroachDB by HTTP](#)
- [Control-M enterprise manager by HTTP](#)
- [Control-M server by HTTP](#)
- [DELL PowerEdge R720 by HTTP](#)
- [DELL PowerEdge R740 by HTTP](#)
- [DELL PowerEdge R820 by HTTP](#)

- [DELL PowerEdge R840 by HTTP](#)
- [Elasticsearch Cluster by HTTP](#)
- [Envoy Proxy by HTTP](#)
- [Etcd by HTTP](#)
- [FortiGate by HTTP](#)
- [GitHub repository by HTTP](#)
- [GitLab by HTTP](#)
- [Google Cloud Platform by HTTP \(GCP by HTTP\)](#)
- [Hadoop by HTTP](#)
- [HAProxy by HTTP](#)
- [HashiCorp Consul Cluster by HTTP](#)
- [HashiCorp Consul Node by HTTP](#)
- [HashiCorp Nomad by HTTP](#)
- [HashiCorp Vault by HTTP](#)
- [Hikvision camera by HTTP](#)
- [HPE iLO by HTTP](#)
- [HPE MSA 2040 Storage by HTTP](#)
- [HPE MSA 2060 Storage by HTTP](#)
- [HPE Primera by HTTP](#)
- [HPE Synergy by HTTP](#)
- [InfluxDB by HTTP](#)
- [Jenkins by HTTP](#)
- [Kubernetes API server by HTTP](#)
- [Kubernetes cluster state by HTTP](#)
- [Kubernetes Controller manager by HTTP](#)
- [Kubernetes kubelet by HTTP](#)
- [Kubernetes nodes by HTTP](#)
- [Kubernetes Scheduler by HTTP](#)
- [MantisBT by HTTP](#)
- [Microsoft 365 reports by HTTP](#)
- [Microsoft SharePoint by HTTP](#)
- [NetApp AFF A700 by HTTP](#)
- [Nextcloud by HTTP](#)
- [NGINX by HTTP](#)
- [NGINX Plus by HTTP](#)
- [Nutanix Prism Element by HTTP](#)
- [OpenStack by HTTP](#)
- [OpenWeatherMap by HTTP](#)
- [Oracle Cloud by HTTP](#)
- [PHP-FPM by HTTP](#)
- [Proxmox VE by HTTP](#)
- [RabbitMQ cluster by HTTP](#)
- [TiDB by HTTP](#)
- [TiDB PD by HTTP](#)
- [TiDB TiKV by HTTP](#)
- [Travis CI by HTTP](#)
- [Veeam Backup Enterprise Manager by HTTP](#)
- [Veeam Backup and Replication by HTTP](#)
- [VMware SD-WAN VeloCloud by HTTP](#)
- [YugabyteDB by HTTP](#)
- [ZooKeeper by HTTP](#)

#### 4 IPMI template operation

IPMI templates do not require any specific setup. To start monitoring, [link](#) the template to a target host (if the template is not available in your Zabbix installation, you may need to import the template's .xml file first - see [Templates out-of-the-box](#) section for instructions).

A detailed description of a template, including the full list of macros, items and triggers, is available in the template's Readme.md file (accessible by clicking on a template name).

Available template:

- [Chassis by IPMI](#)

## 5 JMX template operation

Steps to ensure correct operation of templates that collect metrics by **JMX**:

1. Make sure Zabbix **Java gateway** is installed and set up properly.
2. [Link](#) the template to the target host. The host should have JMX interface set up.

If the template is not available in your Zabbix installation, you may need to import the template's .xml file first - see [Templates out-of-the-box](#) section for instructions.

3. If necessary, adjust the values of template macros.
4. Configure the instance being monitored to allow sharing data with Zabbix.

A detailed description of a template, including the full list of macros, items, and triggers, is available in the template's Readme.md file (accessible by clicking on a template name).

The following templates are available:

- [Apache ActiveMQ by JMX](#)
- [Apache Cassandra by JMX](#)
- [Apache Kafka by JMX](#)
- [Apache Tomcat by JMX](#)
- [GridGain by JMX](#)
- [Ignite by JMX](#)
- [Jira Data Center by JMX](#)
- [WildFly Domain by JMX](#)
- [WildFly Server by JMX](#)

## 6 ODBC template operation

Steps to ensure correct operation of templates that collect metrics via **ODBC monitoring**:

1. Make sure that required ODBC driver is installed on Zabbix server or proxy.
2. [Link](#) the template to a target host (if the template is not available in your Zabbix installation, you may need to import the template's .xml file first - see [Templates out-of-the-box](#) section for instructions).
3. If necessary, adjust the values of template macros.
4. Configure the instance being monitored to allow sharing data with Zabbix.

A detailed description of a template, including the full list of macros, items and triggers, is available in the template's Readme.md file (accessible by clicking on a template name).

The following templates are available:

- [MSSQL by ODBC](#)
- [MySQL by ODBC](#)
- [Oracle by ODBC](#)
- [PostgreSQL by ODBC](#)

## 7 Standardized templates for network devices

### Overview

In order to provide monitoring for network devices such as switches and routers, we have created two so-called models: for the network device itself (its chassis basically) and for network interface.

Since Zabbix 3.4 templates for many families of network devices are provided. All templates cover (where possible to get these items from the device):

- Chassis fault monitoring (power supplies, fans and temperature, overall status)
- Chassis performance monitoring (CPU and memory items)
- Chassis inventory collection (serial numbers, model name, firmware version)
- Network interface monitoring with IF-MIB and EtherLike-MIB (interface status, interface traffic load, duplex status for Ethernet)

These templates are available:

- In new installations - in *Configuration* → *Templates*;

- If you are upgrading from previous versions, you can find these templates in the *zabbix/templates* directory of the downloaded latest Zabbix version. While in *Configuration → Templates* you can import them manually from this directory.

If you are importing the new out-of-the-box templates, you may want to also update the `@Network` interfaces for discovery global regular expression to:

```
Result is FALSE: ^Software Loopback Interface
Result is FALSE: ^(?In)?[lL]oop[bB]ack[0-9._]*$
Result is FALSE: ^NULL[0-9._]*$
Result is FALSE: ^[lL]o[0-9._]*$
Result is FALSE: ^[sS]ystem$
Result is FALSE: ^Nu[0-9._]*$
```

to filter out loopbacks and null interfaces on most systems.

## Devices

List of device families for which templates are available:

| Template name                                       | Vendor           | Device family                     | Known models   | OS    | MIBs used   | Tags              |
|---|------------------|-----------------------------------|--|-------|---|-------------------|
| <i>Alcatel Timetra TIMOS SNMP</i>                   | Alcatel          | Alcatel Timetra                   | ALCATEL SR 7750  | TIMOS | TIMETRA-SYSTEM-MIB, TIMETRA-CHASSIS-MIB   | Certified         |
| <i>Brocade FC SNMP</i>                              | Brocade          | Brocade FC switches               | Brocade 300 SAN Switch-  | -     | SW-MIB, ENTITY-MIB  | Performance Fault |
| <i>Brocade_Foundry Stackable SNMP</i>               | Brocade          | Brocade ICX                       | Brocade ICX6610, Brocade ICX7250-48, Brocade ICX7450-48F   |       | FOUNDRY-SN-AGENT-MIB, FOUNDRY-SN-STACKING-MIB   | Certified         |
| <i>Brocade_Foundry Nonstackable SNMP</i>            | Brocade, Foundry | Brocade MLX, Foundry              | Brocade MLXe, Foundry FLS648, Foundry FWSX424  |       | FOUNDRY-SN-AGENT-MIB  | Performance Fault |
| <i>Check Point Next Generation Firewall by SNMP</i> | Check Point      | Next Generation Firewall          | -  | Gaia  | HOST-RESOURCES-MIB, CHECKPOINT-MIB, UCD-SNMP-MIB, SNMPv2-MIB, IF-MIB                                      | Certified         |
| <i>Cisco Catalyst 3750&lt;device model&gt; SNMP</i> | Cisco            | Cisco Catalyst 3750               | Cisco Catalyst 3750V2-24FS, Cisco Catalyst 3750V2-24PS, Cisco Catalyst 3750V2-24TS, Cisco Catalyst SNMP, Cisco Catalyst SNMP |       | CISCO-MEMORY-POOL-MIB, IF-MIB, EtherLike-MIB, SNMPv2-MIB, CISCO-PROCESS-MIB, CISCO-ENVMON-MIB, ENTITY-MIB | Certified         |
| <i>Cisco IOS SNMP</i>                               | Cisco            | Cisco IOS ver > 12.2 3.5          | Cisco C2950  | IOS   | CISCO-PROCESS-MIB, CISCO-MEMORY-POOL-MIB, CISCO-ENVMON-MIB  | Certified         |
| <i>Cisco IOS versions 12.0_3_T-12.2_3.5 SNMP</i>    | Cisco            | Cisco IOS > 12.0 3 T and 12.2 3.5 | -  | IOS   | CISCO-PROCESS-MIB, CISCO-MEMORY-POOL-MIB, CISCO-ENVMON-MIB  | Certified         |
| <i>Cisco IOS prior to 12.0_3_T SNMP</i>             | Cisco            | Cisco IOS 12.0 3 T                | -  | IOS   | OLD-CISCO-CPU-MIB, CISCO-MEMORY-POOL-MIB  | Certified         |

| Template name                       | Vendor       | Device family                    | Known models                                 | OS      | MIBs used   | Tags                               |
|-------------------------------------|--------------|----------------------------------|--|---------|---|------------------------------------|
| <i>D-Link DES_DGS Switch SNMP</i>   | D-Link       | DES/DGX switches                 | D-Link DES-xxxx/DGS-xxxx,DLINK DGS-3420-26SC | -       | DLINK-AGENT-MIB,EQUIPMENT-MIB,ENTITY-MIB  | Certified                          |
| <i>D-Link DES 7200 SNMP</i>         | D-Link       | DES-7xxx                         | D-Link DES 7206                              | -       | ENTITY-MIB,MY-SYSTEM-MIB,MY-PROCESS-MIB,MY-MEMORY-MIB   | Performance<br>Fault<br>Interfaces |
| <i>Dell Force S-Series SNMP</i>     | Dell         | Dell Force S-Series              | S4810  |         | F10-S-SERIES-CHASSIS-MIB  | Certified                          |
| <i>Extreme Exos SNMP</i>            | Extreme      | Extreme EXOS                     | X670V-48x                                    | EXOS    | EXTREME-SYSTEM-MIB,EXTREME-SOFTWARE-MONITOR-MIB   | Certified                          |
| <i>FortiGate by SNMP</i>            | Fortinet     | FortiGate (NGFW)                 | -  | FortiOS | HOST-RESOURCES-MIB<br>FORTINET-FORTIGATE-MIB<br>FORTINET-CORE-MIB<br>SNMPv2-MIB<br>IF-MIB<br>ENTITY-MIB | Performance<br>Inventory           |
| <i>Huawei VRP SNMP</i>              | Huawei       | Huawei VRP                       | S2352P-EI                                    | -       | ENTITY-MIB,HUAWEI-ENTITY-EXTENT-MIB   | Certified                          |
| <i>Intel_Qlogic Infiniband SNMP</i> | Intel/QLogic | Intel/QLogic Infini-band devices | Infiniband 12300                             |         | ICS-CHASSIS-MIB   | Fault<br>Inventory                 |
| <i>Juniper SNMP</i>                 | Juniper      | MX,SRX,EX models                 | Juniper MX240, Juniper EX4200-24F            | JunOS   | JUNIPER-MIB   | Certified                          |
| <i>Mellanox SNMP</i>                | Mellanox     | Mellanox Infini-band devices     | SX1036                                       | MLNX-OS | HOST-RESOURCES-MIB,ENTITY-MIB,ENTITY-SENSOR-MIB,MELLANOX-MIB  | Certified                          |

| Template name                                | Vendor   | Device family                            | Known models  | OS       | MIBs used                       | Tags      |
|--|----------|--|---|----------|---------------------------------|-----------|
| <i>MikroTik CCR&lt;device model&gt; SNMP</i> | MikroTik | MikroTik Cloud Core Routers (CCR series) | Separate dedicated templates are available for MikroTik CCR1009-7G-1C-1S+, MikroTik CCR1009-7G-1C-1S+PC, MikroTik CCR1009-7G-1C-PC, MikroTik CCR1016-12G, MikroTik CCR1016-12S-1S+, MikroTik CCR1036-12G-4S-EM, MikroTik CCR1036-12G-4S, MikroTik CCR1036-8G-2S+, MikroTik CCR1036-8G-2S+EM, MikroTik CCR1072-1G-8S+, MikroTik CCR2004-16G-2S+, MikroTik CCR2004-1G-12S+2XS | RouterOS | MIKROTIK-MIB,HOST-RESOURCES-MIB | Certified |



| Template name                                 | Vendor   | Device family                               | Known models  | OS                | MIBs used                       | Tags      |
|---|----------|---|---|-------------------|---------------------------------|-----------|
| <i>MikroTik CRS&lt;device model&gt; SNMP</i>  | MikroTik | MikroTik Cloud Router Switches (CRS series) | Separate dedicated templates are available for MikroTik CRS106-1C-5S, MikroTik CRS109-8G-1S-2HnD-IN, MikroTik CRS112-8G-4S-IN, MikroTik CRS112-8P-4S-IN, MikroTik CRS125-24G-1S-2HnD-IN, MikroTik CRS212-1G-10S-1S+IN, MikroTik CRS305-1G-4S+IN, MikroTik CRS309-1G-8S+IN, MikroTik CRS312-4C+8XG-RM, MikroTik CRS317-1G-16S+RM, MikroTik CRS326-24G-2S+IN, MikroTik CRS326-24G-2S+RM, MikroTik CRS326-24S+2Q+RM, MikroTik CRS328-24P-4S+RM, MikroTik CRS328-4C-20S-4S+RM, MikroTik CRS354-48G-4S+2Q+RM, MikroTik CRS354-48P-4S+2Q+RM | RouterOS/SwitchOS | MIKROTIK-MIB,HOST-RESOURCES-MIB | Certified |
| <i>MikroTik CSS&lt;device model&gt; SNMP</i>  | MikroTik | MikroTik Cloud Smart Switches (CSS series)  | Separate dedicated templates are available for MikroTik CSS326-24G-2S+RM, MikroTik CSS610-8G-2S+IN  | RouterOS          | MIKROTIK-MIB,HOST-RESOURCES-MIB | Certified |
| <i>MikroTik FiberBox SNMP</i>                 | MikroTik | MikroTik FiberBox                           | MikroTik FiberBox   | RouterOS          | MIKROTIK-MIB,HOST-RESOURCES-MIB | Certified |
| <i>MikroTik hEX &lt;device model&gt; SNMP</i> | MikroTik | MikroTik hEX                                | Separate dedicated templates are available for MikroTik hEX, MikroTik hEX lite, MikroTik hEX PoE, MikroTik hEX PoE lite, MikroTik hEX S   | RouterOS          | MIKROTIK-MIB,HOST-RESOURCES-MIB | Certified |

| Template name                                      | Vendor   | Device family              | Known models   | OS                     | MIBs used                       | Tags                  |
|--|----------|----------------------------|--|------------------------|---------------------------------|-----------------------|
| <i>MikroTik netPower</i><br><device model><br>SNMP | MikroTik | MikroTik net-Power         | Separate dedicated templates are available for MikroTik netPower 15FR, MikroTik netPower 16P SNMP, MikroTik netPower Lite 7R   | RouterOS/SwitchOS Lite | MIKROTIK-MIB,HOST-RESOURCES-MIB | Certified             |
| <i>MikroTik PowerBox</i><br><device model><br>SNMP | MikroTik | MikroTik Power-Box         | Separate dedicated templates are available for MikroTik PowerBox, MikroTik PowerBox Pro  | RouterOS               | MIKROTIK-MIB,HOST-RESOURCES-MIB | Certified             |
| <i>MikroTik RB</i> <device model> SNMP             | MikroTik | MikroTik RB series routers | Separate dedicated templates are available for MikroTik RB1100AHx4, MikroTik RB1100AHx4 Dude Edition, MikroTik RB2011iL-IN, MikroTik RB2011iL-RM, MikroTik RB2011iLS-IN, MikroTik RB2011UiAS-IN, MikroTik RB2011UiAS-RM, MikroTik RB260GS, MikroTik RB3011UiAS-RM, MikroTik RB4011iGS+RM, MikroTik RB5009UG+S+IN | RouterOS               | MIKROTIK-MIB,HOST-RESOURCES-MIB | Certified             |
| <i>MikroTik SNMP</i>                               | MikroTik | MikroTik RouterOS devices  | MikroTik CCR1016-12G, MikroTik RB2011UAS-2HnD, MikroTik 912UAG-5HPnD, MikroTik 941-2nD, MikroTik 951G-2HnD, MikroTik 1100AHx2  | RouterOS               | MIKROTIK-MIB,HOST-RESOURCES-MIB | Certified             |
| <i>QTech QSW SNMP</i>                              | QTech    | Qtech devices              | Qtech QSW-2800-28T   | -                      | QTECH-MIB,ENTITY-MIB            | Performance Inventory |

| Template name                    | Vendor   | Device family                   | Known models  | OS    | MIBs used   | Tags                     |
|----------------------------------|----------|---------------------------------|---|-------|---|--------------------------|
| <i>Ubiquiti AirOS SNMP</i>       | Ubiquiti | Ubiquiti AirOS wireless devices | NanoBridge, NanoStation                                   | Linux | FROGFOOT-RESOURCES-MIB, IEEE802dot11-MIB                            | Performance              |
| <i>HP Comware HH3C SNMP</i>      | HP       | HP (H3C) Comware                | HP A5500-24G-4SFP HI Switch                               |       | HH3C-ENTITY-EXT-MIB, ENTITY-MIB                                     | Certified                |
| <i>HP Enterprise Switch SNMP</i> | HP       | HP Enterprise Switch            | HP ProCurve J4900B Switch 2626, HP J9728A 2920-48G Switch |       | STATISTICS-MIB, NETSWITCH-MIB, HP-ICF-CHASSIS, ENTITY-MIB, SEMI-MIB | Certified                |
| <i>TP-LINK SNMP</i>              | TP-LINK  | TP-LINK                         | T2600G-28TS v2.0  |       | TPLINK-SYSMONITOR-MIB, TPLINK-SYSINFO-MIB                           | Performance<br>Inventory |
| <i>Netgear Fastpath SNMP</i>     | Netgear  | Netgear Fastpath                | M5300-28G   |       | FASTPATH-SWITCHING-MIB, FASTPATH-BOXSERVICES-PRIVATE-MIB            | Fault<br>Inventory       |

## Template design

Templates were designed with the following in mind:

- User macros are used as much as possible so triggers can be tuned by the user;
- Low-level discovery is used as much as possible to minimize the number of unsupported items;
- All templates depend on Template ICMP Ping so all devices are also checked by ICMP;
- Items don't use any MIBs - SNMP OIDs are used in items and low-level discoveries. So it's not necessary to load any MIBs into Zabbix for templates to work;
- Loopback network interfaces are filtered when discovering as well as interfaces with ifAdminStatus = down(2);
- 64bit counters are used from IF-MIB::ifXTable where possible. If it is not supported, default 32bit counters are used instead.

All discovered network interfaces have a trigger that monitors its operational status (link), for example:

```
{$IFCONTROL:"{#IFNAME}"}=1 and last(/Alcatel Timetra TiMOS SNMP/net.if.status[ifOperStatus.{#SNMPINDEX}])
```

- If you do not want to monitor this condition for a specific interface create a user macro with context with the value 0. For example:

The screenshot shows the Zabbix web interface with the 'Macros' tab selected. Under the 'Host macros' section, there is a table with two columns: 'Macro' and 'Value'. A macro is listed with the name '{\$IFCONTROL: "Gi0/0"}' and a value of '0'.

where Gi0/0 is {#IFNAME}. That way the trigger is not used any more for this specific interface.

- You can also change the default behavior for all triggers not to fire and activate this trigger only to limited number of interfaces like uplinks:

Host
Templates
IPMI
**Macros**
Host inventory
Encryption

Host macros
Inherited and host macros

| Macro                 | Value |
|-----------------------|-------|
| {SIFCONTROL}          | ⇒ 0   |
| {SIFCONTROL: "Gi0/0"} | ⇒ 1   |
| {SIFCONTROL: "Gi0/1"} | ⇒ 1   |

## Tags

- Performance – device family MIBs provide a way to monitor CPU and memory items;
- Fault - device family MIBs provide a way to monitor at least one temperature sensor;
- Inventory – device family MIBs provide a way to collect at least the device serial number and model name;
- Certified – all three main categories above are covered.

## 10 Notifications upon events

### Overview

Assuming that we have configured some items and triggers and now are getting some events happening as a result of triggers changing state, it is time to consider some actions.

To begin with, we would not want to stare at the triggers or events list all the time. It would be much better to receive notification if something significant (such as a problem) has happened. Also, when problems occur, we would like to see that all the people concerned are informed.

That is why sending notifications is one of the primary actions offered by Zabbix. Who and when should be notified upon a certain event can be defined.

To be able to send and receive notifications from Zabbix you have to:

- **define some media**
- **configure an action** that sends a message to one of the defined media

Actions consist of *conditions* and *operations*. Basically, when conditions are met, operations are carried out. The two principal operations are sending a message (notification) and executing a remote command.

For discovery and autoregistration created events, some additional operations are available. Those include adding or removing a host, linking a template etc.

### 1 Media types

#### Overview

Media are the delivery channels used for sending notifications and alerts from Zabbix.

You can configure several media types:

- **Email**
- **SMS**
- **Custom alertscripts**
- **Webhook**

Media types are configured in *Administration* → *Media types*.

Media types

Create media typeImport

Filter

| <input type="checkbox"/> | Name ▲     | Type    | Status  | Used in actions                          | Details   | Action |
|--------------------------|------------|---------|---------|--|---|--------|
| <input type="checkbox"/> | E-mail     | Email   | Enabled | Report problems to Zabbix administrators | SMTP server: "mail.example.com", SMTP helo: "example.com", SMTP email: "zabbix@example.com" | Test   |
| <input type="checkbox"/> | Jira       | Webhook | Enabled |  |   | Test   |
| <input type="checkbox"/> | Mattermost | Webhook | Enabled |  |   | Test   |
| <input type="checkbox"/> | Opsgenie   | Webhook | Enabled |  |   | Test   |
| <input type="checkbox"/> | Pushover   | Webhook | Enabled |  |   | Test   |
| <input type="checkbox"/> | Slack      | Webhook | Enabled |  |   | Test   |
| <input type="checkbox"/> | SMS        | SMS     | Enabled |  | GSM modem: "/dev/ttyS0"   | Test   |
| <input type="checkbox"/> | Test THROW | Webhook | Enabled |  |   | Test   |
| <input type="checkbox"/> | Zendesk    | Webhook | Enabled |  |   | Test   |

Some media types come pre-defined in the default dataset. You just need to finetune their parameters to get them working.

It is possible to test if a configured media type works, by clicking on *Test* in the last column (see [Media type testing](#) for more details).

To create a new media type, click on the *Create media type* button. A media type configuration form is opened.

Common parameters

Some parameters are common for all media types.

Media type

Message templates 5

Options

\*

Name

SMS

Type

SMS

\*

GSM modem

/dev/ttyS0

Description

Enabled

☒

Add

Cancel

In the **Media type** tab the common general attributes are:

| Parameter   | Description                                 |
|-------------|---|
| Name        | Name of the media type.                     |
| Type        | Select the type of media.                   |
| Description | Enter a description.                        |
| Enabled     | Mark the checkbox to enable the media type. |

See the individual pages of media types for media-specific parameters.

The **Message templates** tab allows to set default notification messages for all or some of the following event types:

- Problem
- Problem recovery

- Problem update
- Service
- Service recovery
- Service update
- Discovery
- Autoregistration
- Internal problem
- Internal problem recovery

## Media types

Media type
Message templates 6
Options

| Message type     | Template  | Actions                                     |
|------------------|---|---|
| Problem          | <b>Problem started</b> at {EVENT.TIME} on {EVENT.DA...}   | <a href="#">Edit</a> <a href="#">Remove</a> |
| Problem recovery | <b>Problem has been resolved</b> at {EVENT.RECOVE...}     | <a href="#">Edit</a> <a href="#">Remove</a> |
| Problem update   | <b>{USER.FULLNAME} {EVENT.UPDATE.ACTION} prob...          | <a href="#">Edit</a> <a href="#">Remove</a> |
| Service          | <b>Service problem started</b> at {EVENT.TIME} on {EV...} | <a href="#">Edit</a> <a href="#">Remove</a> |
| Service recovery | <b>Service "{SERVICE.NAME}" has been resolved</b> a...    | <a href="#">Edit</a> <a href="#">Remove</a> |
| Autoregistration | <b>Host name:</b> {HOST.HOST}<br><b>Host IP:</b> {...     | <a href="#">Edit</a> <a href="#">Remove</a> |

[Add](#)

Add
Cancel

To customize message templates:

- In the *Message templates* tab click on [Add](#): a *Message template* popup window will open.
- Select required *Message type* and edit *Subject* and *Message* texts.
- Click on *Add* to save the message template

Message template
×

Message type
Problem

Subject
Problem: {EVENT.NAME}

Message
Problem started at {EVENT.TIME} on {EVENT.DATE}  
Problem name: {EVENT.NAME}  
Host: {HOST.NAME}  
Severity: {EVENT.SEVERITY}  
Operational data: {EVENT.OPDATA}  
Original problem ID: {EVENT.ID}  
{TRIGGER.URL}

Add
Cancel

Message template parameters:

| Parameter           | Description  |
|---------------------|--|
| <i>Message type</i> | Type of an event for which the default message should be used.<br>Only one default message can be defined for each event type.   |
| <i>Subject</i>      | Subject of the default message. The subject may contain macros. It is limited to 255 characters.<br>Subject is not available for SMS media type.   |
| <i>Message</i>      | The default message. It is limited to certain amount of characters depending on the database type (see <a href="#">Sending messages</a> for more information).<br>The message may contain supported <b>macros</b> .<br>In problem and problem update messages, expression macros are supported (for example, <code>{?avg(/host/key, 1h)}</code> ). |

To make changes to an existing message template: In the *Actions* column click on [Edit](#) to edit the template or click on [Remove](#) to delete the message template.

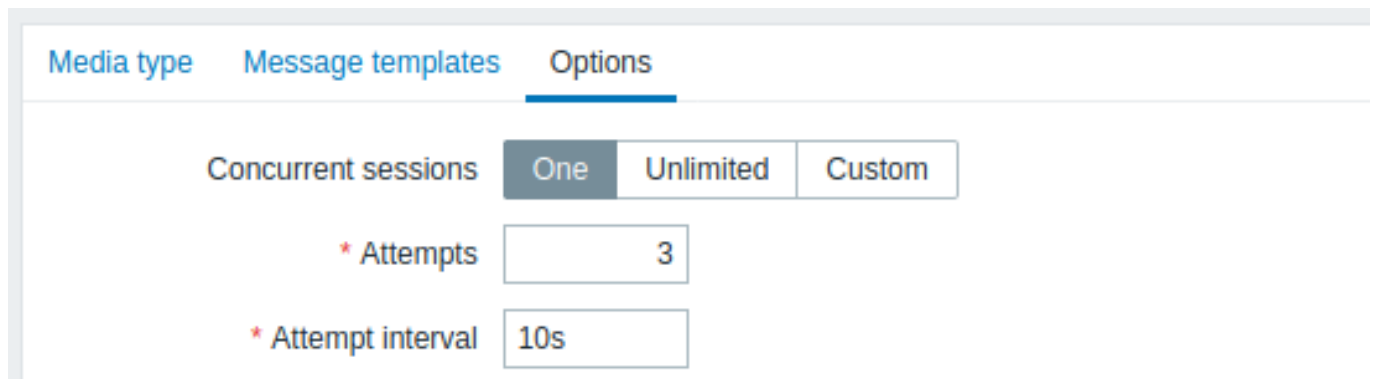
It is possible to define a custom message template for a specific action (see [action operations](#) for details). Custom messages defined in the action configuration will override default media type message template.

**Warning:**

Defining message templates is mandatory for all media types, including webhooks or custom alert scripts that do not use default messages for notifications. For example, an action "Send message to Pushover webhook" will fail to send problem notifications, if the Problem message for the Pushover webhook is not defined.

The **Options** tab contains alert processing settings. The same set of options is configurable for each media type.

All media types are processed in parallel. While the maximum number of concurrent sessions is configurable per media type, the total number of alerter processes on the server can only be limited by the `StartAlerters` [parameter](#). Alerts generated by one trigger are processed sequentially. So multiple notifications may be processed simultaneously only if they are generated by multiple triggers.



| Parameter                  | Description   |
|----------------------------|---|
| <i>Concurrent sessions</i> | Select the number of parallel alerter sessions for the media type:<br><b>One</b> - one session<br><b>Unlimited</b> - unlimited number of sessions<br><b>Custom</b> - select a custom number of sessions<br>Unlimited/high values mean more parallel sessions and increased capacity for sending notifications. Unlimited/high values should be used in large environments where lots of notifications may need to be sent simultaneously.<br>If more notifications need to be sent than there are concurrent sessions, the remaining notifications will be queued; they will not be lost. |
| <i>Attempts</i>            | Number of attempts for trying to send a notification. Up to 100 attempts can be specified; the default value is '3'. If '1' is specified Zabbix will send the notification only once and will not retry if the sending fails.   |
| <i>Attempt interval</i>    | Frequency of trying to resend a notification in case the sending failed, in seconds (0-3600). If '0' is specified, Zabbix will retry immediately.<br>Time suffixes are supported, e.g. 5s, 3m, 1h.  |

## Media type testing

It is possible to test if a configured media type works.


### Email

For example, to test an email media type:

- Locate the relevant email in the **list** of media types
- Click on *Test* in the last column of the list (a testing window will open)
- Enter a *Send to* recipient address and with body and optional subject
- Send a test message by clicking on *Test*

Test success or failure message will be displayed in the same window:

### Test media type

 Media type test successful.

\* Send to

address@domain.com

Subject

Test subject

\* Message

This is the test message from Zabbix

Test

### Webhook

To test a webhook media type:

- Locate the relevant webhook in the **list** of media types
- Click on *Test* in the last column of the list (a testing window will open)
- Edit the webhook parameter values, if needed
- Click on *Test*

By default, webhook tests are performed with parameters entered during configuration. However, it is possible to change attribute values for testing. Replacing or deleting values in the testing window affects the test procedure only, the actual webhook attribute values will remain unchanged.



Test media type "Telegram webhook"

✓

Media type test successful.

✕

Message

{ALERT.MESSAGE}

telegramTOKEN

1266457374:AAFqF072oyxROyWyAGU9hsf\_vqcXvYVmyxI

To

{ALERT.SENDTO}

URL

{Zabbix\_URL}

Response

```
{
  "tags": {
    "key": "MSG-115",
    "link": "http://example.com/MSG-115"
  }
}
```

Response type: JSON

[Open log](#)

Test

Cancel

To view media type test log entries without leaving the test window:

- Click on *Open log* (a new popup window will open).

Test media type "Telegram"

⚠

Details ▲ Media type test failed.

✕

Sending failed: Bad Request: chat not found.

Name ▲

Type

Email

Email

Mattermost

Webhook

Message

{ALERT.MESSAGE}

SMTP email: "marina.generalova@z

Media type test log

```
00:00:00.000 [Debug] [Telegram Webhook] URL: https://api.telegram.org/bot<TOKEN>/sendMessage
00:00:00.000 [Debug] [Telegram Webhook] params: {"chat_id":"{ALERT.SENDTO}","text":"{ALERT.SUBJECT}\n{ALERT.MESSAGE}","disable_web_page_preview":true}
00:00:00.139 [Debug] [Telegram Webhook] HTTP code: 400
00:00:00.140 [Debug] [Telegram Webhook] notification failed: Bad Request: chat not found

Time elapsed: 140ms
```

Ok

selected

Enable

Disable

Response type: String

[Open log](#)

Test

Cancel

If the webhook test is successful

- "Media type test successful." message is displayed
- Server response appears in the gray *Response* field
- Response type (JSON or String) is specified below the *Response* field

If the webhook test fails

- "Media type test failed." message is displayed, followed by additional failure details.

User media

To receive notifications of a media type, a medium (email address/phone number/webhook user ID etc) for this media type must be defined in the user profile. For example, an action sending messages to user "Admin" using webhook "X" will always fail to send anything if the webhook "X" medium is not defined in the user profile.

To define user media:

- Go to your user profile, or go to *Administration* → *Users* and open the user properties form
- In the Media tab, click on [Add](#)

Media

Type

Email

\*

Send to

example@company.com

Remove

example recipient <example2@company.com>

Remove

[Add](#)

\*

When active

1-7,00:00-24:00

Use if severity

☒ Not classified

☒ Information

☒ Warning

☒ Average

☒ High

☒ Disaster

Enabled

☒

Update

Cancel

User media attributes:

| Parameter | Description  |
|-----------|--|
| Type      | The drop-down list contains names of all configured media types.   |
| Send to   | Provide required contact information where to send messages.<br><br>For an email media type it is possible to add several addresses by clicking on <a href="#">Add</a> below the address field. In this case, the notification will be sent to all email addresses provided. It is also possible to specify recipient name in the <i>Send to</i> field of the email recipient in a format 'Recipient name <address1@company.com>'. Note that if a recipient name is provided, an email address should be wrapped in angle brackets (<>). UTF-8 characters in the name are supported, quoted pairs and comments are not. For example: <i>John Abercroft &lt;manager@nycdatcenter.com&gt;</i> and <i>manager@nycdatcenter.com</i> are both valid formats. Incorrect examples: <i>John Doe zabbix@company.com</i> , <i>%%"Zabbix\@ &lt;H(comment)Q &gt;" zabbix@company.com</i> %%.<br><br><i>When active</i><br>You can limit the time when messages are sent, for example, set the working days only (1-5,09:00-18:00). Note that this limit is based on the user <b>time zone</b> . If the user time zone is changed and is different from the system time zone this limit may need to be adjusted accordingly so as not to miss important messages.<br><br><i>Use if severity</i><br>See the <b>Time period specification</b> page for description of the format.<br>Mark the checkboxes of trigger severities that you want to receive notifications for. Note that the default severity ('Not classified') <b>must be</b> checked if you want to receive notifications for non-trigger <b>events</b> .<br>After saving, the selected trigger severities will be displayed in the corresponding severity colors, while unselected ones will be grayed out. |

| Parameter     | Description  |
|---------------|--|
| <i>Status</i> | Status of the user media.<br><b>Enabled</b> - is in use.<br><b>Disabled</b> - is not being used. |

## 1 E-mail

### Overview

To configure e-mail as the delivery channel for messages, you need to configure e-mail as the media type and assign specific addresses to users.

#### Note:

Multiple notifications for single event will be grouped together on the same email thread.

### Configuration

To configure e-mail as the media type:

- Go to *Administration* → *Media types*
- Click on *Create media type* (or click on *E-mail* in the list of pre-defined media types).

The **Media type** tab contains general media type attributes:

Media type
Message templates 5
Options

\* Name

Email

Type

Email

\* SMTP server

mail.example.com

SMTP server port

25

\* SMTP helo

example.com

\* SMTP email

Zabbix\_info <zabbix@example.com>

Connection security

None
STARTTLS
SSL/TLS

Authentication

None
Username and password

Message format

HTML
Plain text

Description

Enabled

☒

All mandatory input fields are marked with a red asterisk.

The following parameters are specific for the e-mail media type:

| Parameter                  | Description   |
|----------------------------|---|
| <i>SMTP server</i>         | Set an SMTP server to handle outgoing messages.   |
| <i>SMTP server port</i>    | Set the SMTP server port to handle outgoing messages.<br>This option is supported <i>starting with Zabbix 3.0</i> .   |
| <i>SMTP helo</i>           | Set a correct SMTP helo value, normally a domain name.  |
| <i>SMTP email</i>          | The address entered here will be used as the <b>From</b> address for the messages sent.<br>Adding a sender display name (like "Zabbix_info" in <i>Zabbix_info &lt;zabbix@company.com&gt;</i> in the screenshot above) with the actual e-mail address is supported since Zabbix 2.2 version.<br>There are some restrictions on display names in Zabbix emails in comparison to what is allowed by RFC 5322, as illustrated by examples:<br>Valid examples:<br><i>zabbix@company.com</i> (only email address, no need to use angle brackets)<br><i>Zabbix_info &lt;zabbix@company.com&gt;</i> (display name and email address in angle brackets)<br><i>Ω-monitoring &lt;zabbix@company.com&gt;</i> (UTF-8 characters in display name)<br>Invalid examples:<br><i>Zabbix HQ zabbix@company.com</i> (display name present but no angle brackets around email address)<br><i>"Zabbix\@ &lt;H(comment)Q &gt;" &lt;zabbix@company.com&gt;</i> (although valid by RFC 5322, quoted pairs and comments are not supported in Zabbix emails) |
| <i>Connection security</i> | Select the level of connection security:<br><b>None</b> - do not use the <a href="#">CURLOPT_USE_SSL</a> option<br><b>STARTTLS</b> - use the <a href="#">CURLOPT_USE_SSL</a> option with <a href="#">CURLUSESSL_ALL</a> value<br><b>SSL/TLS</b> - use of <a href="#">CURLOPT_USE_SSL</a> is optional<br>This option is supported <i>starting with Zabbix 3.0</i> .  |
| <i>SSL verify peer</i>     | Mark the checkbox to verify the SSL certificate of the SMTP server.<br>The value of "SSLCALocation" server configuration directive should be put into <a href="#">CURLOPT_CAPATH</a> for certificate validation.<br>This sets cURL option <a href="#">CURLOPT_SSL_VERIFYPEER</a> .<br>This option is supported <i>starting with Zabbix 3.0</i> .  |
| <i>SSL verify host</i>     | Mark the checkbox to verify that the <i>Common Name</i> field or the <i>Subject Alternate Name</i> field of the SMTP server certificate matches.<br>This sets cURL option <a href="#">CURLOPT_SSL_VERIFYHOST</a> .<br>This option is supported <i>starting with Zabbix 3.0</i> .  |
| <i>Authentication</i>      | Select the level of authentication:<br><b>None</b> - no cURL options are set<br>(since 3.4.2) <b>Username and password</b> - implies "AUTH=*" leaving the choice of authentication mechanism to cURL<br>(until 3.4.2) <b>Normal password</b> - <a href="#">CURLOPT_LOGIN_OPTIONS</a> is set to "AUTH=PLAIN"<br>This option is supported <i>starting with Zabbix 3.0</i> .   |
| <i>Username</i>            | User name to use in authentication.<br>This sets the value of <a href="#">CURLOPT_USERNAME</a> .<br>This option is supported <i>starting with Zabbix 3.0</i> .<br><b>User macros</b> supported as of Zabbix 6.0.30.   |
| <i>Password</i>            | Password to use in authentication.<br>This sets the value of <a href="#">CURLOPT_PASSWORD</a> .<br>This option is supported <i>starting with Zabbix 3.0</i> .<br><b>User macros</b> supported as of Zabbix 6.0.30.  |
| <i>Message format</i>      | Select message format:<br><b>HTML</b> - send as HTML<br><b>Plain text</b> - send as plain text  |

#### Attention:

To enable SMTP authentication options, Zabbix server must be both compiled with the `--with-libcurl` **compilation** option (with cURL 7.20.0 or higher) and use the `libcurl-full` packages during runtime.

See also **common media type parameters** for details on how to configure default messages and alert processing options.

User media

Once the e-mail media type is configured, go to the *Administration* → *Users* section and edit user profile to assign e-mail media to

the user. Steps for setting up user media, being common for all media types, are described on the [Media types](#) page.

## 2 SMS

### Overview

Zabbix supports the sending of SMS messages using a serial GSM modem connected to Zabbix server's serial port.

Make sure that:

- The speed of the serial device (normally /dev/ttyS0 under Linux) matches that of the GSM modem. Zabbix does not set the speed of the serial link. It uses default settings.
- The 'zabbix' user has read/write access to the serial device. Run the command `ls -l /dev/ttyS0` to see current permissions of the serial device.
- The GSM modem has PIN entered and it preserves it after power reset. Alternatively you may disable PIN on the SIM card. PIN can be entered by issuing command `AT+CPIN="NNNN"` (NNNN is your PIN number, the quotes must be present) in a terminal software, such as Unix minicom or Windows HyperTerminal.

Zabbix has been tested with these GSM modems:

- Siemens MC35
- Teltonika ModemCOM/G10

To configure SMS as the delivery channel for messages, you also need to configure SMS as the media type and enter the respective phone numbers for the users.

### Configuration

To configure SMS as the media type:

- Go to *Administration* → *Media types*
- Click on *Create media type* (or click on *SMS* in the list of pre-defined media types).

The following parameters are specific for the SMS media type:

| Parameter        | Description                                  |
|------------------|--|
| <i>GSM modem</i> | Set the serial device name of the GSM modem. |

See [common media type parameters](#) for details on how to configure default messages and alert processing options. Note that parallel processing of sending SMS notifications is not possible.

### User media

Once the SMS media type is configured, go to the *Administration* → *Users* section and edit user profile to assign SMS media to the user. Steps for setting up user media, being common for all media types, are described on the [Media types](#) page.

## 3 Custom alert scripts

### Overview

If you are not satisfied with the existing media types for sending alerts, there is an alternative way to do that. You can create a script that will handle the notification your way.

Alert scripts are executed on Zabbix server. These scripts must be located in the directory specified in the server [configuration file](#) `AlertScriptsPath` parameter.

Here is an example of a custom alert script:

```
#####!/bin/bash

to=$1
subject=$2
body=$3

cat <<EOF | mail -s "$subject" "$to"
$body
EOF
```

**Attention:**

Starting from version 3.4 Zabbix checks for the exit code of the executed commands and scripts. Any exit code which is different from **0** is considered as a **command execution** error. In such case Zabbix will try to repeat failed execution.

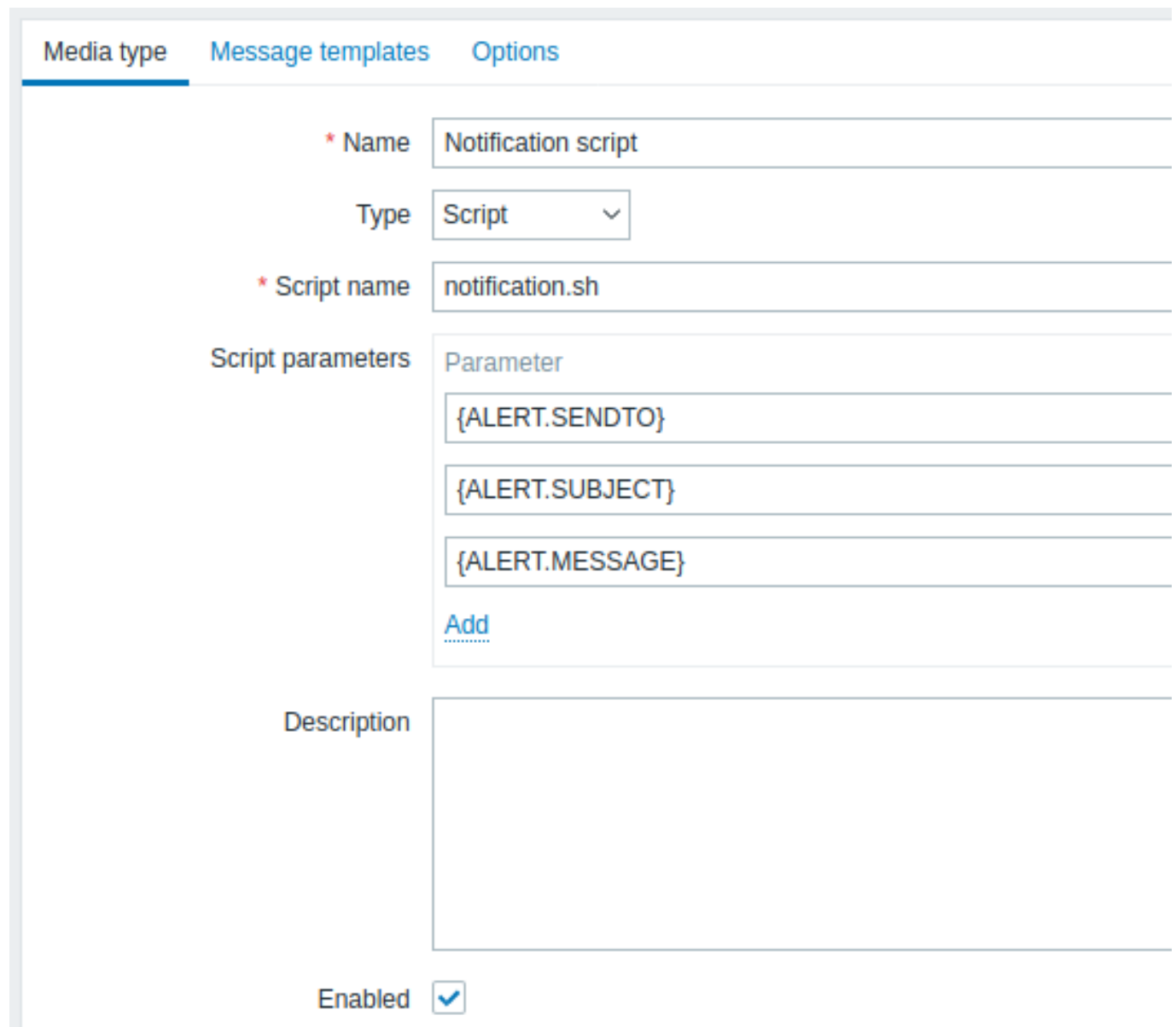
Environment variables are not preserved or created for the script, so they should be handled explicitly.

**Configuration**

To configure custom alert scripts as the media type:

- Go to *Administration* → *Media types*
- Click on *Create media type*

The **Media type** tab contains general media type attributes:



The screenshot shows the Zabbix 'Media type' configuration interface. It has three tabs: 'Media type' (selected), 'Message templates', and 'Options'. The 'Media type' tab contains the following fields:

- Name:** Notification script (marked with a red asterisk as mandatory).
- Type:** Script (selected from a dropdown menu).
- Script name:** notification.sh (marked with a red asterisk as mandatory).
- Script parameters:** A section with a 'Parameter' label and a list of parameters: {ALERT.SENDTO}, {ALERT.SUBJECT}, and {ALERT.MESSAGE}. There is an 'Add' button below the list.
- Description:** A large empty text area.
- Enabled:** A checkbox that is checked.

All mandatory input fields are marked with a red asterisk.

The following parameters are specific for the script media type:

| Parameter                | Description   |
|--------------------------|---|
| <i>Script name</i>       | Enter the name of the script file (e.g., notification.sh) that is located in the directory specified in the server <b>configuration file</b> <code>AlertScriptsPath</code> parameter.                               |
| <i>Script parameters</i> | Add command-line parameters to the script.<br>{ALERT.SENDTO}, {ALERT.SUBJECT} and {ALERT.MESSAGE} <b>macros</b> are supported in script parameters.<br>Customizing script parameters is supported since Zabbix 3.0. |

See [common media type parameters](#) for details on how to configure default messages and alert processing options.

**Warning:**

Even if an alert script doesn't use default messages, message templates for operation types used by this media type must still be defined, otherwise a notification will not be sent.

**Attention:**

As parallel processing of media types is implemented since Zabbix 3.4.0, it is important to note that with more than one script media type configured, these scripts may be processed in parallel by alerter processes. The total number of alerter processes is limited by the `StartAlerters` [parameter](#).

## User media

Once the media type is configured, go to the *Administration* → *Users* section and edit user profile to assign media of this type to the user. Steps for setting up user media, being common for all media types, are described on the [Media types](#) page.

Note that when defining a user media, the *Send to* field cannot be empty. If this field is not used in the alert script, enter any combination of supported characters to bypass validation requirements.

## 4 Webhook

### Overview

The webhook media type is useful for making HTTP calls using custom JavaScript code for straightforward integration with external software such as helpdesk systems, chats, or messengers. You may choose to import an integration provided by Zabbix or create a custom integration from scratch.

### Integrations

The following integrations are available, allowing predefined webhook media types to be used for pushing Zabbix notifications to:

- [brevis.one](#)
- [Discord](#)
- [Event-Driven Ansible](#)
- [Express.ms messenger](#)
- [Github issues](#)
- [GLPi](#)
- [iLert](#)
- [iTop](#)
- [Jira](#)
- [Jira Service Desk](#)
- [ManageEngine ServiceDesk](#)
- [Mantis Bug Tracker](#)
- [Mattermost](#)
- [Microsoft Teams](#)
- [MS Teams Workflows](#)
- [LINE](#)
- [Opsgenie](#)
- [OTRS](#)
- [Pagerduty](#)
- [Pushover](#)
- [Redmine](#)
- [Rocket.Chat](#)
- [ServiceNow](#)
- [SIGNL4](#)
- [Slack](#)
- [SolarWinds](#)
- [SysAid](#)
- [Telegram](#)
- [TOPdesk](#)
- [VictorOps](#)
- [Zammad](#)
- [Zendesk](#)

**Note:**

In addition to the services listed here, Zabbix can be integrated with **Spiceworks** (no webhook is required). To convert Zabbix notifications into Spiceworks tickets, create an **email media type** and enter Spiceworks helpdesk email address (e.g. [help@zabbix.on.spiceworks.com](mailto:help@zabbix.on.spiceworks.com)) in the profile settings of a designated Zabbix user.

## Configuration

To start using a webhook integration:

1. Locate required .xml file in the `templates/media` directory of the downloaded Zabbix version or download it from [Zabbix git repository](#)
2. **Import** the file into your Zabbix installation. The webhook will appear in the list of media types.
3. Configure the webhook according to instructions in the *Readme.md* file (you may click on a webhook's name above to quickly access *Readme.md*).

To create a custom webhook from scratch:

- Go to *Administration* → *Media types*
- Click on *Create media type*

The **Media type** tab contains various attributes specific for this media type:



Media type
Message templates 5
Options

\* Name

Express.ms

Type

Webhook

Parameters

| Name                | Value                 |
|---------------------|-----------------------|
| event_source        | {EVENT.SOURCE}        |
| event_update_status | {EVENT.UPDATE.STATUS} |
| event_value         | {EVENT.VALUE}         |
| express_message     | {ALERT.MESSAGE}       |
| express_send_to     | {ALERT.SENDTO}        |
| express_tags        | {EVENT.TAGSJSON}      |
| express_token       | <PLACE BOT TOKEN>     |
| express_url         | <PLACE INSTANCE URL>  |

Add

\* Script

var Express = {...

\* Timeout

30s

Process tags

☒

Include event menu entry

☐

\* Menu entry name

\* Menu entry URL

Description

Enabled

☒

Update

Clone

Delete

Cancel

All mandatory input fields are marked with a red asterisk.

The following parameters are specific for the webhook media type:

| Parameter                       | Description  |
|---------------------------------|--|
| <i>Parameters</i>               | <p>Specify the webhook variables as the attribute and value pairs.</p> <p>For preconfigured webhooks, a list of parameters varies, depending on the service. Check the webhook's <i>Readme.md</i> file for parameter description.</p> <p>For new webhooks, several common variables are included by default (URL:&lt;empty&gt;, HTTPProxy:&lt;empty&gt;, To:{ALERT.SENDTO}, Subject:{ALERT.SUBJECT}, Message:{ALERT.MESSAGE}), feel free to keep or remove them.</p> <p>All <b>macros</b> that are supported in problem notifications are supported in the parameters.</p> <p>If you specify an HTTP proxy, the field supports the same functionality as in the item configuration <b>HTTP proxy</b> field. The proxy string may be prefixed with [scheme] :// to specify which kind of proxy is used (e.g. https, socks4, socks5; see <a href="#">documentation</a>).</p>   |
| <i>Script</i>                   | <p>Enter JavaScript code in the block that appears when clicking in the parameter field (or on the view/edit button next to it). This code will perform the webhook operation.</p> <p>The script is a function code that accepts parameter - value pairs. The values should be converted into JSON objects using JSON.parse() method, for example: <code>var params = JSON.parse(value);</code>.</p> <p>The code has access to all parameters, it may perform HTTP GET, POST, PUT and DELETE requests and has control over HTTP headers and request body.</p> <p>The script must contain a return operator, otherwise it will not be valid. It may return OK status along with an optional list of tags and tag values (see <i>Process tags</i> option) or an error string.</p> <p>Note that the script is executed only after an alert is created. If the script is configured to return and process tags, these tags will not get resolved in {EVENT.TAGS} and {EVENT.RECOVERY.TAGS} macros in the initial problem message and recovery messages because the script has not had the time to run yet.</p> <p><i>Note:</i> Using local variables instead of global ones is recommended to make sure that each script operates on its own data and that there are no collisions between simultaneous calls (see <a href="#">known issues</a>).</p> <p>See also: <a href="#">Webhook development guidelines</a>, <a href="#">Webhook script examples</a>, <a href="#">Additional JavaScript objects</a>.</p> |
| <i>Timeout</i>                  | <p>JavaScript execution timeout (1-60s, default 30s).</p> <p>Time suffixes are supported, e.g. 30s, 1m.</p>  |
| <i>Process tags</i>             | <p>Mark the checkbox to process returned JSON property values as tags. These tags are added to any existing problem tags.</p> <p>Note that when using <a href="#">webhook tags</a>, the webhook must return a JSON object containing at least an empty tags object: <code>var result = {tags: {}};</code></p> <p>Examples of tags that can be returned: <i>Jira ID: PROD-1234, Responsible: John Smith, Processed:&lt;no value&gt;</i></p>   |
| <i>Include event menu entry</i> | <p>Mark the checkbox to include an entry in the <b>event menu</b> linking to a created external ticket.</p> <p>An entry will be included for each webhook that is enabled and has this checkbox marked. Note that if the <i>Menu entry name</i> and <i>Menu entry URL</i> parameters contain any {EVENT.TAGS.&lt;tag name&gt;} macros, an entry will be included only if these macros can be resolved (that is, the event has these tags defined).</p> <p>If marked, the webhook should not be used for sending notifications to different users (consider creating a <b>dedicated user</b> instead) and should not be used in multiple alert actions <b>for a single problem event</b>.</p>   |
| <i>Menu entry name</i>          | <p>Specify the menu entry name.</p> <p>{EVENT.TAGS.&lt;tag name&gt;} macro is supported.</p>   |
| <i>Menu entry URL</i>           | <p>This field is only mandatory if <i>Include event menu entry</i> is marked.</p> <p>Specify the underlying URL of the menu entry.</p> <p>{EVENT.TAGS.&lt;tag name&gt;} macro is supported.</p> <p>This field is only mandatory if <i>Include event menu entry</i> is marked.</p>  |

See [common media type parameters](#) for details on how to configure default messages and alert processing options.

**Warning:**

Even if a webhook doesn't use default messages, message templates for operation types used by this webhook must still be defined.

## User media

Once the media type is configured, go to the *Administration* → *Users* section and assign the webhook media to an existing user or create a new user to represent the webhook. Steps for setting up user media for an existing user, being common for all media types, are described on the [Media types](#) page.

If a webhook uses tags to store ticket\message ID, avoid assigning the same webhook as a media to different users as doing so may cause webhook errors (applies to the majority of webhooks that utilize *Include event menu entry* option). In this case, the best practice is to create a dedicated user to represent the webhook:

1. After configuring the webhook media type, go to the *Administration* → *Users* section and create a dedicated Zabbix user to represent the webhook - for example, with a username *Slack* for the Slack webhook. All settings, except media, can be left at their defaults as this user will not be logging into Zabbix.
2. In the user profile, go to a tab *Media* and **add a webhook** with the required contact information. If the webhook does not use a *Send to* field, enter any combination of supported characters to bypass validation requirements.
3. Grant this user at least read **permissions** to all hosts for which it should send the alerts.

When configuring alert action, add this user in the *Send to users* field in Operation details - this will tell Zabbix to use the webhook for notifications from this action.

## Configuring alert actions

Actions determine which notifications should be sent via the webhook. Steps for **configuring actions** involving webhooks are the same as for all other media types with these exceptions:

- If a webhook uses **webhook tags** to store ticket\message ID and handle update\resolve operations, avoid using the same webhook in multiple alert actions for a single problem event. If {EVENT.TAGS.<tag name>} exists and gets updated in the webhook, its resulting value will be undefined. To avoid this, use a new tag name in the webhook for storing updated values. This applies to Jira, Jira Service Desk, Mattermost, Opsgenie, OTRS, Redmine, ServiceNow, Slack, Zammad, and Zendesk webhooks provided by Zabbix and to most webhooks utilizing the *Include event menu entry* option. Note, however, that a single webhook can be used in multiple operations or escalation steps of the same action, as well as in different actions that will not be triggered by the same problem event due to different **conditions**.
- When using a webhook in actions for **internal events**, ensure to mark the *Custom message* checkbox and define a custom message in the action operation configuration. Otherwise, a notification will not be sent.

## 1 Webhook script examples

### Overview

Though Zabbix offers a large number of webhook integrations available out-of-the-box, you may want to create your own webhooks instead. This section provides examples of custom webhook scripts (used in the *Script* parameter). See **webhook** section for description of other webhook parameters.

### Jira webhook (custom)

Media type Message templates 5 Options

\* Name Jira webhook

Type Webhook

Parameters

| Name      | Value           |
|-----------|-----------------|
| HTTPProxy |                 |
| Message   | {ALERT.MESSAGE} |
| Subject   | {ALERT.SUBJECT} |
| To        | {ALERT.SENDTO}  |
| URL       |                 |

Add

\* Script try {...

\* Timeout 30s

Process tags ☒

Include event menu entry ☒

\* Menu entry name {EVENT.tags.issue\_key}

\* Menu entry URL https://tsupport.zabbix.lan/browse/{EVENT.tags.issue\_key}

Description Creating a JIRA issue.

Enabled ☒

This script will create a JIRA issue and return some info on the created issue.

```
try {
  Zabbix.log(4, '[ Jira webhook ] Started with params: ' + value);

  var result = {
    'tags': {
      'endpoint': 'jira'
    }
  },
  params = JSON.parse(value),
  req = new HttpRequest(),
  fields = {},
  resp;

  if (params.HTTPProxy) {
    req.setProxy(params.HTTPProxy);
  }
}
```

```

req.addHeader('Content-Type: application/json');
req.addHeader('Authorization: Basic ' + params.authentication);

fields.summary = params.summary;
fields.description = params.description;
fields.project = {key: params.project_key};
fields.issuetype = {id: params.issue_id};

resp = req.post('https://jira.example.com/rest/api/2/issue/',
    JSON.stringify({"fields": fields})
);

if (req.getStatus() != 201) {
    throw 'Response code: ' + req.getStatus();
}

resp = JSON.parse(resp);
result.tags.issue_id = resp.id;
result.tags.issue_key = resp.key;

return JSON.stringify(result);
}
catch (error) {
    Zabbix.log(4, '[ Jira webhook ] Issue creation failed json : ' + JSON.stringify({"fields": fields}));
    Zabbix.log(3, '[ Jira webhook ] issue creation failed : ' + error);

    throw 'Failed with error: ' + error;
}

```

Slack webhook (custom)

This webhook will forward notifications from Zabbix to a Slack channel.

| Media type  | Message templates | Options |      |       |     |  |           |  |         |                |      |                 |          |     |
|---|-------------------|---------|------|-------|-----|--|-----------|--|---------|----------------|------|-----------------|----------|-----|
| <div> <div>* Name</div> <div>Slack chat bot</div> </div>  |                   |         |      |       |     |  |           |  |         |                |      |                 |          |     |
| <div> <div>Type</div> <div>Webhook ▼</div> </div>   |                   |         |      |       |     |  |           |  |         |                |      |                 |          |     |
| <div> <div>Parameters</div> <table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>URL</td> <td></td> </tr> <tr> <td>HTTPProxy</td> <td></td> </tr> <tr> <td>channel</td> <td>{ALERT.SENDTO}</td> </tr> <tr> <td>text</td> <td>{ALERT.SUBJECT}</td> </tr> <tr> <td>username</td> <td>bot</td> </tr> </tbody> </table> <div>Add</div> </div> |                   |         | Name | Value | URL |  | HTTPProxy |  | channel | {ALERT.SENDTO} | text | {ALERT.SUBJECT} | username | bot |
| Name  | Value             |         |      |       |     |  |           |  |         |                |      |                 |          |     |
| URL   |                   |         |      |       |     |  |           |  |         |                |      |                 |          |     |
| HTTPProxy   |                   |         |      |       |     |  |           |  |         |                |      |                 |          |     |
| channel   | {ALERT.SENDTO}    |         |      |       |     |  |           |  |         |                |      |                 |          |     |
| text  | {ALERT.SUBJECT}   |         |      |       |     |  |           |  |         |                |      |                 |          |     |
| username  | bot               |         |      |       |     |  |           |  |         |                |      |                 |          |     |
| <div> <div>* Script</div> <div>try {...</div> </div>  |                   |         |      |       |     |  |           |  |         |                |      |                 |          |     |

```

try {
    var params = JSON.parse(value),
        req = new HttpRequest(),
        response;

    if (params.HTTPProxy) {

```

```

    req.setProxy(params.HTTPProxy);
}

req.addHeader('Content-Type: application/x-www-form-urlencoded');

Zabbix.log(4, '[ Slack webhook ] Webhook request with value=' + value);

response = req.post(params.hook_url, 'payload=' + encodeURIComponent(value));
Zabbix.log(4, '[ Slack webhook ] Responded with code: ' + req.getStatus() + '. Response: ' + response);

try {
    response = JSON.parse(response);
}
catch (error) {
    if (req.getStatus() < 200 || req.getStatus() >= 300) {
        throw 'Request failed with status code ' + req.getStatus();
    }
    else {
        throw 'Request success, but response parsing failed.';
    }
}

if (req.getStatus() !== 200 || !response.ok || response.ok === 'false') {
    throw response.error;
}

return 'OK';
}
catch (error) {
    Zabbix.log(3, '[ Slack webhook ] Sending failed. Error: ' + error);

    throw 'Failed with error: ' + error;
}

```

## 2 Actions

### Overview

If you want some operations taking place as a result of events (for example, notifications sent), you need to configure actions.

Actions can be defined in response to events of all supported types:

- Trigger actions - for events when trigger status changes from *OK* to *PROBLEM* and back
- Service actions - for events when service status changes from *OK* to *PROBLEM* and back
- Discovery actions - for events when network discovery takes place
- Autoregistration actions - for events when new active agents auto-register (or host metadata changes for registered ones)
- Internal actions - for events when items become unsupported or triggers go into an unknown state

### Configuring an action

To configure an action, do the following:

- Go to *Configuration -> Actions* and select the required action type from the submenu (you can switch to another type later, using the title dropdown)
- Click on *Create action*
- Name the action
- Choose **conditions** upon which operations are carried out
- Choose the **operations** to carry out

Note that service actions can be configured in the **service action** section.

General action attributes:

Action

Operations

\* Name

Report problems to Zabbix administrators

Type of calculation

And

A and B

Conditions

| Label | Name   |
|-------|--|
| A     | Trigger severity is greater than or equals <i>Not classified</i> |
| B     | Trigger severity does not equal <i>Information</i>               |
| Add   |  |

Enabled

☒

All mandatory input fields are marked with a red asterisk.

| Parameter                  | Description   |
|----------------------------|---|
| <i>Name</i>                | Unique action name.   |
| <i>Type of calculation</i> | Select the evaluation <b>option</b> for action conditions (with more than one condition):<br><b>And</b> - all conditions must be met<br><b>Or</b> - enough if one condition is met<br><b>And/Or</b> - combination of the two: AND with different condition types and OR with the same condition type<br><b>Custom expression</b> - a user-defined calculation formula for evaluating action conditions. |
| <i>Conditions</i>          | List of action conditions.<br>Click on <i>Add</i> to add a new <b>condition</b> .<br>If no conditions are configured, the action will run for every event that corresponds to the <b>action type</b> being configured.  |
| <i>Enabled</i>             | Mark the checkbox to enable the action. Otherwise, it will be disabled.   |

## 1 Conditions

### Overview

It is possible to define that an action is executed only if the event matches a defined set of conditions. Conditions are set when configuring the **action**.

Condition matching is case-sensitive.

### Trigger actions

The following conditions can be used in trigger-based actions:

| Condition type    | Supported operators      | Description   |
|-------------------|--------------------------|---|
| <i>Host group</i> | equals<br>does not equal | Specify host groups or host groups to exclude.<br><b>equals</b> - event belongs to this host group.<br><b>does not equal</b> - event does not belong to this host group.<br>Specifying a parent host group implicitly selects all nested host groups.<br>To specify the parent group only, all nested groups have to be additionally set with the <b>does not equal</b> operator. |
| <i>Template</i>   | equals<br>does not equal | Specify templates or templates to exclude.<br><b>equals</b> - event belongs to a trigger inherited from this template.<br><b>does not equal</b> - event does not belong to a trigger inherited from this template.  |
| <i>Host</i>       | equals<br>does not equal | Specify hosts or hosts to exclude.<br><b>equals</b> - event belongs to this host.<br><b>does not equal</b> - event does not belong to this host.  |

| Condition type               | Supported operators   | Description  |
|------------------------------|---|--|
| <i>Tag name</i>              | equals<br>does not equal<br>contains<br>does not contain                        | Specify event tag or event tag to exclude.<br><b>equals</b> - event has this tag<br><b>does not equal</b> - event does not have this tag<br><b>contains</b> - event has a tag containing this string<br><b>does not contain</b> - event does not have a tag containing this string   |
| <i>Tag value</i>             | equals<br>does not equal<br>contains<br>does not contain                        | Specify event tag and value combination or tag and value combination to exclude.<br><b>equals</b> - event has this tag and value<br><b>does not equal</b> - event does not have this tag and value<br><b>contains</b> - event has a tag and value containing these strings<br><b>does not contain</b> - event does not have a tag and value containing these strings   |
| <i>Trigger</i>               | equals<br>does not equal  | Specify triggers or triggers to exclude.<br><b>equals</b> - event is generated by this trigger.<br><b>does not equal</b> - event is generated by any other trigger, except this one.   |
| <i>Event name</i>            | contains<br>does not contain  | Specify a string in the name of the event generated by the trigger or a string to exclude. By default, the event name matches the trigger name unless a custom event name is specified in <a href="#">trigger configuration</a> .<br><b>contains</b> - event name contains this string.<br><b>does not contain</b> - this string is excluded from the event name.<br><i>Note:</i> Entered value will be compared to event name with all macros expanded. |
| <i>Trigger severity</i>      | equals<br>does not equal<br>is greater than or equals<br>is less than or equals | Specify trigger severity.<br><b>equals</b> - equal to trigger severity<br><b>does not equal</b> - not equal to trigger severity<br><b>is greater than or equals</b> - more or equal to trigger severity<br><b>is less than or equals</b> - less or equal to trigger severity   |
| <i>Time period</i>           | in<br>not in  | Specify a time period or a time period to exclude.<br><b>in</b> - event time is within the time period.<br><b>not in</b> - event time is not within the time period.<br>See the <a href="#">time period specification</a> page for description of the format.<br><b>User macros</b> are supported, since Zabbix 3.4.0.   |
| <i>Problem is suppressed</i> | no<br>yes   | Specify if the problem is suppressed (not shown) because of host maintenance.<br><b>no</b> - problem is not suppressed.<br><b>yes</b> - problem is suppressed.   |

## Discovery actions

The following conditions can be used in discovery-based events:

| Condition type | Supported operators      | Description   |
|----------------|--------------------------|---|
| <i>Host IP</i> | equals<br>does not equal | Specify an IP address range or a range to exclude for a discovered host.<br><b>equals</b> - host IP is in the range.<br><b>does not equal</b> - host IP is not in the range.<br>It may have the following formats:<br>Single IP: 192.168.1.33<br>Range of IP addresses: 192.168.1-10.1-254<br>IP mask: 192.168.4.0/24<br>List: 192.168.1.1-254, 192.168.2.1-100, 192.168.2.200, 192.168.4.0/24<br>Support for spaces in the list format is provided since Zabbix 3.0.0. |



| Condition type          | Supported operators   | Description   |
|-------------------------|---|---|
| <i>Service type</i>     | equals<br>does not equal  | Specify a service type of a discovered service or a service type to exclude.<br><b>equals</b> - matches the discovered service.<br><b>does not equal</b> - does not match the discovered service.<br>Available service types: SSH, LDAP, SMTP, FTP, HTTP, HTTPS ( <i>available since Zabbix 2.2 version</i> ), POP, NNTP, IMAP, TCP, Zabbix agent, SNMPv1 agent, SNMPv2 agent, SNMPv3 agent, ICMP ping, telnet ( <i>available since Zabbix 2.2 version</i> ).   |
| <i>Service port</i>     | equals<br>does not equal  | Specify a TCP port range of a discovered service or a range to exclude.<br><b>equals</b> - service port is in the range.<br><b>does not equal</b> - service port is not in the range.   |
| <i>Discovery rule</i>   | equals<br>does not equal  | Specify a discovery rule or a discovery rule to exclude.<br><b>equals</b> - using this discovery rule.<br><b>does not equal</b> - using any other discovery rule, except this one.  |
| <i>Discovery check</i>  | equals<br>does not equal  | Specify a discovery check or a discovery check to exclude.<br><b>equals</b> - using this discovery check.<br><b>does not equal</b> - using any other discovery check, except this one.  |
| <i>Discovery object</i> | equals  | Specify the discovered object.<br><b>equals</b> - equal to discovered object (a device or a service).   |
| <i>Discovery status</i> | equals  | <b>Up</b> - matches 'Host Up' and 'Service Up' events<br><b>Down</b> - matches 'Host Down' and 'Service Down' events<br><b>Discovered</b> - matches 'Host Discovered' and 'Service Discovered' events<br><b>Lost</b> - matches 'Host Lost' and 'Service Lost' events  |
| <i>Uptime/Downtime</i>  | is greater than or equals<br>is less than or equals   | Uptime for 'Host Up' and 'Service Up' events. Downtime for 'Host Down' and 'Service Down' events.<br><b>is greater than or equals</b> - is more or equal to. Parameter is given in seconds.<br><b>is less than or equals</b> - is less or equal to. Parameter is given in seconds.  |
| <i>Received value</i>   | equals<br>does not equal<br>is greater than or equals<br>is less than or equals<br>contains<br>does not contain | Specify the value received from an agent (Zabbix, SNMP) check in a discovery rule. String comparison. If several Zabbix agent or SNMP checks are configured for a rule, received values for each of them are checked (each check generates a new event which is matched against all conditions).<br><b>equals</b> - equal to the value.<br><b>does not equal</b> - not equal to the value.<br><b>is greater than or equals</b> - more or equal to the value.<br><b>is less than or equals</b> - less or equal to the value.<br><b>contains</b> - contains the substring. Parameter is given as a string.<br><b>does not contain</b> - does not contain the substring. Parameter is given as a string. |
| <i>Proxy</i>            | equals<br>does not equal  | Specify a proxy or a proxy to exclude.<br><b>equals</b> - using this proxy.<br><b>does not equal</b> - using any other proxy except this one.   |

**Note:**

Service checks in a discovery rule, which result in discovery events, do not take place simultaneously. Therefore, if **multiple** values are configured for *Service type*, *Service port* or *Received value* conditions in the action, they will be compared to one discovery event at a time, but **not** to several events simultaneously. As a result, actions with multiple values for the same check types may not be executed correctly.

Autoregistration actions

The following conditions can be used in actions based on active agent autoregistration:

| Condition type       | Supported operators                                       | Description  |
|----------------------|---|--|
| <i>Host metadata</i> | contains<br>does not contain<br>matches<br>does not match | Specify host metadata or host metadata to exclude.<br><b>contains</b> - host metadata contains the string.<br><b>does not contain</b> - host metadata does not contain the string.<br>Host metadata can be specified in an <b>agent configuration file</b> .<br><b>matches</b> - host metadata matches regular expression.<br><b>does not match</b> - host metadata does not match regular expression. |
| <i>Host name</i>     | contains<br>does not contain<br>matches<br>does not match | Specify a host name or a host name to exclude.<br><b>contains</b> - host name contains the string.<br><b>does not contain</b> - host name does not contain the string.<br><b>matches</b> - host name matches regular expression.<br><b>does not match</b> - host name does not match regular expression.   |
| <i>Proxy</i>         | equals<br>does not equal                                  | Specify a proxy or a proxy to exclude.<br><b>equals</b> - using this proxy.<br><b>does not equal</b> - using any other proxy except this one.  |

#### Internal event actions

The following conditions can be set for actions based on internal events:

| Condition type    | Supported operators                                      | Description   |
|-------------------|--|---|
| <i>Event type</i> | equals   | <b>Item in "not supported" state</b> - matches events where an item goes from a 'normal' to 'not supported' state<br><b>Low-level discovery rule in "not supported" state</b> - matches events where a low-level discovery rule goes from a 'normal' to 'not supported' state<br><b>Trigger in "unknown" state</b> - matches events where a trigger goes from a 'normal' to 'unknown' state |
| <i>Host group</i> | equals<br>does not equal                                 | Specify host groups or host groups to exclude.<br><b>equals</b> - event belongs to this host group.<br><b>does not equal</b> - event does not belong to this host group.  |
| <i>Tag name</i>   | equals<br>does not equal<br>contains<br>does not contain | Specify event tag or event tag to exclude.<br><b>equals</b> - event has this tag<br><b>does not equal</b> - event does not have this tag<br><b>contains</b> - event has a tag containing this string<br><b>does not contain</b> - event does not have a tag containing this string  |
| <i>Tag value</i>  | equals<br>does not equal<br>contains<br>does not contain | Specify event tag and value combination or tag and value combination to exclude.<br><b>equals</b> - event has this tag and value<br><b>does not equal</b> - event does not have this tag and value<br><b>contains</b> - event has a tag and value containing these strings<br><b>does not contain</b> - event does not have a tag and value containing these strings                        |
| <i>Template</i>   | equals<br>does not equal                                 | Specify templates or templates to exclude.<br><b>equals</b> - event belongs to an item/trigger/low-level discovery rule inherited from this template.<br><b>does not equal</b> - event does not belong to an item/trigger/low-level discovery rule inherited from this template.  |
| <i>Host</i>       | equals<br>does not equal                                 | Specify hosts or hosts to exclude.<br><b>equals</b> - event belongs to this host.<br><b>does not equal</b> - event does not belong to this host.  |

#### Type of calculation

The following options of calculating conditions are available:

- **And** - all conditions must be met

Note that using "And" calculation is disallowed between several triggers when they are selected as a Trigger= condition. Actions can only be executed based on the event of one trigger.

- **Or** - enough if one condition is met
- **And/Or** - combination of the two: AND with different condition types and OR with the same condition type, for example:

*Host group* equals Oracle servers  
*Host group* equals MySQL servers  
*Event name* contains 'Database is down'  
*Event name* contains 'Database is unavailable'

is evaluated as

(Host group equals Oracle servers **or** Host group equals MySQL servers) **and** (Event name contains 'Database is down' **or** Event name contains 'Database is unavailable')

- **Custom expression** - a user-defined calculation formula for evaluating action conditions. It must include all conditions (represented as uppercase letters A, B, C, ...) and may include spaces, tabs, brackets ( ), **and** (case sensitive), **or** (case sensitive), **not** (case sensitive).

While the previous example with **And/Or** would be represented as (A or B) and (C or D), in a custom expression you may as well have multiple other ways of calculation:

(A and B) and (C or D)  
(A and B) or (C and D)  
((A or B) and C) or D  
(not (A or B) and C) or not D  
etc.

Actions disabled due to deleted objects

If a certain object (host, template, trigger, etc.) used in an action condition/operation is deleted, the condition/operation is removed and the action is disabled to avoid incorrect execution of the action. The action can be re-enabled by the user.

This behavior takes place when deleting:

- host groups ("host group" condition, "remote command" operation on a specific host group);
- hosts ("host" condition, "remote command" operation on a specific host);
- templates ("template" condition, "link to template" and "unlink from template" operations);
- triggers ("trigger" condition);
- discovery rules (when using "discovery rule" and "discovery check" conditions).

*Note:* If a remote command has many target hosts, and we delete one of them, only this host will be removed from the target list, the operation itself will remain. But, if it's the only host, the operation will be removed, too. The same goes for "link to template" and "unlink from template" operations.

Actions are not disabled when deleting a user or user group used in a "send message" operation.

## 2 Operations

Overview

You can define the following operations for all events:

- send a message
- execute a remote command

### Attention:

Zabbix server does not create alerts if access to the host is explicitly "denied" for the user defined as action operation recipient or if the user has no rights defined to the host at all.

For discovery and autoregistration events, there are additional operations available:

- **add host**
- remove host
- enable host
- disable host
- add to host group
- remove from host group
- link to template
- unlink from template
- set host inventory mode

Configuring an operation

To configure an operation, go to the *Operations* tab in **action** configuration.

Action

Operations 2

\* Default operation step duration

1h

Operations

Steps Details

1 Send message to user groups: Zabbix administrators vi

Add

Recovery operations

Details

Notify all involved

Add

Action

Edit

Update operations

Details

Add

Action

Pause operations for suppressed problems

☒

Notify about canceled escalations

☒

\* At least one operation must exist.

Add

Cancel

General operation attributes:

| Parameter                              | Description   |
|--|---|
| <i>Default operation step duration</i> | <p>Duration of one operation step by default (60 seconds to 1 week).<br/>For example, an hour-long step duration means that if an operation is carried out, an hour will pass before the next step.</p> <p><b>Time suffixes</b> are supported, e.g. 60s, 1m, 2h, 1d, since Zabbix 3.4.0.</p> <p><b>User macros</b> are supported, since Zabbix 3.4.0.</p>   |
| <i>Operations</i>                      | <p>Action operations (if any) are displayed, with these details:</p> <p><b>Steps</b> - escalation step(s) to which the operation is assigned</p> <p><b>Details</b> - type of operation and its recipient/target.</p> <p>The operation list also displays the media type (e-mail, SMS or script) used as well as the name and surname (in parentheses after the username) of a notification recipient.</p> <p><b>Start in</b> - how long after an event the operation is performed</p> <p><b>Duration (sec)</b> - step duration is displayed. <i>Default</i> is displayed if the step uses default duration, and a time is displayed if custom duration is used.</p> <p><b>Action</b> - links for editing and removing an operation are displayed.</p> |
| <i>Recovery operations</i>             | <p>Action operations (if any) are displayed, with these details:</p> <p><b>Details</b> - type of operation and its recipient/target.</p> <p>The operation list also displays the media type (e-mail, SMS or script) used as well as the name and surname (in parentheses after the username) of a notification recipient.</p> <p><b>Action</b> - links for editing and removing an operation are displayed.</p>   |
| <i>Update operations</i>               | <p>Action operations (if any) are displayed, with these details:</p> <p><b>Details</b> - type of operation and its recipient/target.</p> <p>The operation list also displays the media type (e-mail, SMS or script) used as well as the name and surname (in parentheses after the username) of a notification recipient.</p> <p><b>Action</b> - links for editing and removing an operation are displayed.</p>   |

| Parameter                                       | Description   |
|---|---|
| <i>Pause operations for suppressed problems</i> | <p>Mark this checkbox to delay the start of operations for the duration of a maintenance period. When operations are started, after the maintenance, all operations are performed including those for the events during the maintenance.</p> <p>Note that this setting affects only problem escalations; recovery and update operations will not be affected.</p> <p>If you unmark this checkbox, operations will be executed without delay even during a maintenance period.</p> <p>This option is not available for <i>Service actions</i>.</p> |
| <i>Notify about canceled escalations</i>        | <p>Unmark this checkbox to disable notifications about canceled escalations (when host, item, trigger or action is disabled).</p>   |

All mandatory input fields are marked with a red asterisk.

To configure details of a new operation, click on [Add](#) in the Operations block. To edit an existing operation, click on [Edit](#) next to the operation. A popup window will open where you can edit the operation step details.

Operation details

Operation details

×

Operation

Send message

▼

Steps

1

-

1

(0 - infinitely)

Step duration

0

(0 - use action default)

\* At least one user or user group must be selected.

Send to user groups

| User group            | Action                 |
|-----------------------|------------------------|
| Zabbix administrators | <a href="#">Remove</a> |
| <a href="#">Add</a>   |                        |

Send to users

| User                | Action |
|---------------------|--------|
| <a href="#">Add</a> |        |

Send only to

Email

▼

Custom message

☐

Conditions

| Label               | Name                      | Action                 |
|---------------------|---------------------------|------------------------|
| A                   | Event is not acknowledged | <a href="#">Remove</a> |
| <a href="#">Add</a> |                           |                        |

Update

Cancel

| Parameter                      | Description   |
|--------------------------------|---|
| Operation                      | <p>Select the operation:</p> <p><b>Send message</b> - send message to user</p> <p><b>&lt;remote command name&gt;</b> - execute a remote command. Commands are available for execution if previously defined in <b>global scripts</b> with <i>Action operation</i> selected as its scope. More operations are available for discovery and autoregistration based events (see above).</p>   |
| Steps                          | <p>Select the step(s) to assign the operation to in an <b>escalation</b> schedule:</p> <p><b>From</b> - execute starting with this step</p> <p><b>To</b> - execute until this step (0=infinity, execution will not be limited)</p>  |
| Step duration                  | <p>Custom duration for these steps (0=use default step duration).</p> <p><b>Time suffixes</b> are supported, e.g. 60s, 1m, 2h, 1d, since Zabbix 3.4.0.</p> <p><b>User macros</b> are supported, since Zabbix 3.4.0.</p>   |
| Operation type: send message   | <p>Several operations can be assigned to the same step. If these operations have different step duration defined, the shortest one is taken into account and applied to the step.</p>   |
| Send to user groups            | <p>Click on <i>Add</i> to select user groups to send the message to.</p> <p>The user group must have at least "read" <b>permissions</b> to the host in order to be notified.</p>  |
| Send to users                  | <p>Click on <i>Add</i> to select users to send the message to.</p> <p>The user must have at least "read" <b>permissions</b> to the host in order to be notified.</p>  |
| Send only to Custom message    | <p>Send message to all defined media types or a selected one only.</p> <p>If selected, the custom message can be configured.</p>  |
| Subject                        | <p>For notifications about internal events via <b>webhooks</b>, custom message is mandatory.</p> <p>Subject of the custom message. The subject may contain macros. It is limited to 255 characters.</p>   |
| Message                        | <p>The custom message. The message may contain macros. It is limited to certain amount of characters depending on the type of database (see <b>Sending message</b> for more information).</p>   |
| Operation type: remote command |   |
| Target list                    | <p>Select targets to execute the command on:</p> <p><b>Current host</b> - command is executed on the host of the trigger that caused the problem event. This option will not work if there are multiple hosts in the trigger.</p> <p><b>Host</b> - select host(s) to execute the command on.</p> <p><b>Host group</b> - select host group(s) to execute the command on. Specifying a parent host group implicitly selects all nested host groups. Thus the remote command will also be executed on hosts from nested groups.</p> <p>A command on a host is executed only once, even if the host matches more than once (e.g. from several host groups; individually and from a host group).</p> <p>The target list is meaningless if a custom script is executed on Zabbix server. Selecting more targets in this case only results in the script being executed on the server more times.</p> <p>Note that for global scripts, the target selection also depends on the <i>Host group</i> setting in global script <b>configuration</b>.</p> <p><i>Target list</i> option is not available for <i>Service actions</i> because in this case remote commands are always executed on Zabbix server.</p> |
| Conditions                     | <p>Condition for performing the operation:</p> <p><b>Not ack</b> - only when the event is unacknowledged</p> <p><b>Ack</b> - only when the event is acknowledged.</p> <p><i>Conditions</i> option is not available for <i>Service actions</i>.</p>  |

When done, click on *Add* to add the operation to the list of *Operations*.

## 1 Sending message

## Overview

Sending a message is one of the best ways of notifying people about a problem. That is why it is one of the primary actions offered by Zabbix.

## Configuration

To be able to send and receive notifications from Zabbix you have to:

- **define the media** to send a message to

If the operation takes place outside of the **When active** time period defined for the selected media in the user configuration, the message will not be sent.

The default trigger severity ('Not classified') **must be** checked in user media **configuration** if you want to receive notifications for non-trigger events such as discovery, active agent autoregistration or internal events.

- **configure an action operation** that sends a message to one of the defined media

### Attention:

Zabbix sends notifications only to those users that have at least 'read' permissions to the host that generated the event. At least one host of a trigger expression must be accessible.

You can configure custom scenarios for sending messages using **escalations**.

To successfully receive and read e-mails from Zabbix, e-mail servers/clients must support standard 'SMTP/MIME e-mail' format since Zabbix sends UTF-8 data (If the subject contains ASCII characters only, it is not UTF-8 encoded.). The subject and the body of the message are base64-encoded to follow 'SMTP/MIME e-mail' format standard.

Message limit after all macros expansion is the same as message limit for **Remote commands**.

## Tracking messages

You can view the status of messages sent in *Monitoring → Problems*.

In the *Actions* column you can see summarized information about actions taken. In there green numbers represent messages sent, red ones - failed messages. *In progress* indicates that an action is initiated. *Failed* informs that no action has executed successfully.

If you click on the event time to view event details, you will be able to see the details of messages sent (or not sent) due to the event in the *Actions* block.

In *Reports → Action log* you will see details of all actions taken for those events that have an action configured.

## 2 Remote commands

## Overview

With remote commands you can define that a certain pre-defined command is automatically executed on the monitored host upon some condition.

Thus remote commands are a powerful mechanism for smart pro-active monitoring.

In the most obvious uses of the feature you can try to:

- Automatically restart some application (web server, middleware, CRM) if it does not respond
- Use IPMI 'reboot' command to reboot some remote server if it does not answer requests
- Automatically free disk space (removing older files, cleaning /tmp) if running out of disk space
- Migrate a VM from one physical box to another depending on the CPU load
- Add new nodes to a cloud environment upon insufficient CPU (disk, memory, whatever) resources

Configuring an action for remote commands is similar to that for sending a message, the only difference being that Zabbix will execute a command instead of sending a message.

Remote commands can be executed by Zabbix server, proxy or agent. Remote commands on Zabbix agent can be executed directly by Zabbix server or through Zabbix proxy. Both on Zabbix agent and Zabbix proxy remote commands are disabled by default. They can be enabled by:

- adding an `AllowKey=system.run[*]` parameter in agent configuration;
- setting the `EnableRemoteCommands` parameter to '1' in proxy configuration.

Remote commands executed by Zabbix server are run as described in [Command execution](#) including exit code checking.

Remote commands are executed even if the target host is in maintenance.

Remote command limit

Remote command limit after resolving all macros depends on the type of database and character set (non-ASCII characters require more than one byte to be stored):

| Database                   | Limit in characters | Limit in bytes |
|----------------------------|---------------------|----------------|
| MySQL                      | 65535               | 65535          |
| Oracle Database            | 2048                | 4000           |
| PostgreSQL                 | 65535               | not limited    |
| SQLite (only Zabbix proxy) | 65535               | not limited    |

Remote command execution output (return value) is limited to 16MB (including trailing whitespace that is truncated). [IPMI remote command](#) limit is based on the installed IPMI library. Note that [database limits](#) apply to all remote commands.

Configuration

Those remote commands that are executed on Zabbix agent (custom scripts) must be first enabled in the agent [configuration](#).

Make sure that the `AllowKey=system.run[<command>,*]` parameter is added for each allowed command in agent configuration to allow specific command with nowait mode. Restart agent daemon if changing this parameter.

**Attention:**

Remote commands do not work with active Zabbix agents.

Then, when configuring a new action in *Configuration* → *Actions*:

- Define the appropriate conditions. In this example, set that the action is activated upon any disaster problems with one of Apache applications:

The screenshot shows the Zabbix Configuration interface for the 'Actions' section, specifically the 'Operations' tab. The 'Name' field is set to 'Serious problem with Apache'. The 'Type of calculation' is set to 'And'. The 'Conditions' table lists three conditions: A (Problem is not suppressed), B (Application contains Apache), and C (Trigger severity is greater than or equals Disaster). The 'Add' button is visible. The 'Enabled' checkbox is checked.

- In the *Operations* tab, click on Add in the Operations/Recovery operations/Update operations block
- From the Operation dropdown field select one of the predefined scripts



The screenshot shows a web interface titled 'Operation details'. On the left, there are labels 'Operation' and 'Steps'. To the right of 'Operation' is a dropdown menu currently showing 'Restart webserver'. Below this, under the 'Steps' label, is a list box containing two items: 'Send message' and 'Restart webserver', with the latter being highlighted in blue.

- Select the target list for the script

#### Predefined scripts

All scripts (webhook, script, SSH, Telnet, IPMI) that are available for action operations are defined in [global scripts](#).

For example:

```
sudo /etc/init.d/apache restart
```

In this case, Zabbix will try to restart an Apache process. With this command, make sure that the command is executed on Zabbix agent (click the *Zabbix agent* button against *Execute on*).

#### Attention:

Note the use of **sudo** - Zabbix user does not have permissions to restart system services by default. See below for hints on how to configure **sudo**.

#### Note:

Zabbix agent should run on the remote host and accept incoming connections. Zabbix agent executes commands in background.

Remote commands on Zabbix agent are executed without timeout by the `system.run[,nowait]` key and are not checked for execution results. On Zabbix server and Zabbix proxy, remote commands are executed with timeout as set in the `TrapperTimeout` parameter of `zabbix_server.conf` or `zabbix_proxy.conf` file and are **checked** for execution results.

#### Access permissions

Make sure that the 'zabbix' user has execute permissions for configured commands. One may be interested in using **sudo** to give access to privileged commands. To configure access, execute as root:

```
visudo
```

Example lines that could be used in *sudoers* file:

```
# allows 'zabbix' user to run all commands without password.
zabbix ALL=NOPASSWD: ALL
```

```
# allows 'zabbix' user to restart apache without password.
zabbix ALL=NOPASSWD: /etc/init.d/apache restart
```

#### Note:

On some systems *sudoers* file will prevent non-local users from executing commands. To change this, comment out **requiretty** option in */etc/sudoers*.

#### Remote commands with multiple interfaces

If the target system has multiple interfaces of the selected type (Zabbix agent or IPMI), remote commands will be executed on the default interface.

It is possible to execute remote commands via SSH and Telnet using another interface than the Zabbix agent one. The available interface to use is selected in the following order:

- Zabbix agent default interface
- SNMP default interface
- JMX default interface
- IPMI default interface

## IPMI remote commands

For IPMI remote commands the following syntax should be used:

`<command> [<value>]`

where

- `<command>` - one of IPMI commands without spaces
- `<value>` - 'on', 'off' or any unsigned integer. `<value>` is an optional parameter.

Examples

Examples of **global scripts** that may be used as remote commands in action operations.

### Example 1

Restart of Windows on certain condition.

In order to automatically restart Windows upon a problem detected by Zabbix, define the following script:

| Script parameter | Value                                  |
|------------------|--|
| <i>Scope</i>     | 'Action operation'                     |
| <i>Type</i>      | 'Script'                               |
| <i>Command</i>   | c:\windows\system32\shutdown.exe -r -f |

### Example 2

Restart the host by using IPMI control.

| Script parameter | Value              |
|------------------|--------------------|
| <i>Scope</i>     | 'Action operation' |
| <i>Type</i>      | 'IPMI'             |
| <i>Command</i>   | reset              |

### Example 3

Power off the host by using IPMI control.

| Script parameter | Value              |
|------------------|--------------------|
| <i>Scope</i>     | 'Action operation' |
| <i>Type</i>      | 'IPMI'             |
| <i>Command</i>   | power off          |

## 3 Additional operations

### Overview

In this section you may find some details of **additional operations** for discovery/autoregistration events.

#### Adding host

Hosts are added during the discovery process, as soon as a host is discovered, rather than at the end of the discovery process.

#### Note:

As network discovery can take some time due to many unavailable hosts/services having patience and using reasonable IP ranges is advisable.

When adding a host, its name is decided by the standard **gethostbyname** function. If the host can be resolved, resolved name is used. If not, the IP address is used. Besides, if IPv6 address must be used for a host name, then all ":" (colons) are replaced by "\_" (underscores), since colons are not allowed in host names.

**Attention:**

If performing discovery by a proxy, currently hostname lookup still takes place on Zabbix server.

**Attention:**

If a host already exists in Zabbix configuration with the same name as a newly discovered one, versions of Zabbix prior to 1.8 would add another host with the same name. Zabbix 1.8.1 and later adds **\_N** to the hostname, where **N** is increasing number, starting with 2.

## 4 Using macros in messages

### Overview

In message subjects and message text you can use macros for more efficient problem reporting.

In addition to a number of built-in macros, **user macros** and **expression macros** are also supported. A **full list of macros** supported by Zabbix is available.

### Examples

Examples here illustrate how you can use macros in messages.

#### Example 1

Message subject:

Problem: {TRIGGER.NAME}

When you receive the message, the message subject will be replaced by something like:

Problem: Processor load is too high on Zabbix server

#### Example 2

Message:

Processor load is: {?last(/zabbix.zabbix.com/system.cpu.load[,avg1])}

When you receive the message, the message will be replaced by something like:

Processor load is: 1.45

#### Example 3

Message:

Latest value: {?last(/{HOST.HOST}/{ITEM.KEY})}

MAX for 15 minutes: {?max(/{HOST.HOST}/{ITEM.KEY},15m)}

MIN for 15 minutes: {?min(/{HOST.HOST}/{ITEM.KEY},15m)}

When you receive the message, the message will be replaced by something like:

Latest value: 1.45

MAX for 15 minutes: 2.33

MIN for 15 minutes: 1.01

#### Example 4

Message:

[http://<server\\_ip\\_or\\_name>/zabbix/tr\\_events.php?triggerid={TRIGGER.ID}&eventid={EVENT.ID}](http://<server_ip_or_name>/zabbix/tr_events.php?triggerid={TRIGGER.ID}&eventid={EVENT.ID})

When you receive the message, it will contain a link to the *Event details* page, which provides information about the event, its trigger, and a list of latest events generated by the same trigger.

#### Example 5

Informing about values from several hosts in a trigger expression.

Message:

Problem name: {TRIGGER.NAME}

Trigger expression: {TRIGGER.EXPRESSION}

1. Item value on {HOST.NAME1}: {ITEM.VALUE1} ({ITEM.NAME1})
2. Item value on {HOST.NAME2}: {ITEM.VALUE2} ({ITEM.NAME2})

When you receive the message, the message will be replaced by something like:

Problem name: Processor load is too high on a local host

Trigger expression: last(/Myhost/system.cpu.load[percpu,avg1])>5 or last(/Myotherhost/system.cpu.load[percpu,avg1])>5

1. Item value on Myhost: 0.83 (Processor load (1 min average per core))
2. Item value on Myotherhost: 5.125 (Processor load (1 min average per core))

Example 6

Receiving details of both the problem event and recovery event in a **recovery** message:

Message:

Problem:

Event ID: {EVENT.ID}  
 Event value: {EVENT.VALUE}  
 Event status: {EVENT.STATUS}  
 Event time: {EVENT.TIME}  
 Event date: {EVENT.DATE}  
 Event age: {EVENT.AGE}  
 Event acknowledgment: {EVENT.ACK.STATUS}  
 Event update history: {EVENT.UPDATE.HISTORY}

Recovery:

Event ID: {EVENT.RECOVERY.ID}  
 Event value: {EVENT.RECOVERY.VALUE}  
 Event status: {EVENT.RECOVERY.STATUS}  
 Event time: {EVENT.RECOVERY.TIME}  
 Event date: {EVENT.RECOVERY.DATE}  
 Operational data: {EVENT.OPDATA}

When you receive the message, the macros will be replaced by something like:

Problem:

Event ID: 21874  
 Event value: 1  
 Event status: PROBLEM  
 Event time: 13:04:30  
 Event date: 2018.01.02  
 Event age: 5m  
 Event acknowledgment: Yes  
 Event update history: 2018.01.02 13:05:51 "John Smith (Admin)"  
 Actions: acknowledged.

Recovery:

Event ID: 21896  
 Event value: 0  
 Event status: OK  
 Event time: 13:10:07  
 Event date: 2018.01.02  
 Operational data: Current value is 0.83

#### Attention:

Separate notification macros for the original problem event and recovery event are supported since Zabbix 2.2.0.

### 3 Recovery operations

## Overview

Recovery operations allow you to be notified when problems are resolved.

Both messages and remote commands are supported in recovery operations. While several operations can be added, escalation is not supported - all operations are assigned to a single step and therefore will be performed simultaneously.

## Use cases

Some use cases for recovery operations are as follows:

1. Notify on a recovery all users that were notified on the problem:
  - Select *Notify all involved* as operation type.
2. Have multiple operations upon recovery: send a notification and execute a remote command:
  - Add operation types for sending a message and executing a command.
3. Open a ticket in external helpdesk/ticketing system and close it when the problem is resolved:
  - Create an external script that communicates with the helpdesk system.
  - Create an action having operation that executes this script and thus opens a ticket.
  - Have a recovery operation that executes this script with other parameters and closes the ticket.
  - Use the {EVENT.ID} macro to reference the original problem.

## Configuring a recovery operation

To configure a recovery operation, go to the *Operations* tab in **action** configuration.

Action

Operations 2

\* Default operation step duration

1h

Pause operations for suppressed problems

☒

Operations

Steps

Details

1

Send message to user groups: Zabbix administrators vi

Add

Recovery operations

Details

Notify all involved

Add

Action

Edit

Update operations

Details

Add

Action

\* At least one operation must exist.

To configure details of a new recovery operation, click on [Add](#) in the *Recovery operations* block. To edit an existing operation, click on [Edit](#) next to the operation. A popup window will open where you can edit the operation step details.

## Recovery operation details

Operation details

×

Operation

Send message

▼

\*

At least one user or user group must be selected.

Send to user groups

User group

Zabbix administrators

Add

Action

Remove

Send to users

User

Add

Action

Send only to

Email

▼

Custom message

☐

Add

Cancel

Three operation types are available for recovery events:

- **Send message** - send recovery message to specified user;
- **Notify all involved** - send recovery message to all users who were notified on the problem event;
- **<remote command name>** - execute a remote command. Commands are available for execution if previously defined in **global scripts** with *Action operation* selected as its scope.

Parameters for each operation type are described below. All mandatory input fields are marked with a red asterisk. When done, click on *Add* to add operation to the list of *Recovery operations*.

**Note:**

Note that if the same recipient is defined in several operation types without specified *Custom message*, duplicate notifications are not sent.

Operation type: **send message**

| Parameter                  | Description  |
|----------------------------|--|
| <i>Send to user groups</i> | Click on <i>Add</i> to select user groups to send the recovery message to.<br>The user group must have at least "read" <b>permissions</b> to the host in order to be notified. |
| <i>Send to users</i>       | Click on <i>Add</i> to select users to send the recovery message to.<br>The user must have at least "read" <b>permissions</b> to the host in order to be notified.             |
| <i>Send only to</i>        | Send default recovery message to all defined media types or a selected one only.   |
| <i>Custom message</i>      | If selected, a custom message can be defined.  |
| <i>Subject</i>             | Subject of the custom message. The subject may contain macros.   |
| <i>Message</i>             | The custom message. The message may contain macros.  |

Operation type: **remote command**

| Parameter          | Description   |
|--------------------|---|
| <i>Target list</i> | <p>Select targets to execute the command on:</p> <p><b>Current host</b> - command is executed on the host of the trigger that caused the problem event. This option will not work if there are multiple hosts in the trigger.</p> <p><b>Host</b> - select host(s) to execute the command on.</p> <p><b>Host group</b> - select host group(s) to execute the command on. Specifying a parent host group implicitly selects all nested host groups. Thus the remote command will also be executed on hosts from nested groups.</p> <p>A command on a host is executed only once, even if the host matches more than once (e.g. from several host groups; individually and from a host group).</p> <p>The target list is meaningless if the command is executed on Zabbix server. Selecting more targets in this case only results in the command being executed on the server more times.</p> <p>Note that for global scripts, the target selection also depends on the <i>Host group</i> setting in global script <a href="#">configuration</a>.</p> |

Operation type: notify all involved

| Parameter             | Description  |
|-----------------------|--|
| <i>Custom message</i> | If selected, a custom message can be defined.                  |
| <i>Subject</i>        | Subject of the custom message. The subject may contain macros. |
| <i>Message</i>        | The custom message. The message may contain macros.            |

## 4 Update operations

### Overview

Update operations are available in actions with the following event sources:

- *Triggers* - when problems are **updated** by other users, i.e. commented upon, acknowledged, severity has been changed, closed (manually);
- *Services* - when the severity of a service has changed but the service is still not recovered.

Both messages and remote commands are supported in update operations. While several operations can be added, escalation is not supported - all operations are assigned to a single step and therefore will be performed simultaneously.

### Configuring an update operation

To configure an update operation go to the *Operations* tab in action [configuration](#).

Action
Operations 2

\* Default operation step duration

Pause operations for suppressed problems
☒

| Operations | Steps               | Details | Start in | Duration |
|------------|---------------------|---------|----------|----------|
|            | <a href="#">Add</a> |         |          |          |

| Recovery operations | Details             | Action |
|---------------------|---------------------|--------|
|                     | <a href="#">Add</a> |        |

| Update operations | Details   |
|-------------------|---|
|                   | <p><b>Notify all involved</b></p> <p><b>Send message to user groups: Zabbix administrators via SMS</b></p> <p><a href="#">Add</a></p> |

To configure details of a new update operation, click on [Add](#) in the Update operations block. To edit an existing operation, click on [Edit](#) next to the operation. A popup window will open where you can edit the operation step details.

Update operations offer the same set of parameters as [Recovery operations](#).

Operation details

Operation

\* At least one user or user group must be selected.

| Send to user groups | User group            | Action                 |
|---------------------|-----------------------|------------------------|
|                     | Zabbix administrators | <a href="#">Remove</a> |
|                     | <a href="#">Add</a>   |                        |

| Send to users | User                | Action |
|---------------|---------------------|--------|
|               | <a href="#">Add</a> |        |

Send only to

Custom message
☐

Add

Cancel

## 5 Escalations



## Overview

With escalations you can create custom scenarios for sending notifications or executing remote commands.

In practical terms it means that:

- Users can be informed about new problems immediately
- Notifications can be repeated until the problem is resolved
- Sending a notification can be delayed
- Notifications can be escalated to another "higher" user group
- Remote commands can be executed immediately or when a problem is not resolved for a lengthy period

Actions are escalated based on the **escalation step**. Each step has a duration in time.

You can define both the default duration and a custom duration of an individual step. The minimum duration of one escalation step is 60 seconds.

You can start actions, such as sending notifications or executing commands, from any step. Step one is for immediate actions. If you want to delay an action, you can assign it to a later step. For each step, several actions can be defined.

The number of escalation steps is not limited.

Escalations are defined when **configuring an operation**. Escalations are supported for problem operations only, not recovery.

Miscellaneous aspects of escalation behavior

Let's consider what happens in different circumstances if an action contains several escalation steps.

| Situation  | Behavior  |
|--|---|
| <i>The host in question goes into maintenance after the initial problem notification is sent</i>   | Depending on the <i>Pause operations for suppressed problems</i> setting in action <b>configuration</b> , all remaining escalation steps are executed either with a delay caused by the maintenance period or without delay. A maintenance period does not cancel operations.   |
| <i>The time period defined in the <b>Time period</b> action condition ends after the initial notification is sent</i>  | All remaining escalation steps are executed. The <i>Time period</i> condition cannot stop operations; it has effect with regard to when actions are started/not started, not operations.  |
| <i>A problem starts during maintenance and continues (is not resolved) after maintenance ends</i>  | Depending on the <i>Pause operations for suppressed problems</i> setting in action <b>configuration</b> , all escalation steps are executed either from the moment maintenance ends or immediately.   |
| <i>A problem starts during a no-data maintenance and continues (is not resolved) after maintenance ends</i>  | It must wait for the trigger to fire, before all escalation steps are executed.   |
| <i>Different escalations follow in close succession and overlap</i>  | The execution of each new escalation supersedes the previous escalation, but for at least one escalation step that is always executed on the previous escalation. This behavior is relevant in actions upon events that are created with EVERY problem evaluation of the trigger.   |
| <i>During an escalation in progress (like a message being sent), based on any type of event:&lt;br&gt;- the action is disabled&lt;br&gt;Based on trigger event:&lt;br&gt;- the trigger is disabled&lt;br&gt;- the host or item is disabled&lt;br&gt;Based on internal event about triggers:&lt;br&gt;- the trigger is disabled&lt;br&gt;Based on internal event about items/low-level discovery rules:&lt;br&gt;- the item is disabled&lt;br&gt;- the host is disabled</i> | The message in progress is sent and then one more message on the escalation is sent. The follow-up message will have the cancellation text at the beginning of the message body ( <i>NOTE: Escalation canceled</i> ) naming the reason (for example, <i>NOTE: Escalation canceled: action '&lt;Action name&gt;' disabled</i> ). This way the recipient is informed that the escalation is canceled and no more steps will be executed. This message is sent to all who received the notifications before. The reason of cancellation is also logged to the server log file (starting from <b>Debug Level 3=Warning</b> ). |
|  | Note that the <i>Escalation canceled</i> message is also sent if operations are finished, but recovery operations are configured and are not executed yet.  |

| Situation   | Behavior  |
|---|---|
| <i>During an escalation in progress (like a message being sent) the action is deleted</i> | No more messages are sent. The information is logged to the server log file (starting from <b>Debug Level 3=Warning</b> ), for example: <code>escalation canceled: action id:334 deleted</code> |

## Escalation examples

### Example 1

Sending a repeated notification once every 30 minutes (5 times in total) to a 'MySQL Administrators' group. To configure:

- in Operations tab, set the *Default operation step duration* to '30m' (30 minutes)
- Set the escalation steps to be *From '1' To '5'*
- Select the 'MySQL Administrators' group as recipients of the message

The screenshot shows the 'Operations 1' tab in Zabbix. The 'Default operation step duration' is set to 30m. The checkbox 'Pause operations for suppressed problems' is checked. Below, the 'Operations' section contains a table with one step: '1 - 5 Send message to user groups: MySQL Administrators via Email'. The 'Start in' column shows 'Immediately' and the 'Duration' column shows 'Default'. There is an 'Add' button below the table.

Notifications will be sent at 0:00, 0:30, 1:00, 1:30, 2:00 hours after the problem starts (unless, of course, the problem is resolved sooner).

If the problem is resolved and a recovery message is configured, it will be sent to those who received at least one problem message within this escalation scenario.

#### Note:

If the trigger that generated an active escalation is disabled, Zabbix sends an informative message about it to all those that have already received notifications.

### Example 2

Sending a delayed notification about a long-standing problem. To configure:

- In Operations tab, set the *Default operation step duration* to '10h' (10 hours)
- Set the escalation steps to be *From '2' To '2'*

The screenshot shows the 'Operations 1' tab in Zabbix. The 'Default operation step duration' is set to 10h. The checkbox 'Pause operations for suppressed problems' is checked. Below, the 'Operations' section contains a table with one step: '2 Send message to user groups: Managers via SMS'. The 'Start in' column shows '10:00:00' and the 'Duration' column shows 'Default'. There is an 'Add' button below the table.

A notification will only be sent at Step 2 of the escalation scenario, or 10 hours after the problem starts.

You can customize the message text to something like 'The problem is more than 10 hours old'.

### Example 3

Escalating the problem to the Boss.

In the first example above we configured periodical sending of messages to MySQL administrators. In this case, the administrators will get four messages before the problem will be escalated to the Database manager. Note that the manager will get a message only in case the problem is not acknowledged yet, supposedly no one is working on it.

Action
Operations 2

\* Default operation step duration

Pause operations for suppressed problems
☒

| Operations          | Steps                        | Details                              | Start in    | Duration |
|---------------------|------------------------------|--------------------------------------|-------------|----------|
| 1 - 0               | Send message to user groups: | MySQL administrators via Email       | Immediately | Default  |
| 5                   | Send message to users:       | Database manager (J S) via all media | 02:00:00    | Default  |
| <a href="#">Add</a> |                              |                                      |             |          |

Details of Operation 2:

Operation details

Operation type

Send message

Steps

-  (0 - infinitely)

Step duration

(0 - use action default)

\* At least one user or user group must be selected.

Send to user groups

| User group          | Action |
|---------------------|--------|
| <a href="#">Add</a> |        |

Send to users

| User                | Action                 |
|---------------------|------------------------|
| Database manager    | <a href="#">Remove</a> |
| <a href="#">Add</a> |                        |

Send only to

- All -

Custom message

☒

Subject

Unacknowledged problem: {EVENT.NAME}

Message

Problem started at {EVENT.TIME} on {EVENT.DATE}  
Problem name: {EVENT.NAME}  
Host: {HOST.NAME}  
Severity: {EVENT.SEVERITY}  
  
Original problem ID: {EVENT.ID}  
{TRIGGER.URL}  
{ESC.HISTORY}

Conditions

| Label               | Name                      | Action                 |
|---------------------|---------------------------|------------------------|
| A                   | Event is not acknowledged | <a href="#">Remove</a> |
| <a href="#">Add</a> |                           |                        |

Update

Cancel

Note the use of {ESC.HISTORY} macro in the customized message. The macro will contain information about all previously executed steps on this escalation, such as notifications sent and commands executed.

#### Example 4

A more complex scenario. After multiple messages to MySQL administrators and escalation to the manager, Zabbix will try to restart the MySQL database. It will happen if the problem exists for 2:30 hours and it hasn't been acknowledged.

If the problem still exists, after another 30 minutes Zabbix will send a message to all guest users.

If this does not help, after another hour Zabbix will reboot server with the MySQL database (second remote command) using IPMI commands.

Action

Operations 5

\* Default operation step duration

30m

Pause operations for suppressed problems

☒

Operations

| Steps | Details   | Start in    | Duration |
|-------|---|-------------|----------|
| 1 - 0 | Send message to user groups: MySQL Administrators via Email | Immediately | Default  |
| 5     | Send message to users: Database Manager (J S) via all media | 02:00:00    | Default  |
| 6     | Run script "Restart MySQL" on current host                  | 02:30:00    | Default  |
| 7     | Send message to user groups: Guests via all media           | 03:00:00    | Default  |
| 9     | Run script "Restart server" on current host                 | 04:00:00    | Default  |

Add

Example 5

An escalation with several operations assigned to one step and custom intervals used. The default operation step duration is 30 minutes.

Action

Operations 4

\* Default operation step duration

30m

Pause operations for suppressed problems

☒

Operations

| Steps | Details  | Start in    | Duration |
|-------|--|-------------|----------|
| 1 - 4 | Send message to user groups: MySQL Administrators via Email  | Immediately | Default  |
| 5 - 6 | Send message to users: Database Manager (J S) via all media  | 02:00:00    | 1h       |
| 5 - 7 | Send message to user groups: Zabbix administrators via Email | 02:00:00    | 10m      |
| 11    | Send message to user groups: Guests via Email                | 04:00:00    | Default  |

Add

Notifications will be sent as follows:

- to MySQL administrators at 0:00, 0:30, 1:00, 1:30 after the problem starts
- to Database manager at 2:00 and 2:10 (and not at 3:00; seeing that steps 5 and 6 overlap with the next operation, the shorter custom step duration of 10 minutes in the next operation overrides the longer step duration of 1 hour tried to set here)
- to Zabbix administrators at 2:00, 2:10, 2:20 after the problem starts (the custom step duration of 10 minutes working)
- to guest users at 4:00 hours after the problem start (the default step duration of 30 minutes returning between steps 8 and 11)

3 Receiving notification on unsupported items

Overview

Receiving notifications on unsupported items is supported since Zabbix 2.2.

It is part of the concept of internal events in Zabbix, allowing users to be notified on these occasions. Internal events reflect a change of state:

- when items go from 'normal' to 'unsupported' (and back)
- when triggers go from 'normal' to 'unknown' (and back)
- when low-level discovery rules go from 'normal' to 'unsupported' (and back)

This section presents a how-to for receiving notification when an item turns unsupported.

Configuration

Overall, the process of setting up the notification should feel familiar to those who have set up alerts in Zabbix before.

### Step 1

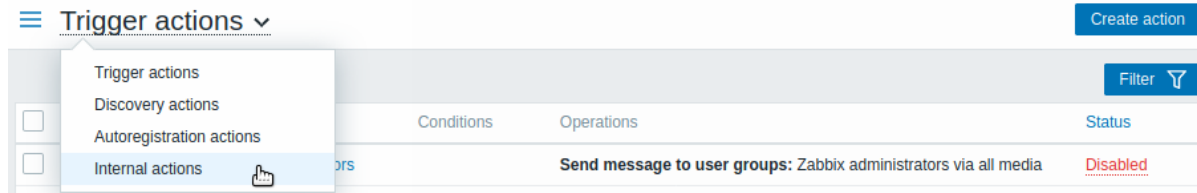
Configure **some media**, such as e-mail, SMS, or script to use for the notifications. Refer to the corresponding sections of the manual to perform this task.

#### Attention:

For notifying on internal events the default severity ('Not classified') is used, so leave it checked when configuring **user media** if you want to receive notifications for internal events.

### Step 2

Go to *Configuration* → *Actions* and select *Internal actions* from the third level menu (or page title dropdown).

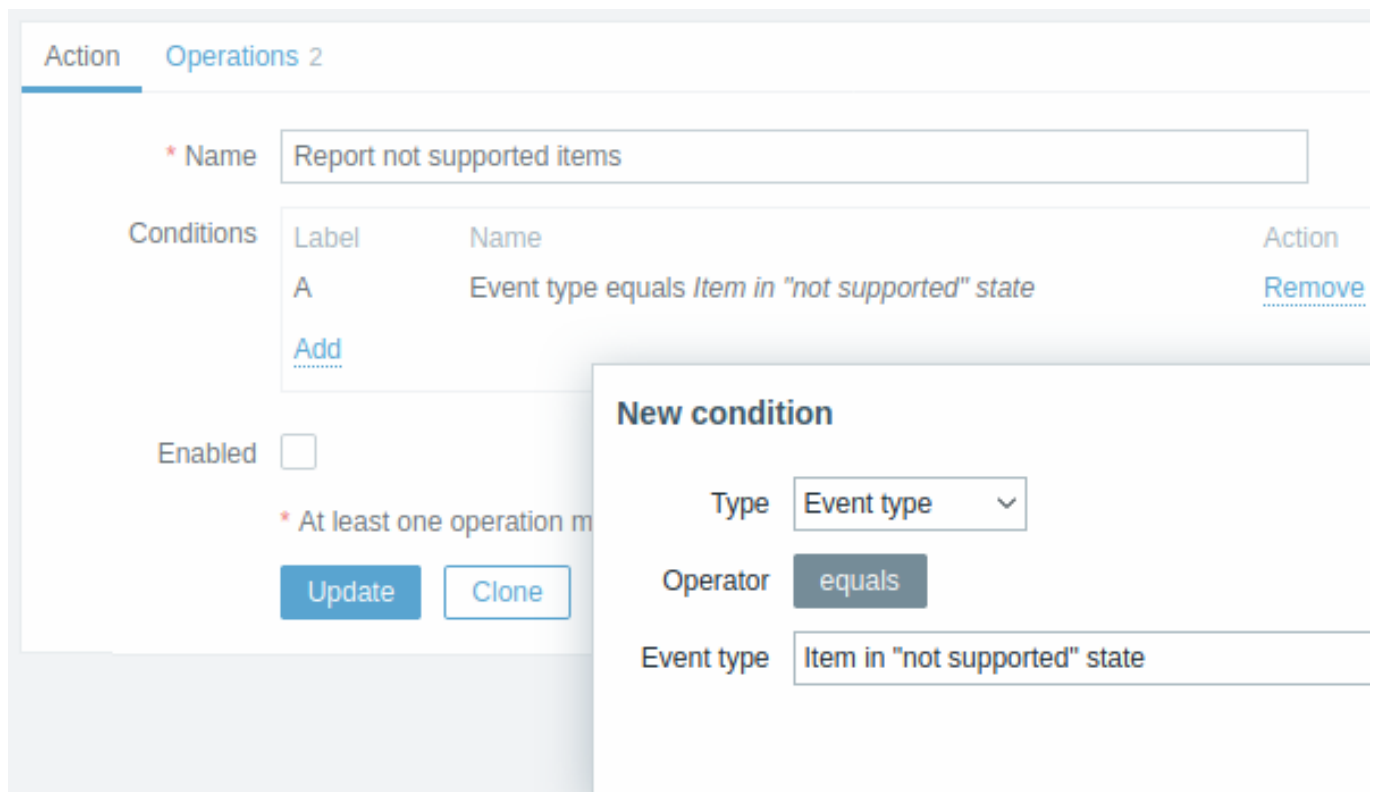


Click on *Create action* to the right to open an action configuration form.

### Step 3

In the **Action** tab enter a name for the action. Then click on *Add* in the condition block to add a new condition.

In the new condition popup window select *Event type* as the condition type and then select *Item in "not supported" state* as the event type value.



Don't forget to click on *Add* to actually list the condition in the *Conditions* block.

### Step 4

In the **Operations** tab, click on *Add* in the *Operations* block and select some recipients of the message (user groups/users) and the media types (or 'All') to use for delivery.

Select *Custom message* checkbox if you wish to enter the custom subject/content of the problem message.

\* Default operation step duration

Operations

Steps Details

1 **Send message to user groups: Zabbix administrators via all media**

[Add](#)

Recovery operations

Details

**Notify all involved**

[Add](#)

Action

[Edit](#) [Remove](#)

## Operation details

Operation type Send message

Steps  -  (0 - infinitely)

Step duration  (0 - use action default)

\* At least one user or user group must be selected.

Send to user groups

User group

Zabbix administrators

[Add](#)

Action

[Remove](#)

Send to users

User

[Add](#)

Action

Send only to

Custom message ☒

Subject

Message

Host: {HOST.NAME}  
Item: {ITEM.NAME}  
Key: {ITEM.KEY}  
State: {ITEM.STATE}

Click on *Add* to actually list the operation in the *Operations* block.

If you wish to receive more than one notification, set the operation step duration (interval between messages sent) and add another step.

#### Step 5

The **Recovery operations** block allows to configure a recovery notification when an item goes back to the normal state. Click on *Add* in the *Recovery operations* block, select the operation type, the recipients of the message (user groups/users) and the media types (or 'All') to use for delivery.

Select *Custom message* checkbox if you wish to enter the custom subject/content of the problem message.

The screenshot shows the Zabbix configuration interface. At the top, there are tabs for 'Action' and 'Operations 2'. Below the 'Operations 2' tab, there is a section for 'Default operation step duration' set to '1h'. Below this, there are two sections: 'Operations' and 'Recovery operations'. The 'Operations' section has a table with one row labeled '1' and 'Send m', and an 'Add' button. The 'Recovery operations' section has a table with one row labeled 'Notify all invol' and an 'Add' button. Below these sections, there is a note '\* At least one op' and two buttons: 'Add' and 'Cancel'. An 'Operation details' popup window is open, showing the following fields: 'Operation type' set to 'Notify all involved', 'Custom message' checked, 'Subject' set to '{ITEM.STATE}: {HOST.NAME}:{ITEM.NAME}', and 'Message' set to 'Host: {HOST.NAME}\nItem: {ITEM.NAME}\nKey: {ITEM.KEY}\nState: {ITEM.STATE}'.

Click on *Add* in the *Operation details* popup window to actually list the operation in the *Recovery operations* block.

#### Step 6

When finished, click on the **Add** button at the bottom of the form.

And that's it, you're done! Now you can look forward to receiving your first notification from Zabbix if some item turns unsupported.

## 11 Macros

### Overview

Zabbix supports a number of built-in macros which may be used in various situations. These macros are variables, identified by a specific syntax:

{MACRO}

Macros resolve to a specific value depending on the context.

Effective use of macros allows to save time and make Zabbix configuration more transparent.

In one of typical uses, a macro may be used in a template. Thus a trigger on a template may be named "Processor load is too high on {HOST.NAME}". When the template is applied to the host, such as Zabbix server, the name will resolve to "Processor load is too high on Zabbix server" when the trigger is displayed in the Monitoring section.

Macros may be used in item key parameters. A macro may be used for only a part of the parameter, for example `item.key[server_{HOST.HOST}_local]`. Double-quoting the parameter is not necessary as Zabbix will take care of any ambiguous special symbols, if present in the resolved macro.

There are other types of macros in Zabbix.

Zabbix supports the following macros:

- {MACRO} - built-in macro (see [full list](#))
- {<macro>.<func>(<params>)} - macro **functions**

- `{${MACRO}}` - **user-defined macro**, optionally **with context**
- `{#MACRO}` - macro for **low-level discovery**
- `{?EXPRESSION}` - **expression macro**

## 1 Macro functions

### Overview

Macro functions offer the ability to customize **macro** values.

Sometimes a macro may resolve to a value that is not necessarily easy to work with. It may be long or contain a specific substring of interest that you would like to extract. This is where macro functions can be useful.

The syntax of a macro function is:

```
{<macro>.<func>(<params>)}
```

where:

- `<macro>` - the macro to customize (for example `{ITEM.VALUE}` or `{#LLDMACRO}`)
- `<func>` - the function to apply
- `<params>` - a comma-delimited list of function parameters

Parameters must be quoted if they:

- start with a space or double quotes
- contain closing parentheses or a comma

For example:

```
{{TIME}}.fmttime(format,time_shift)}
{{ITEM.VALUE}}.regsub(pattern, output)}
{{#LLDMACRO}}.regsub(pattern, output)}
```

A single function per macro is supported; multiple macro functions in chain are not supported.

#### Note:

Please see **escaping examples** for cases when macro functions are used inside other contexts (function, item key, another macro, etc).

### Supported macro functions

Optional function parameters are indicated by `< >`.

| FUNCTION  |  |   |
|---|--|---|
| Description   | Parameters   | Supported for   |
| <b>fmtnum</b><br>(digits)<br>Number formatting to control the number of digits printed after the decimal point. | <b>digits</b> - the number of digits after decimal point. Valid range: 0-20 (since Zabbix 6.0.21). No trailing zeros will be produced. | {ITEM.VALUE}<br>{ITEM.LASTVALUE}<br>Expression macros |
| <b>fmttime</b><br>(format,<time_shift>)   |  |   |



---

**FUNCTION**


---

|   |  |   |
|---|--|---|
| Time formatting.  | <p><b>format</b> - mandatory format string, compatible with strftime function formatting</p> <p><b>time_shift</b> - the time shift applied to the time before formatting; should start with</p> <p>-&lt;N&gt;&lt;time_unit&gt; or</p> <p>+&lt;N&gt;&lt;time_unit&gt;, where</p> <p>N - the number of time units to add or subtract;</p> <p>time_unit - h (hour), d (day), w (week), M (month) or y (year).</p> <p>Since Zabbix 5.4, time_shift parameter supports multi-step time operations and may include /&lt;time_unit&gt; for shifting to the beginning of the time unit (/d - midnight, /w - 1st day of the week (Monday), /M - 1st day of the month, etc.). Examples:</p> <p>-1w - exactly 7 days back;</p> <p>-1w/w - Monday of the previous week;</p> <p>-1w/w+1d - Tuesday of the previous week.</p> <p>Note that time operations are calculated from left to right without priorities. For example, -1M/d+1h/w will be parsed as ((-1M/d)+1h)/w.</p> | {TIME}  |
| <p><b>iregsub</b><br/>(pat-tern,output)</p> <p>Substring extraction by a regular expression match (case insensitive).</p> | <p><b>pattern</b> - the regular expression to match</p> <p><b>output</b> - the output options. \1 - \9 placeholders are supported to capture groups. \0 returns the matched text.</p>  | <p>{ITEM.VALUE}</p> <p>{ITEM.LASTVALUE}</p> <p>Low-level discovery macros (except in low-level discovery rule filter)</p> |
| <p><b>regsub</b><br/>(pat-tern,output)</p> <p>Substring extraction by a regular expression match (case sensitive).</p>    | <p><b>pattern</b> - the regular expression to match</p> <p><b>output</b> - the output options. \1 - \9 placeholders are supported to capture groups. \0 returns the matched text.</p>  | <p>{ITEM.VALUE}</p> <p>{ITEM.LASTVALUE}</p> <p>Low-level discovery macros (except in low-level discovery rule filter)</p> |

---

If a function is used in a **supported location**, but applied to a macro not supporting macro functions, then the macro evaluates to 'UNKNOWN'.

If pattern is not a correct regular expression then the macro evaluates to 'UNKNOWN' (excluding low-level discovery macros where the function will be ignored in that case and macro will remain unexpanded)

Examples

The ways in which macro functions can be used to customize macro values is illustrated in the following examples on received values:

| Received value | Macro                    | Output |
|----------------|--------------------------|--------|
| 24.3413523     | {{ITEM.VALUE}.fmtnum(2)} | 24.34  |
| 24.3413523     | {{ITEM.VALUE}.fmtnum(0)} | 24     |

| Received value          | Macro  | Output      |
|-------------------------|--|-------------|
| 12:36:01                | {{TIME}.fmttime(%B)}   | October     |
| 12:36:01                | {{TIME}.fmttime(%d %B,-1M/M)}  | 1 September |
| 123Log line             | {{ITEM.VALUE}.regsub("[0-9]+", Problem))}  | Problem     |
| 123 Log line            | {{ITEM.VALUE}.regsub("^([0-9]+)"Problem "Problem"))}   |             |
| 123 Log line            | {{ITEM.VALUE}.regsub("^([0-9]+)"Problem ID: 123 Problem ID: \1)}                                       |             |
| Log line                | {{ITEM.VALUE}.regsub(".*", "Problem ID: " "Problem ID: \1")}   |             |
| MySQL crashed errno 123 | {{ITEM.VALUE}.regsub("^(\w+).*?("[Problem ID: MySQL_123 " " Problem ID: \1_\2 ")}                      |             |
| 123 Log line            | {{ITEM.VALUE}.regsub("([1-9]+", *UNKNOWN* (invalid regular expression) "Problem ID: \1")}              |             |
| customername_1          | {{#IFALIAS}.regsub("(.*)_([0-9]+)"customername \1)}  |             |
| customername_1          | {{#IFALIAS}.regsub("(.*)_([0-9]+)"", \2)}  |             |
| customername_1          | {{#IFALIAS}.regsub("(.*)_([0-9]+)"{{#IFALIAS}.regsub("(.*)_([0-9]+", \1)} (invalid regular expression) |             |
| customername_1          | `\${MACRO}`:{{#IFALIAS}.regsub(`(``\${MACRO}`-9)`customername` \1)}"}                                  |             |
| customername_1          | `\${MACRO}`:{{#IFALIAS}.regsub(`(``\${MACRO}`-9)`\1)`", \2)}"}   |             |
| customername_1          | `\${MACRO}`:{{#IFALIAS}.regsub(`(``\${MACRO}`-9)`{{#IFALIAS}.regsub(`(``.*)_([0-9]+\`, \1)}"}          |             |
| customername_1          | `\${MACRO}`:{{#IFALIAS}.regsub(`(``\${MACRO}`-9)`\1)}"}  |             |
| customername_1          | `\${MACRO}`:{{#IFALIAS}.regsub(`(``\${MACRO}`-9)`customername` \1)}\`"}                                |             |
| customername_1          | `\${MACRO}`:{{#IFALIAS}.regsub(`(``\${MACRO}`-9)`\1)`\`, \2)}\`"}                                      |             |
| customername_1          | `\${MACRO}`:{{#IFALIAS}.regsub(`(``\${MACRO}`-9)`{{#IFALIAS}.regsub(`(``.*)_([0-9]+\`, \1)}\`"}        |             |
| customername_1          | `\${MACRO}`:{{#IFALIAS}.regsub(`(``\${MACRO}`-9)`\1)}\`"}  |             |

## Seeing full item values

Long values of resolved {ITEM.VALUE} and {ITEM.LASTVALUE} macros for text/log items are truncated to 20 characters in some frontend locations. To see the full values of these macros you may use macro functions, e.g.:

```
{{ITEM.VALUE}.regsub("(.*)", \1)}<br> {{ITEM.LASTVALUE}.regsub("(.*)", \1)}
```

See also: {ITEM.VALUE} and {ITEM.LASTVALUE} [macro details](#).

## 2 User macros

### Overview

User macros are supported in Zabbix for greater flexibility, in addition to the macros [supported](#) out-of-the-box.

User macros can be defined on global, template and host level. These macros have a special syntax:

```
`${MACRO}`
```

Zabbix resolves macros according to the following precedence:

1. host level macros (checked first)
2. macros defined for first level templates of the host (i.e., templates linked directly to the host), sorted by template ID
3. macros defined for second level templates of the host, sorted by template ID
4. macros defined for third level templates of the host, sorted by template ID, etc.
5. global macros (checked last)

In other words, if a macro does not exist for a host, Zabbix will try to find it in the host templates of increasing depth. If still not found, a global macro will be used, if exists.

**Warning:**

If a macro with the **same name** exists on multiple linked templates of the same level, the macro from the template with the lowest ID will be used. Thus having macros with the same name in multiple templates is a configuration risk.

If Zabbix is unable to find a macro, the macro will not be resolved.

**Attention:**

Macros (including user macros) are left unresolved in the Configuration section (for example, in the trigger list) by design to make complex configuration more transparent.

User macros can be used in:

- item key parameter
- item update intervals and flexible intervals
- trigger name and description
- trigger expression parameters and constants (see [examples](#))
- many other locations - see the [full list](#)

Common use cases of global and host macros

- use a global macro in several locations; then change the macro value and apply configuration changes to all locations with one click
- take advantage of templates with host-specific attributes: passwords, port numbers, file names, regular expressions, etc.

Configuration







To define user macros, go to the corresponding location in the frontend:

- for global macros, visit *Administration* → *General* → *Macros*
- for host and template level macros, open host or template properties and look for the *Macros* tab

**Note:**






If a user macro is used in items or triggers in a template, it is suggested to add that macro to the template even if it is defined on a global level. That way, if the macro type is *text* exporting the template to XML and importing it in another system will still allow it to work as expected. Values of secret macros are not **exported**.

A user macro has the following attributes:

| Macro  | Value   |   | Description  |
|--|---|---|--|
| <input type="text" value="{MYSQL_PASSWORD}"/>  | <input type="password" value="*****"/>               |  | <input type="text" value="description"/> |
| <input type="text" value="{MYSQL_USERNAME}"/>  | <input type="password" value="*****"/>               |  | <input type="text" value="description"/> |
| <input type="text" value="{SECRET_PASSWORD}"/> | <input type="text" value="path/to/secret:password"/> |  | <input type="text" value="description"/> |
| <input type="text" value="{SECRET_USERNAME}"/> | <input type="text" value="path/to/secret:username"/> |  | <input type="text" value="description"/> |
| <input type="text" value="{SNMP_COMMUNITY}"/>  | <input type="text" value="public"/>                  |  | <input type="text" value="description"/> |
| <input type="text" value="{WORKING_HOURS}"/>   | <input type="text" value="1-5,09:00-18:00"/>         |  | <input type="text" value="description"/> |

[Add](#)

| Parameter | Description   |
|-----------|---|
| Macro     | Macro name. The name must be wrapped in curly brackets and start with a dollar sign. Example: {\$FRONTEND_URL}. The following characters are allowed in the macro names: <b>A-Z</b> (uppercase only) , <b>0-9</b> , <b>_</b> , <b>.</b> |

| Parameter   | Description  |
|-------------|--|
| Value       | <p>Macro value. Three value types are supported:</p> <p><b>Text</b> (default) - plain-text value</p> <p><b>Secret text</b> - the value is masked with asterisks, which could be useful to protect sensitive information such as passwords or shared keys.</p> <p><b>Vault secret</b> - the value contains a reference path (as 'path:key', for example "secret/zabbix:password") to a <b>Vault secret</b></p> <p><i>Note</i> that while the value of a secret macro is hidden from sight, the value can be revealed through the use in items. For example, in an external script an 'echo' statement referencing a secret macro may be used to reveal the macro value to the frontend because Zabbix server has access to the real macro value.</p> <p>To select the value type click on the button at the end of the value input field:</p> <div>  icon indicates a text macro;         <br/>  icon indicates a secret text macro. Upon hovering, the value field transforms into a         <div> <div>Set new value</div>   button, which allows to enter a new value of the macro (to exit without saving a new value, click the backwards arrow (↶)).         </div> <br/>  icon indicates a secret Vault macro.       </div> <p>Maximum length of a user macro value is 2048 characters (255 characters in versions before 5.2.0).</p> |
| Description | Text field used to provide more information about this macro.  |

**Note:**

URLs that contain a secret macro will not work as the macro in them will be resolved as "\*\*\*\*\*".

**Attention:**

In trigger expressions user macros will resolve if referencing a parameter or constant. They will NOT resolve if referencing a host, item key, function, operator or another trigger expression. Secret macros cannot be used in trigger expressions.

## Examples

### Example 1

Use of host-level macro in the "Status of SSH daemon" item key:

```
net.tcp.service[ssh,{SSH_PORT}]
```

This item can be assigned to multiple hosts, providing that the value of **{SSH\_PORT}** is defined on those hosts.

### Example 2

Use of host-level macro in the "CPU load is too high" trigger:

```
last(/ca_001/system.cpu.load[,avg1])>{$MAX_CPULOAD}
```

Such a trigger would be created on the template, not edited in individual hosts.

**Note:**

If you want to use the amount of values as the function parameter (for example, **max(/host/key,#3)**), include hash mark in the macro definition like this: **SOME\_PERIOD => #3**

### Example 3

Use of two macros in the "CPU load is too high" trigger:

```
min(/ca_001/system.cpu.load[,avg1],{$CPULOAD_PERIOD})>{$MAX_CPULOAD}
```

Note that a macro can be used as a parameter of trigger function, in this example function **min()**.

#### Example 4

Synchronize the agent unavailability condition with the item update interval:

- define `{ $INTERVAL }` macro and use it in the item update interval;
- use `{ $INTERVAL }` as parameter of the agent unavailability trigger:

```
nodata(/ca_001/agent.ping,{ $INTERVAL })=1
```

#### Example 5

Centralize configuration of working hours:

- create a global `{ $WORKING_HOURS }` macro equal to 1-5, 09:00-18:00;
- use it in the *Working time* field in *Administration* → *General* → *GUI*;
- use it in the *When active* field in *Administration* → *Users* → *Media*;
- use it to set up more frequent item polling during working hours:

Update interval

| Custom intervals |            | Type | Interval  | Period   |
|------------------|------------|------|---|--|
| Flexible         | Scheduling |      | <input type="text" value="{ \$SHORT_INTERVAL }"/> | <input type="text" value="{ \$WORKING_HOURS }"/> |

- use it in the *Time period* action condition;
- adjust the working time in *Administration* → *General* → *Macros*, if needed.

#### Example 6

Use host prototype macro to configure items for discovered hosts:

- on a host prototype define user macro `{ $SNMPVALUE }` with `{ #SNMPVALUE }` **low-level discovery** macro as a value:

Host prototype macros **Inherited and host prototype macros**

| Macro  | Value  |
|--|--|
| <input type="text" value="{ \$SNMPVALUE }"/> | <input type="text" value="{ #SNMPVALUE }"/> <span>T ▾</span> |

Add

- assign *Generic SNMPv2* template to the host prototype;
- use `{ $SNMPVALUE }` in the *SNMP OID* field of *Generic SNMPv2* template items.

User macro context

See **user macros with context**.

### 3 User macros with context

#### Overview

An optional context can be used in **user macros**, allowing to override the default value with a context-specific one.

The context is appended to the macro name; the syntax depends on whether the context is a static text value:

```
{ $MACRO:"static text" }
```

or a regular expression:

```
{ $MACRO:regex:"regular expression" }
```

Note that a macro with regular expression context can only be defined in user macro configuration. If the `regex:` prefix is used elsewhere as user macro context, like in a trigger expression, it will be treated as static context.

Context quoting is optional (see also [important notes](#)).

Macro context examples:

| Example   | Description  |
|---|--|
| <code>{\$LOW_SPACE_LIMIT}</code>                        | User macro without context.  |
| <code>{\$LOW_SPACE_LIMIT:/tmp}</code>                   | User macro with context (static string).   |
| <code>{\$LOW_SPACE_LIMIT:regex:"~/tmp\$"}</code>        | User macro with context (regular expression). Same as <code>{\$LOW_SPACE_LIMIT:/tmp}</code> .            |
| <code>{\$LOW_SPACE_LIMIT:regex:"~/var/log/.*\$"}</code> | User macro with context (regular expression). Matches all strings prefixed with <code>/var/log/</code> . |

## Use cases

User macros with context can be defined to accomplish more flexible thresholds in trigger expressions (based on the values retrieved by low-level discovery). For example, you may define the following macros:

- `{$LOW_SPACE_LIMIT} = 10`
- `{$LOW_SPACE_LIMIT:/home} = 20`
- `{$LOW_SPACE_LIMIT:regex:"^[a-z]+$" = 30`

Then a low-level discovery macro may be used as macro context in a trigger prototype for mounted file system discovery:

```
last(/host/vfs.fs.size[{#FSNAME},pfree])<{$LOW_SPACE_LIMIT:"{#FSNAME}"}
```

After the discovery different low-space thresholds will apply in triggers depending on the discovered mount points or file system types. Problem events will be generated if:

- `/home` folder has less than 20% of free disk space
- folders that match the regexp pattern (like `/etc`, `/tmp` or `/var`) have less than 30% of free disk space
- folders that don't match the regexp pattern and are not `/home` have less than 10% of free disk space

## Important notes

- If more than one user macro with context exists, Zabbix will try to match the simple context macros first and then context macros with regular expressions in an undefined order.

### Warning:

Do not create different context macros matching the same string to avoid undefined behavior.

- If a macro with its context is not found on host, linked templates or globally, then the macro without context is searched for.
- Only low-level discovery macros are supported in the context. Any other macros are ignored and treated as plain text.

Technically, macro context is specified using rules similar to [item key](#) parameters, except macro context is not parsed as several parameters if there is a `,` character:

- Macro context must be quoted with `"` if the context contains a `}` character or starts with a `"` character. Quotes inside quoted context must be escaped with the `\` character.
- The `\` character itself is not escaped, which means it's impossible to have a quoted context ending with the `\` character - the macro `{$MACRO:"a:b\\c"}` is invalid.
- The leading spaces in context are ignored, the trailing spaces are not:
  - For example `{$MACRO:A}` is the same as `{$MACRO: A}`, but not `{$MACRO:A }`.
- All spaces before leading quotes and after trailing quotes are ignored, but all spaces inside quotes are not:
  - Macros `{$MACRO:"A"}`, `{$MACRO: "A"}`, `{$MACRO:"A" }` and `{$MACRO: "A" }` are the same, but macros `{$MACRO:"A" }` and `{$MACRO:" A "}` are not.

The following macros are all equivalent, because they have the same context: `{$MACRO:A}`, `{$MACRO: A}` and `{$MACRO:"A"}`. This is in contrast with item keys, where `'key[a]'`, `'key[ a]'` and `'key["a"]'` are the same semantically, but different for uniqueness purposes.

## 4 Low-level discovery macros

### Overview

There is a type of macro used within the [low-level discovery](#) (LLD) function:

{#MACRO}

It is a macro that is used in an LLD rule and returns real values of the file system name, network interface, SNMP OID, etc.

These macros can be used for creating item, trigger and graph *prototypes*. Then, when discovering real file systems, network interfaces etc., these macros are substituted with real values and are the basis for creating real items, triggers and graphs.

These macros are also used in creating host and host group *prototypes* in virtual machine **discovery**.

Some low-level discovery macros come "pre-packaged" with the LLD function in Zabbix - {#FSNAME}, {#FSTYPE}, {#IFNAME}, {#SNMPINDEX}, {#SNMPVALUE}. However, adhering to these names is not compulsory when creating a **custom** low-level discovery rule. Then you may use any other LLD macro name and refer to that name.

Supported locations

LLD macros can be used:

- in the low-level discovery rule filter
- for item prototypes in
  - name
  - key parameters
  - unit
  - update interval<sup>1</sup>
  - history storage period<sup>1</sup>
  - trend storage period<sup>1</sup>
  - item value preprocessing steps
  - SNMP OID
  - IPMI sensor field
  - calculated/aggregate item expression, in:
    - \* expression constants and function parameters
    - \* item key parameters
  - aggregate item filter conditions (host group name and tag name)
  - SSH script and Telnet script
  - database monitoring SQL query
  - JMX item endpoint field
  - description
  - HTTP agent URL field
  - HTTP agent HTTP query fields field
  - HTTP agent request body field
  - HTTP agent required status codes field
  - HTTP agent headers field key and value
  - HTTP agent HTTP authentication username field
  - HTTP agent HTTP authentication password field
  - HTTP agent HTTP proxy field
  - HTTP agent HTTP SSL certificate file field
  - HTTP agent HTTP SSL key file field
  - HTTP agent HTTP SSL key password field
  - HTTP agent HTTP timeout<sup>1</sup> field
  - tags
- for trigger prototypes in
  - name
  - operational data
  - expression (only in constants and function parameters)
  - URL
  - description
  - tags
- for graph prototypes in
  - name
- for host prototypes in
  - name
  - visible name
  - custom interface fields: IP, DNS, port, SNMP v1/v2 community, SNMP v3 context name, SNMP v3 security name, SNMP v3 authentication passphrase, SNMP v3 privacy passphrase
  - host group prototype name
  - host tag value
  - host macro value

- (see the [full list](#))

In all those places, except the low-level discovery rule filter, LLD macros can be used inside static user **macro context**.

Using macro functions

Macro functions are supported with low-level discovery macros (except in low-level discovery rule filter), allowing to extract a certain part of the macro value using a regular expression.

For example, you may want to extract the customer name and interface number from the following LLD macro for the purposes of event tagging:

```
{#IFALIAS}=customername_1
```

To do so, the `regsub` macro function can be used with the macro in the event tag value field of a trigger prototype:

| Tags      |   |                        |
|-----------|---|------------------------|
| Customer  | <code>{{#IFALIAS}.regsub("(.*)_([0-9]+)", \1)}</code> | <a href="#">Remove</a> |
| Interface | <code>{{#IFALIAS}.regsub("(.*)_([0-9]+)", \2)}</code> | <a href="#">Remove</a> |

Note that commas are not allowed in unquoted item **key parameters**, so the parameter containing a macro function has to be quoted. The backslash (\) character should be used to escape double quotes inside the parameter. Example:

```
net.if.in["{{#IFALIAS}.regsub(\"(.*)_([0-9]+)\", \1)}", bytes]
```

For more information on macro function syntax, see: [Macro functions](#)

Macro functions are supported in low-level discovery macros since Zabbix 4.0.

Footnotes

<sup>1</sup> In the fields marked with <sup>1</sup> a single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported.

## 5 Expression macros

Overview

Expression macros are useful for formula calculations. They are calculated by expanding all macros inside and evaluating the resulting expression.

Expression macros have a special syntax:

```
{?EXPRESSION}
```

The syntax in EXPRESSION is the same as in [trigger expressions](#) (see usage limitations below).

`{HOST.HOST<1-9>}` and `{ITEM.KEY<1-9>}` macros are supported inside expression macros. `{ITEM.KEY<1-9>}` macros are supported in expression macros since Zabbix 6.0.9.

Usage

In the following locations:

- graph names
- map element labels
- map shape labels
- map link labels

only a **single** function, from the following set: `avg`, `last`, `max`, `min`, is allowed as an expression macro, e.g.:

```
{?avg(/{HOST.HOST}/{ITEM.KEY},1h)}
```

Expressions such as `{?last(/host/item1)/last(/host/item2)}`, `{?count(/host/item1,5m)}` and `{?last(/host/item1)*10}` are incorrect in these locations.

However, in:

- trigger event names
- trigger-based notifications and commands
- problem update notifications and commands



**complex** expressions are allowed, e.g.:

```
{?trendavg(/host/item1,1M:now/M)/trendavg(/host/item1,1M:now/M-1y)*100}
```

**Note:**

When using expression macros in templates please do not specify the template name but rather use {HOST.HOST<N>}, because template names are not substituted with hosts during linkage. You can also omit host reference altogether for the first host, e.g. {?avg(/item1,1h)}

See also:

- [Supported macros](#) for a list of supported locations of the expression macro
- [Example](#) of using an expression macro in the event name

## 12 Users and user groups

### Overview

All users in Zabbix access the Zabbix application through the web-based frontend. Each user is assigned a unique login name and a password.

All user passwords are encrypted and stored in the Zabbix database. Users cannot use their user id and password to log directly into the UNIX server unless they have also been set up accordingly to UNIX. Communication between the web server and the user browser can be protected using SSL.

With a flexible [user permission schema](#) you can restrict and differentiate rights to:

- access administrative Zabbix frontend functions
- perform certain actions in the frontend
- access monitored hosts in hostgroups
- use specific API methods

### 1 Configuring a user

#### Overview

The initial Zabbix installation has two predefined users:

- *Admin* - a Zabbix [superuser](#) with full permissions;
- *guest* - a special Zabbix [user](#). The 'guest' user is disabled by default. If you add it to the Guests user group, you may log in with this user and access monitoring pages in Zabbix. (Note that, before Zabbix 6.0.28, automatic guest login was possible.) By default, 'guest' has no permissions on Zabbix objects.

To configure a new user:

- Go to *Administration* → *Users*
- Click on *Create user* (or on the user name to edit an existing user)
- Edit user attributes in the form

#### General attributes

The *User* tab contains general user attributes:

User
Media 1
Permissions

\* Username

Admin

Name

Zabbix

Last name

Administrator

\* Groups

Zabbix administrators x

type here to search

Select

Password

Change password

Language

English (en\_US) v

Time zone

System default: (UTC+02:00) Europe/Riga v

Theme

Blue v

Auto-login

☒

Auto-logout

☐ 15m

\* Refresh

30s

\* Rows per page

50

URL (after login)

All mandatory input fields are marked with a red asterisk.

| Parameter        | Description   |
|------------------|---|
| <i>Username</i>  | Unique username, used as the login name.  |
| <i>Name</i>      | User first name (optional).   |
| <i>Last name</i> | If not empty, visible in acknowledgment information and notification recipient information.   |
| <i>Groups</i>    | User last name (optional).  |
| <i>Password</i>  | If not empty, visible in acknowledgment information and notification recipient information.   |
| <i>Language</i>  | Select <b>user groups</b> the user belongs to. Starting with Zabbix 3.4.3 this field is auto-complete so starting to type the name of a user group will offer a dropdown of matching groups. Scroll down to select. Alternatively, click on <i>Select</i> to add groups. Click on 'x' to remove the selected. |
| <i>Time zone</i> | Adherence to user groups determines what host groups and hosts the user will have <b>access to</b> .  |
| <i>Theme</i>     | Two fields for entering the user password.  |
|                  | With an existing password, contains a <i>Password</i> button, clicking on which opens the password fields.  |
|                  | Note that passwords longer than 72 characters will be truncated.  |
|                  | Language of the Zabbix frontend.  |
|                  | The php gettext extension is required for the translations to work.   |
|                  | Select the time zone to override global <b>time zone</b> on user level or select <b>System default</b> to use global time zone settings.  |
|                  | Defines how the frontend looks like:  |
|                  | <b>System default</b> - use default system settings   |
|                  | <b>Blue</b> - standard blue theme   |
|                  | <b>Dark</b> - alternative dark theme  |
|                  | <b>High-contrast light</b> - light theme with high contrast   |
|                  | <b>High-contrast dark</b> - dark theme with high contrast   |

| Parameter                | Description  |
|--------------------------|--|
| <i>Auto-login</i>        | Mark this checkbox to make Zabbix remember the user and log the user in automatically for 30 days. Browser cookies are used for this.  |
| <i>Auto-logout</i>       | With this checkbox marked the user will be logged out automatically, after the set amount of seconds (minimum 90 seconds, maximum 1 day).<br><b>Time suffixes</b> are supported, e.g. 90s, 5m, 2h, 1d.<br>Note that this option will not work:<br>* If the "Show warning if Zabbix server is down" global configuration option is enabled and Zabbix frontend is kept open;<br>* When Monitoring menu pages perform background information refreshes;<br>* If logging in with the <i>Remember me for 30 days</i> option checked. |
| <i>Refresh</i>           | Set the refresh rate used for graphs, plain text data, etc. Can be set to 0 to disable.  |
| <i>Rows per page</i>     | You can determine how many rows per page will be displayed in lists.   |
| <i>URL (after login)</i> | You can make Zabbix transfer the user to a specific URL after successful login, for example, to Problems page.   |

## User media

The *Media* tab contains a listing of all media defined for the user. Media are used for sending notifications. Click on *Add* to assign media to the user.

See the **Media types** section for details on configuring user media.

## Permissions

The *Permissions* tab contains information on:

- The user role. Users cannot change their own role.
- The user type (User, Admin, Super Admin) that is defined in the role configuration.
- Host groups the user has access to. Users of type 'User' and 'Admin' do not have access to any host groups and hosts by default. To get the access they need to be included in user groups that have access to respective host groups and hosts.
- Access rights to sections and elements of Zabbix frontend, modules, and API methods. Elements to which access is allowed are displayed in green color. Light gray color means that access to the element is denied.
- Rights to perform certain actions. Actions that are allowed are displayed in green color. Light gray color means that a user does not have the rights to perform this action.

See the **User permissions** page for details.

## 2 Permissions

### Overview

You can differentiate user permissions in Zabbix by defining the respective user role. Then the unprivileged users need to be included in user groups that have access to host group data.

### User role

The user role defines which parts of UI, which API methods, and which actions are available to the user. The following roles are pre-defined in Zabbix:

| User type               | Description   |
|-------------------------|---|
| <i>Guest role</i>       | The user has access to the Monitoring, Inventory, and Reports menu sections, but without the rights to perform any actions.   |
| <i>User role</i>        | The user has access to the Monitoring, Inventory, and Reports menu sections. The user has no access to any resources by default. Any permissions to host groups must be explicitly assigned.              |
| <i>Admin role</i>       | The user has access to the Monitoring, Inventory, Reports and Configuration menu sections. The user has no access to any host groups by default. Any permissions to host groups must be explicitly given. |
| <i>Super Admin role</i> | The user has access to all menu sections. The user has a read-write access to all host groups. Permissions cannot be revoked by denying access to specific host groups.                                   |

**User roles** are configured in the *Administration→User roles* section. Super Admins can modify or delete pre-defined roles and create more roles with custom sets of permissions.

To assign a role to the user, go to the Permissions tab in the user configuration form, locate the *Role* field and select a role. Once a role is selected a list of associated permissions will be displayed below.

User
Media
Permissions

\* Role

Admin role

Select

User type
Admin

Permissions

|            |             |
|------------|-------------|
| Host group | Permissions |
| All groups | None        |

Permissions can be assigned for user groups only.

Access to UI elements

Monitoring
Dashboard
Problems
Hosts
Overview
Latest data
Maps
Discovery
Services

Inventory
Overview
Hosts

Reports
Availability report
Triggers top 100
Notifications
Scheduled reports

Configuration
Host groups
Templates
Hosts
Maintenance
Actions
Discovery
Services

Access to modules
No enabled modules found.

Access to API
Enabled

Access to actions

Create and edit dashboards
Create and edit maps
Create and edit maintenance

Add problem comments
Change severity
Acknowledge problems
Close problems
Execute scripts

Manage API tokens
Manage scheduled reports

Add
Cancel

#### Permissions to host groups

Access to any host data in Zabbix is granted to **user groups** on the host group level only.

That means that an individual user cannot be directly granted access to a host (or host group). It can only be granted access to a host by being part of a user group that is granted access to the host group that contains the host.

### 3 User groups

#### Overview

User groups allow to group users both for organizational purposes and for assigning permissions to data. Permissions to monitoring data of host groups are assigned to user groups, not individual users.

It may often make sense to separate what information is available for one group of users and what - for another. This can be

accomplished by grouping users and then assigning varied permissions to host groups.

A user can belong to any number of groups.

Configuration

To configure a user group:

- Go to *Administration* → *User groups*
- Click on *Create user group* (or on the group name to edit an existing group)
- Edit group attributes in the form

The **User group** tab contains general group attributes:

User groupPermissionsTag filter

\* Group name

Security specialists

Users

Admin (Zabbix Administrator) ×user (New User) ×

type here to search

Frontend access

System default

Enabled

☒

Debug mode

☐

Add

Cancel

All mandatory input fields are marked with a red asterisk.

| Parameter       | Description   |
|-----------------|---|
| Group name      | Unique group name.  |
| Users           | To add users to the group start typing the name of an existing user. When the dropdown with matching user names appears, scroll down to select.<br>Alternatively you may click the <i>Select</i> button to select users in a popup.   |
| Frontend access | How the users of the group are authenticated.<br><b>System default</b> - use default authentication method (set <b>globally</b> )<br><b>Internal</b> - use Zabbix internal authentication (even if LDAP authentication is used globally). Ignored if HTTP authentication is the global default.<br><b>LDAP</b> - use LDAP authentication (even if internal authentication is used globally). Ignored if HTTP authentication is the global default.<br><b>Disabled</b> - access to Zabbix frontend is forbidden for this group |
| Enabled         | Status of user group and group members.<br><i>Checked</i> - user group and users are enabled<br><i>Unchecked</i> - user group and users are disabled  |
| Debug mode      | Mark this checkbox to activate <b>debug mode</b> for the users.   |

The **Permissions** tab allows you to specify user group access to host group (and thereby host) data:

User group
Permissions
Tag filter

Permissions

| Host group                      | Permissions               |
|---------------------------------|---------------------------|
| All groups                      | None                      |
| Discovered hosts                | Read-write Read Deny None |
| Hypervisors                     | Read-write Read Deny None |
| Linux servers                   | Read-write Read Deny None |
| Templates (including subgroups) | Read-write Read Deny None |
| Templates/Server hardware       | Read-write Read Deny None |
| Templates/Virtualization        | Read-write Read Deny None |

Select
Read-write
Read
Deny
None

☐ Include subgroups

Add

Current permissions to host groups are displayed in the *Permissions* block.

If current permissions of the host group are inherited by all nested host groups, this is indicated after the host group name ("*including subgroups*"). Note that a *Super admin* user can enforce nested host groups to have the same level of permissions as the parent host group; this can be done in the host group *configuration* form.

You may change the level of access to a host group:

- **Read-write** - read-write access to a host group;
- **Read** - read-only access to a host group;
- **Deny** - access to a host group denied;
- **None** - no permissions are set.

Use the selection field below to select host groups and the level of access to them. This field is auto-complete so starting to type the name of a host group will offer a dropdown of matching host groups. If you wish to see all host groups, click on *Select*. If you wish to include nested host groups, mark the *Include subgroups* checkbox. Click on *Add* to add the selected host groups to the list of host group permissions.

#### Attention:

Adding a parent host group with the *Include subgroups* checkbox marked will override (and remove from the list) previously configured permissions of all related nested host groups. Adding a host group with *None* as the level of access selected will remove the host group from the list if the host group is already in the list.

The **Tag filter** tab allows you to set tag-based permissions for user groups to see problems filtered by tag name and its value:

User group
Permissions
Tag filter

Permissions

| Host group          | Tags           | Action |
|---------------------|----------------|--------|
| Templates/Databases | Service: MySQL | Remove |

Select
tag

☐ Include subgroups

Add

To select a host group to apply a tag filter for, click *Select* to get the complete list of existing host groups or start to type the name of a host group to get a dropdown of matching groups. If you want to apply tag filters to nested host groups, mark the *Include subgroups* checkbox.

Tag filter allows to separate the access to host group from the possibility to see problems.

For example, if a database administrator needs to see only "MySQL" database problems, it is required to create a user group for database administrators first, then specify "Service" tag name and "MySQL" value.

Templates/Databases X  
type here to search

Select

Service

MySQL

If "Service" tag name is specified and value field is left blank, corresponding user group will see all problems for selected host group with tag name "Service". If both tag name and value fields are left blank but host group selected, corresponding user group will see all problems for selected host group. Make sure a tag name and tag value are correctly specified otherwise a corresponding user group will not see any problems.

Let's review an example when a user is a member of several user groups selected. Filtering in this case will use OR condition for tags.

| User group A        |          |           | User group B        |          |           | Visible result<br>for a user<br>(member) of<br>both groups |
|---------------------|----------|-----------|---------------------|----------|-----------|--|
| Tag filter          |          |           | Tag filter          |          |           |  |
| Host group          | Tag name | Tag value | Host group          | Tag name | Tag value |  |
| Templates/Databases | Service  | MySQL     | Templates/Databases | Service  | Oracle    | Service:<br>MySQL or<br>Oracle<br>problems<br>visible      |
| Templates/Databases | blank    | blank     | Templates/Databases | Service  | Oracle    | All problems<br>visible                                    |
| not selected        | blank    | blank     | Templates/Databases | Service  | Oracle    | Service:Oracle<br>problems<br>visible                      |

**Attention:**  
Adding a filter (for example, all tags in a certain host group "Templates/Databases") results in not being able to see the problems of other host groups.

Host access from several user groups

A user may belong to any number of user groups. These groups may have different access permissions to hosts.

Therefore, it is important to know what hosts an unprivileged user will be able to access as a result. For example, let us consider how access to host **X** (in Hostgroup 1) will be affected in various situations for a user who is in user groups A and B.

- If Group A has only *Read* access to Hostgroup 1, but Group B *Read-write* access to Hostgroup 1, the user will get **Read-write** access to 'X'.

**Attention:**  
"Read-write" permissions have precedence over "Read" permissions starting with Zabbix 2.2.

- In the same scenario as above, if 'X' is simultaneously also in Hostgroup 2 that is **denied** to Group A or B, access to 'X' will be **unavailable**, despite a *Read-write* access to Hostgroup 1.
- If Group A has no permissions defined and Group B has a *Read-write* access to Hostgroup 1, the user will get **Read-write** access to 'X'.
- If Group A has *Deny* access to Hostgroup 1 and Group B has a *Read-write* access to Hostgroup 1, the user will get access to 'X' **denied**.

Other details

- An Admin level user with *Read-write* access to a host will not be able to link/unlink templates, if he has no access to the *Templates* group. With *Read* access to *Templates* group he will be able to link/unlink templates to the host, however, will not see any templates in the template list and will not be able to operate with templates in other places.

- An Admin level user with *Read* access to a host will not see the host in the configuration section host list; however, the host triggers will be accessible in IT service configuration.
- Any non-Super Admin user (including 'guest') can see network maps as long as the map is empty or has only images. When hosts, host groups or triggers are added to the map, permissions are respected.
- Zabbix server will not send notifications to users defined as action operation recipients if access to the concerned host is explicitly "denied".

### 13 Storage of secrets

#### Overview

It is possible to store some sensitive information secretly in HashiCorp Vault KV Secrets Engine - Version 2. Secrets can be saved for:

- user macro values
- database access credentials

Zabbix provides read-only access to the secrets in Vault, assuming that secrets are managed by someone else.

#### User macro values

It is possible to store user macro values secretly in Vault.

A "**Vault secret**" value of a user macro contains a reference path (as 'path:key', for example "secret/zabbix:password").

The following commands may be used to set the value for the path mentioned in example:

```
# Enable "secret/" mount point if not already enabled, note that "kv-v2" must be used
vault secrets enable -path=secret/ kv-v2
```

```
# Put new secret with key password under mount point "secret/" and path "secret/zabbix"
vault kv put secret/zabbix password=<password>
```

```
# Test that secret is successfully added
vault kv get secret/zabbix
```

```
# Finally test with Curl, note that "data" need to be manually added after mount point and "/v1" before the path
curl --header "X-Vault-Token: <VaultToken>" https://127.0.0.1:8200/v1/secret/data/zabbix
```

The secret value is retrieved by Zabbix server on every refresh of configuration data and is stored in configuration cache. The authentication token for a read-only access to the reference paths must be provided in server configuration ('VaultToken' parameter). If the macro value cannot be retrieved successfully the corresponding item using the value will turn unsupported.

It is also possible to trigger refresh of secret values from Vault, using a 'secrets\_reload' command line **option**.

Zabbix proxy never communicates with Vault to get any secrets other than database credentials. Secret values on Zabbix proxy are retrieved from Zabbix server on each configuration sync and stored in configuration cache the same way as on Zabbix server.

That means a Zabbix proxy cannot start data collection after a restart until it receives the configuration data update from Zabbix server for the first time. Encryption must be enabled between Zabbix server and proxy; otherwise a server warning message is logged.

#### Database credentials

It is supported to store database credentials used by Zabbix server, proxies and frontend secretly in Vault:

- Vault-related parameters for retrieving database credentials can be optionally entered in the frontend **installation wizard**.

Database credentials retrieved from Vault will be cached by the frontend. Note that the filesystem temporary file directory is used for database credential caching in frontend. You may use the ZBX\_DATA\_CACHE\_TTL **constant** to control how often the data cache is refreshed/invalidated.

- For server/proxy the VaultDBPath configuration parameter may be used to specify the path from where credentials for database will be retrieved by keys 'password' and 'username' (for example: secret/zabbix/database).

The following commands may be used to set the values for the path mentioned in example:

```
# Enable "secret/" mount point if not already enabled, note that "kv-v2" must be used
vault secrets enable -path=secret/ kv-v2
```



```
# Put new secrets with keys username and password under mount point "secret/" and path "secret/zabbix/data"
vault kv put secret/zabbix/database username=zabbix password=<password>

# Test that secret is successfully added
vault kv get secret/zabbix/database

# Finally test with Curl, note that "data" need to be manually added after mount point and "/v1" before the path
curl --header "X-Vault-Token: <VaultToken>" https://127.0.0.1:8200/v1/secret/data/zabbix/database
```

#### Configuration parameters

For Zabbix server/proxy new configuration parameters have been added for Vault authentication and retrieving database credentials:

- VaultToken - Vault authentication token (see Zabbix [server/proxy](#) configuration file for details)
- VaultURL - Vault server HTTP[S] URL
- VaultDBPath - Vault path from where credentials for database will be retrieved by keys 'password' and 'username' (for example: secret/zabbix/database)

Zabbix server and Zabbix proxy read the Vault-related configuration parameters from zabbix\_server.conf and zabbix\_proxy.conf upon startup.

Zabbix server and Zabbix proxy will additionally read "VAULT\_TOKEN" environment variable once during startup and unset it so that it would not be available through forked scripts; it is an error if both VaultToken and VAULT\_TOKEN contain value.

#### Note:

Forward slash and colon are reserved symbols. Forward slash can only be used to separate mount point from path (e.g. secret/zabbix where mount point is "secret" and "zabbix" is path) and, in case of Vault macros, colon can only be used to separate path from key. It is possible to URL-encode "/" and ":" if there is need to create mount point with name that is separated by forward slash (e.g. foo/bar/zabbix where mount point is "foo/bar" and path is "zabbix" as "foo%2Fbar/zabbix") and if mount point name or path needs to contain colon.

#### Configuring TLS

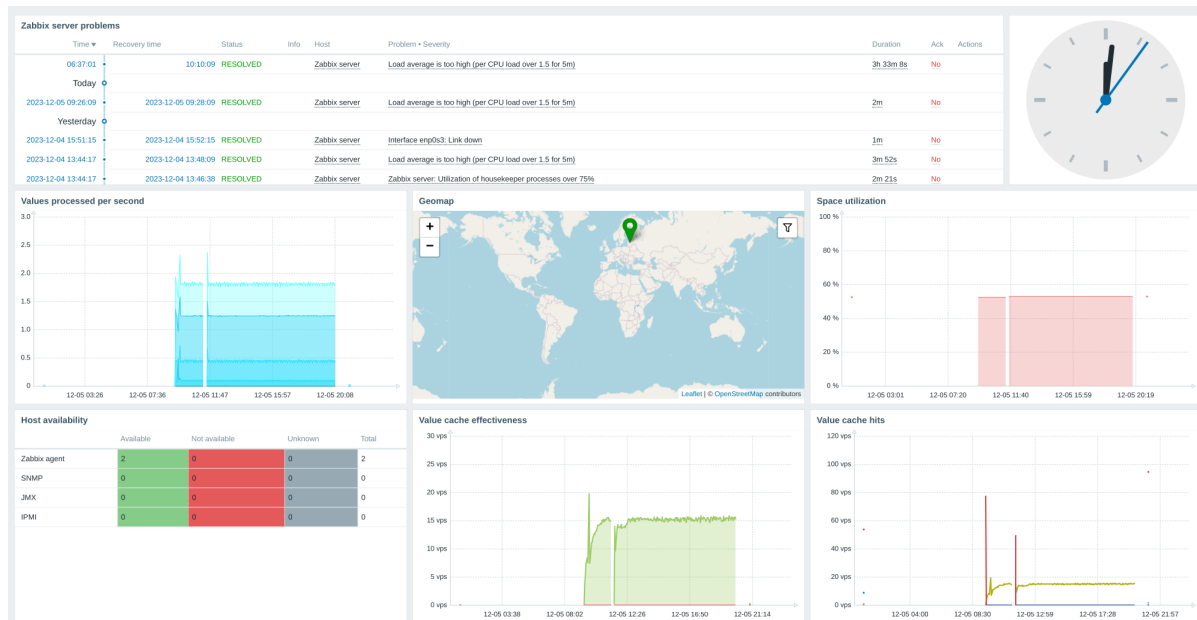
Certificate signed by a certificate authority (CA) should be added to the default CA store. Alternatively a custom CA store location can be specified using the SSLCALocation configuration parameter; note that in this case the certificate directory must be prepared using the openssl c\_rehash utility, for example configure SSLCALocation and copy "ca.pem" inside that directory, then run the following command:

```
c_rehash .
```

## 14 Scheduled reports

### Overview

With the *Scheduled reports* feature, you can set up a PDF version of a given dashboard to be sent to specified recipients at recurring intervals.



### Attention:

Currently the support of scheduled reports is experimental.

### Note:

For multi-page dashboards, only the first page is included in the PDF report.

### Pre-requisites:

- Zabbix web service must be installed and configured correctly to enable scheduled report generation - see [Setting up scheduled reports](#) for instructions.
- A user must have a **user role** of type *Admin* or *Super admin* with the following permissions:
  - *Scheduled reports* in the *Access to UI elements* block (to view reports)
  - *Manage scheduled reports* in the *Access to actions* block (to create/edit reports)

To create a scheduled report in Zabbix frontend, do the following:

- Go to: *Reports* → *Scheduled reports*
- Click *Create report* in the upper right corner of the screen
- Enter parameters of the report in the form

You can also create a report by opening an existing one, clicking the *Clone* button, and then saving it under a different name.

### Configuration

The *Scheduled reports* tab contains general report attributes.

All mandatory input fields are marked with a red asterisk.

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| Parameter            | Description   |
|----------------------|---|
| <i>Repeat on</i>     | Days of the week when the report will be sent. This field is available only if <i>Cycle</i> is set to "Weekly".   |
| <i>Start date</i>    | Date when regular report generation should be started.  |
| <i>End date</i>      | Date when regular report generation should be stopped.  |
| <i>Subject</i>       | Subject of the report email. Supports {TIME} macro.   |
| <i>Message</i>       | Body of the report email. Supports {TIME} macro.  |
| <i>Subscriptions</i> | <p>List of report recipients. By default, includes only the report owner. Any Zabbix user with configured email media may be specified as a report recipient.</p> <p>Click <i>Add user</i> or <i>Add user group</i> to add more recipients.</p> <p>Click the username to edit settings:</p> <p><i>Generate report by</i> - whether the report data should be generated based on the dashboard permissions of the current user or the recipient.</p> <p><i>Status</i> - select "Include" to send the report to the user or "Exclude" to prevent sending the report to this user. At least one user must have the "Include" status. The "Exclude" status can be used to exclude specific users from a user group that is included.</p> <p>Note that users with insufficient permissions (that is, users with a role based on the <i>Admin</i> user type who are not members of the same user group as the recipient or report owner) will see "Inaccessible user" or "Inaccessible user group" instead of the actual names in the fields <i>Recipient</i> and <i>Generate report by</i>; the fields <i>Status</i> and <i>Action</i> will be displayed as read-only.</p> |
| <i>Enabled</i>       | Report status. Clearing this checkbox will disable the report.  |
| <i>Description</i>   | An optional description of the report. This description is for internal use and will not be sent to report recipients.  |

#### Form buttons

Buttons at the bottom of the form allow to perform several operations.

|               |  |
|---------------|--|
| <b>Add</b>    | Add a report. This button is only available for new reports.                     |
| <b>Update</b> | Update the properties of a report.   |
| <b>Clone</b>  | Create another report based on the properties of the current report.             |
| <b>Test</b>   | Test if report configuration is correct by sending a report to the current user. |
| <b>Delete</b> | Delete the report.   |
| <b>Cancel</b> | Cancel the editing of report properties.   |

#### Testing

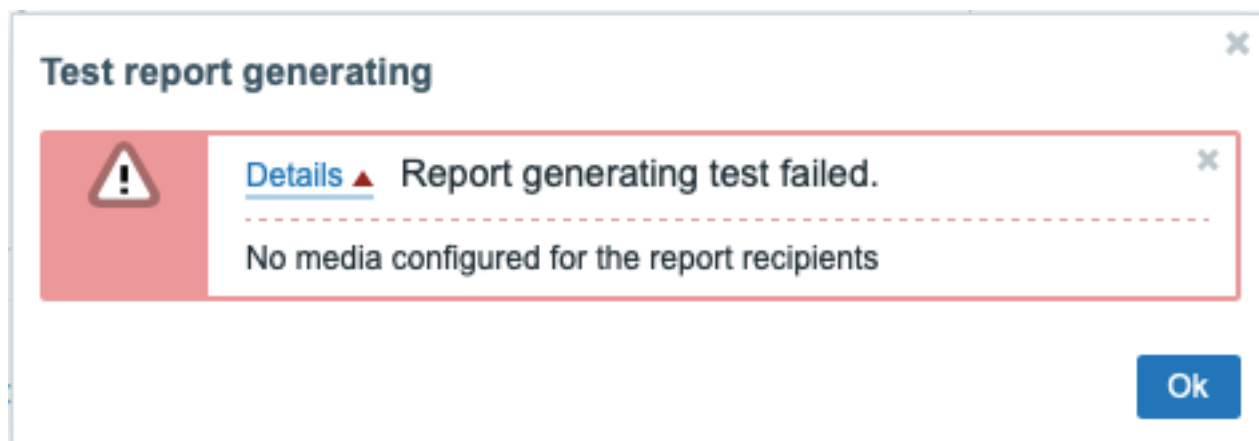
To test a report, click the *Test* button at the bottom of the report configuration form.

##### Note:

The *Test* button is not available if the report configuration form has been opened from the dashboard **action menu**.

If the configuration is correct, the test report is sent immediately to the current user. For test reports, subscribers and *Generate report by* user settings are ignored.

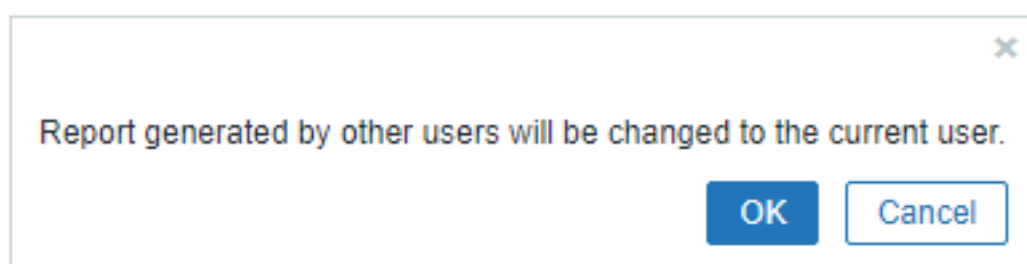
If the configuration is incorrect, an error message is displayed describing the possible cause.



#### Updating a report

To update an existing report, click the report name, make the required configuration changes, and then click the *Update* button.

If an existing report is updated by another user and this user changes the Dashboard, upon clicking the *Update* button, a warning message "Report generated by other users will be changed to the current user" will be displayed.



Clicking *OK* at this step will lead to the following changes:

- *Generate report by* settings will be updated to display the user who edited the report last (unless *Generate report by* is set to the recipient).
- Users that have been displayed as "Inaccessible user" or "Inaccessible user group" will be deleted from the list of report subscribers.

Clicking *Cancel* will close the configuration form and cancel the report update.

#### Cloning a report

To quickly clone an existing report, click the *Clone* button at the bottom of an existing report configuration form. When cloning a report created by another user, the current user becomes the owner of the new report.

Report settings will be copied to the new report configuration form with respect to user permissions:

- If the user who clones a report has no permissions to a dashboard, the *Dashboard* field will be cleared.
- If the user who clones a report has no permissions to some users or user groups in the *Subscriptions* list, inaccessible recipients will not be cloned.
- *Generate report by* settings will be updated to display the current user (unless *Generate report by* is set to the recipient).

Change the required settings and the report name, then click *Add*.

## 8 Service monitoring

**Overview** Service monitoring is a business-level monitoring that can be used to get an overview of the entire IT infrastructure service tree, identify weak places of the infrastructure, calculate SLA of various IT services, and check out other information at a higher level. Service monitoring focuses on the overall availability of a service instead of low-level details, such as the lack of disk space, high processor load, etc. Since Zabbix 6.0, service monitoring also provides functionality to find the root cause of a problem if a service is not performing as expected.

Service monitoring allows to create a hierarchy representation of monitored data.

A very simple service structure may look like:

```

Service
|
|-Workstations
| |
| |-Workstation1
| |
| |-Workstation2
|
|-Servers

```

Each node of the structure has attribute status. The status is calculated and propagated to upper levels according to the selected algorithm. The status of individual nodes is affected by the status of the mapped problems. Problem mapping is accomplished with [tagging](#).

Zabbix can send notifications or automatically execute a script on the Zabbix server in case service status change is detected. It is possible to define flexible rules whether a parent service should go into a 'Problem state' based on the statuses of child services. Services problem data can then be used to calculate SLA and send SLA reports based on the flexible set of conditions.

Service monitoring is configured in the Services menu, which consists of the following sections:

- [Services](#)

Services section allows to build a hierarchy of your monitored infrastructure by adding parent services, and then - child services to the parent services.

In addition to configuring service tree, this section provides an overview of the whole infrastructure and allows to quickly identify the problems that led to a service status change.

- [Service actions](#)

In this section you can configure service actions. Service actions are optional and allow to: - send a notification that a service is down; - execute a remote command on a Zabbix server upon a service status change; - send a recovery notification when a service is up again.

- [SLA](#)

In this section you can define service level agreements and set service level objectives for specific services.

- [SLA report](#)

In this section you can view SLA reports.

#### See also:

- SLA monitoring configuration [example](#)
- Notes about [upgrading services](#) from Zabbix versions below 6.0

## 1 Service tree

Service tree is configured in the *Services->Services* menu section. In the upper right corner, switch from [View](#) to the Edit mode.

Services
?
Create service
View
Edit

| <input type="checkbox"/> | Name                 | Status  | Root cause                             | Created at | Tags   |       |
|--------------------------|----------------------|---------|--|------------|--------|-------|
| <input type="checkbox"/> | Load balancer 5      | OK      |  | 2000-01-01 | SLA: 1 | + ↗ × |
| <input type="checkbox"/> | Video surveillance 2 | Warning | Hikvision camera: Error receiving data | 2000-01-01 | SLA: 2 | + ↗ × |

To [configure](#) a new service, click on the *Create service* button in the top right-hand corner.

To quickly add a child service, you can alternatively press a plus icon next to the parent service. This will open the same service configuration form, but the Parent services parameter will be pre-filled.

**Service configuration** In the **Service** tab, specify required service parameters:

Service

Service

Tags 2

Child services

\* Name

Connections

Parent services

Availability

×

type here to search

Select

Problem tags

| Name | Operation | Value      | Action |
|------|-----------|------------|--------|
| Type | Equals    | Connection | Remove |

Add

\* Sort order (0->999)

0

Status calculation rule

Most critical of child services

▼

Description

Created at

2000-01-01

☐ Advanced configuration

Update

Clone

Delete

Cancel

All mandatory input fields are marked with a red asterisk.

| Parameter                      | Description  |
|--------------------------------|--|
| <b>Name</b>                    | Service name.  |
| <b>Parent services</b>         | Parent services the service belongs to.<br>Leave this field empty if you are adding the service of highest level.<br>One service may have multiple parent services. In this case, it will be displayed in the service tree under each of the parent services.  |
| <b>Problem tags</b>            | Specify tags to map problem data to the service:<br><b>Equals</b> - include the specified tag names and values (case-sensitive)<br><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br>Tag name matching is always case-sensitive.  |
| <b>Sort order</b>              | Sort order for display, lowest comes first.  |
| <b>Status calculation rule</b> | Rule for calculating service status:<br><b>Most critical if all children have problems</b> - the most critical problem in the child services is used to color the service status, if all children have problems<br><b>Most critical of child services</b> - the most critical problem in the child services is used to color the service status<br><b>Set status to OK</b> - do not calculate service status |
| <b>Description</b>             | Mark the <i>Advanced configuration</i> checkbox below to configure additional status calculation rules.  |
| <b>Advanced configuration</b>  | Service description.<br>Mark the checkbox to access <b>advanced configuration</b> options.   |

Advanced configuration

☒ Advanced configuration

Additional rules

| Name  | Action                                      |
|---|---|
| Average - If at least 4 child services have Average status or above | <a href="#">Edit</a> <a href="#">Remove</a> |
| Disaster - If at least 3 child services have High status or above   | <a href="#">Edit</a> <a href="#">Remove</a> |
| <a href="#">Add</a>   |   |

Status propagation rule

As is

Weight

0

| Parameter                      | Description  |
|--------------------------------|--|
| <b>Additional rules</b>        | Click on <i>Add</i> to define additional status calculation rules.   |
| <i>Set status to</i>           | Set service status to either <i>OK</i> (default), <i>Not classified</i> , <i>Information</i> , <i>Warning</i> , <i>Average</i> , <i>High</i> or <i>Disaster</i> in case of a condition match.  |
| <i>Condition</i>               | <p>Select the condition for direct child services:</p> <p><b>if at least (N) child services have (Status) status or above</b></p> <p><b>if at least (N%) of child services have (Status) status or above</b></p> <p><b>if less than (N) child services have (Status) status or below</b></p> <p><b>if less than (N%) of child services have (Status) status or below</b></p> <p><b>if weight of child services with (Status) status or above is at least (W)</b></p> <p><b>if weight of child services with (Status) status or above is at least (N%)</b></p> <p><b>if weight of child services with (Status) status or below is less than (W)</b></p> <p><b>if weight of child services with (Status) status or below is less than (N%)</b></p> <p>If several conditions are specified and the situation matches more than one condition, the highest severity will be set.</p> |
| <i>N (W)</i>                   | Set the value of N or W (1-100000), or N% (1-100) in the condition.  |
| <i>Status</i>                  | Select the value of <i>Status</i> in the condition: <i>OK</i> (default), <i>Not classified</i> , <i>Information</i> , <i>Warning</i> , <i>Average</i> , <i>High</i> or <i>Disaster</i> .   |
| <b>Status propagation rule</b> | Rule for propagating the service status to the parent service:   |
| <b>rule</b>                    | <p><b>As is</b> - the status is propagated without change</p> <p><b>Increase by</b> - you may increase the propagated status by 1 to 5 severities</p> <p><b>Decrease by</b> - you may decrease the propagated status by 1 to 5 severities</p> <p><b>Ignore this service</b> - the status is not propagated to the parent service at all</p> <p><b>Fixed status</b> - the status is propagated statically, i.e. as always the same</p>  |
| <b>Weight</b>                  | Weight of the service (integer in the range from 0 (default) to 1000000).  |

#### Note:

Additional status calculation rules can only be used to increase severity level over the level calculated according to the main *Status calculation rule* parameter. If according to additional rules the status should be *Warning*, but according to the *Status calculation rule* the status is *Disaster* - the service will have status *Disaster*.

The **Tags** tab contains **service-level tags**. Service-level tags are used to identify a service. Tags of this type are not used to map problems to the service (for that, use **Problem tags** from the first tab).

The **Child services** tab allows to specify dependant services. Click on *Add* to add a service from the list of existing services. If you want to add a new child service, save this service first, then click on a plus icon next to the service that you have just created.

**Tags** There are two different types of tags in services:

- Service tags
- Problem tags

#### Service tags

Service tags are used to match services with **service actions** and **SLAs**. These tags are specified at the *Tags* service configuration tab. For mapping SLAs, *OR* logic is used: a service will be mapped to an SLA if it has at least one matching tag. In service actions, mapping rules are configurable and can use either *AND*, *OR*, or *AND/OR* logic.



| Name     | Value      |
|----------|------------|
| internal | monitoring |
| tag      | value      |

Add

### Problem tags

Problem tags are used to match problems and services. These tags are specified at the primary service configuration tab.

Only child services of the lowest hierarchy level may have problem tags defined and be directly correlated to problems. If problem tags match, the service status will change to the same status as the problem has. In case of several problems, a service will have the status of the most severe one. Status of a parent service is then calculated based on child services statuses according to Status calculation rules.

If several tags are specified, *AND* logic is used: a problem must have all tags specified in the service configuration to be mapped to the service.

| Name     | Operation | Value  | Action |
|----------|-----------|--------|--------|
| Database | Equals    | MySQL  | Remove |
| Type     | Contains  | Server | Remove |

Add

#### Note:

A problem in Zabbix inherits tags from the whole chain of templates, hosts, items, web scenarios, and triggers. Any of these tags can be used for matching problems to services.

### Example:

Problem *Web camera 3 is down* has tags `type:video` `surveillance`, `floor:1st` and `name:webcam 3` and status *Warning*

The service **Web camera 3** has the only problem tag specified: `name:webcam 3`

| Name | Operation | Value    | Action |
|------|-----------|----------|--------|
| name | Equals    | webcam 3 | Remove |

Add

Service status will change from *OK* to *Warning* when this problem is detected.

If the service **Web camera 3** had problem tags `name:webcam 3` and `floor:2nd`, its status would not be changed, when the problem is detected, because the conditions are only partially met.

#### Note:

The buttons described below are visible only when *Services* section is in the Edit mode.

### Modifying existing services

To edit an existing service, press the pencil icon next to the service.

To clone an existing service, press the pencil icon to open its configuration and then press Clone button. When a service is cloned, its parent links are preserved, while the child links are not.

To delete a service, press on the x icon next to it. When you delete a parent service, its child services will not be deleted and will move one level higher in the service tree (1st level children will get the same level as the deleted parent service).

Two buttons below the list of services offer some mass-editing options:

- *Mass update* - mass update service properties
- *Delete* - delete the services

To use these options, mark the checkboxes before the respective services, then click on the required button.

## 2 Service actions

**Overview** In this section you can view and configure service **actions**.

Service actions are useful if you want some operations taking place as a result of service status change (OK ↔ PROBLEM), for example:

- send message
- restart webserver

Service actions are functionally similar to other action types in Zabbix (for example, trigger actions).

**Configuration** To create a new service action, go to the *Service actions* subsection of the *Services* menu, then click on *Create action* in the upper right corner.

Service actions are configured in the same way as other types of actions in Zabbix. For more details, see configuring **actions**.

The key differences are:

- User access to service actions depends on access rights to services granted by user's **role**.
- Service actions support different set of **conditions**.

**Conditions** The following conditions can be used in service actions:

| Condition type           | Supported operators                                      | Description   |
|--------------------------|--|---|
| <i>Service</i>           | equals<br>does not equal                                 | Specify a service or a service to exclude.<br><b>equals</b> - event belongs to this service.<br><b>does not equal</b> - event does not belong to this service.<br>Specifying a parent service implicitly selects all child services. To specify the parent service only, all nested services have to be additionally set with the <b>does not equal</b> operator.   |
| <i>Service name</i>      | contains<br>does not contain                             | Specify a string in the service name or a string to exclude.<br><b>contains</b> - event is generated by a service, containing this string in the name.<br><b>does not contain</b> - this string cannot be found in the service name.  |
| <i>Service tag name</i>  | equals<br>does not equal<br>contains<br>does not contain | Specify an event tag or an event tag to exclude. Service event tags can be defined in the service configuration section <i>Tags</i> .<br><b>equals</b> - event has this tag<br><b>does not equal</b> - event does not have this tag<br><b>contains</b> - event has a tag containing this string<br><b>does not contain</b> - event does not have a tag containing this string.  |
| <i>Service tag value</i> | equals<br>does not equal<br>contains<br>does not contain | Specify an event tag and value combination or a tag and value combination to exclude. Service event tags can be defined in the service configuration section <i>Tags</i> .<br><b>equals</b> - event has this tag and value<br><b>does not equal</b> - event does not have this tag and value<br><b>contains</b> - event has a tag and value containing these strings<br><b>does not contain</b> - event does not have a tag and value containing these strings. |

### Attention:

Make sure to define **message templates** for Service actions in the *Administration->Media types* menu. Otherwise, the notifications will not be sent.

3 SLA

**Overview** Once the **services** are created, you can start monitoring whether their performance is on track with service level agreement (SLA).

*Services->SLA* menu section allows to configure SLAs for various services. An SLA in Zabbix defines service level objective (SLO), expected uptime schedule and planned downtimes.

SLAs and services are matched by **service tags**. The same SLA may be applied to multiple services - performance will be measured for each matching service separately. A single service may have multiple SLAs assigned - data for each of the SLAs will be displayed separately.

In SLA reports Zabbix provides Service level indicator (SLI) data, which measures real service availability. Whether a service meets the SLA targets is determined by comparing SLO (expected availability in %) with SLI (real-life availability in %).

**Configuration** To create a new SLA, click on the *Create SLA* button.

The **SLA** tab allows to specify general SLA parameters.

New SLA

SLA

Excluded downtimes

\*

Name

SLA:1

\*

SLO

99.9

%

Reporting period

Daily

Weekly

Monthly

Quarterly

Annually

Time zone

System default: (UTC+00:00) UTC

Schedule

24x7

Custom

\*

Effective date

2000-01-01

\*

Service tags

Name

Operation

Value

Action

SLA

Equals

1

Remove

Add

Description

Enabled

☒

Add

Cancel

| Parameter        | Description  |
|------------------|--|
| Name             | Enter the SLA name.  |
| SLO              | Enter the service level objective (SLO) as percentage.   |
| Reporting period | Selecting the period will affect what periods are used in the <b>SLA report</b> - <i>daily, weekly, monthly, quarterly, or annually</i> .  |
| Time zone        | Select the SLA time zone.  |
| Schedule         | Select the SLA schedule - 24x7 or custom.  |
| Effective date   | Select the date of starting SLA calculation.   |
| Service tags     | Add service tags to identify the services towards which this SLA should be applied.<br><b>Name</b> - service tag name, must be exact match, case-sensitive.<br><b>Operation</b> - select <i>Equals</i> if the tag value must match exactly (case-sensitive) or <i>Contains</i> if part of the tag value must match (case-insensitive).<br><b>Value</b> - service tag value to search for according to selected operation.<br>The SLA is applied to a service, if at least one service tag matches. |
| Description      | Add a description for the SLA.   |

565

| Parameter      | Description                                      |
|----------------|--|
| <i>Enabled</i> | Mark the checkbox to enable the SLA calculation. |

The **Excluded downtimes** tab allows to specify downtimes that are excluded from the SLA calculation.

New SLA

SLA
Excluded downtimes 1

Excluded downtimes

| Start time       | Duration | Name        | Action                                      |
|------------------|----------|-------------|---|
| 2022-02-01 02:00 | 3h       | Maintenance | <a href="#">Edit</a> <a href="#">Remove</a> |

[Add](#)

Add
Cancel

Click on *Add* to configure excluded downtimes, then enter the period name, start date and duration.

**SLA reports** How a service performs compared to an SLA is visible in the **SLA report**. SLA reports can be viewed:

- from the *SLA* section by clicking on the SLA report hyperlink;
- from the *Services* section by clicking on the SLA name in the info tab;
- in the Dashboard **widget SLA report**.

Once an SLA is configured, the *Info* tab in the services section will also display some information about service performance.

## 4 Setup example

**Overview** This section describes a simple setup for monitoring Zabbix high availability cluster as a service.

**Pre-requisites** Prior to configuring service monitoring, you need to have the hosts configured:

- *HA node 1* with at least one trigger and a tag (preferably set on a trigger level) **component:HA node 1**
- *HA node 2* with at least one trigger and a tag (preferably set on a trigger level) **component:HA node 2**

**Service tree** The next step is to build the service tree. In this example, the infrastructure is very basic and consists of three services: *Zabbix cluster* (parent) and two child services *Zabbix server node 1* and *Zabbix server node 2*.

```

Zabbix cluster
|
|- Zabbix server node 1
|- Zabbix server node 2

```

At the Services page, turn on *Edit* mode and press Create service:

Create service
View
Edit

In the service configuration window, enter name *Zabbix cluster* and mark the checkbox *Advanced configuration*.

## New service

? X

Service **Tags** Child services

\* Name

Parent services

Problem tags

| Name                             | Operation                             | Value                              | Action                 |
|----------------------------------|---------------------------------------|------------------------------------|------------------------|
| <input type="text" value="tag"/> | <input type="text" value="Equals"/> ▼ | <input type="text" value="value"/> | <a href="#">Remove</a> |
| <a href="#">Add</a>              |                                       |                                    |                        |

\* Sort order (0->999)

Status calculation rule ⓘ  ▼

Description

☒ Advanced configuration

Additional rules

| Name                | Action |
|---------------------|--------|
| <a href="#">Add</a> |        |

Status propagation rule  ▼

Weight

Configure additional rule:

## New additional rule

X

Set status to  ▼

Condition  ▼

N

Status  ▼

Zabbix cluster will have two child services - one for each of the HA nodes. If both HA nodes have problems of at least *Warning* status, parent service status should be set to *Disaster*. To achieve this, additional rule should be configured as:

- Set status to: Disaster
- Condition: If at least N child services have Status status or above
- N: 2
- Status: Warning

Switch to the *Tags* tab and add a tag `Zabbix:server`. This tag will be used later for service actions and SLA reports.

## New service

? X

Service **Tags 1** Child services

Tags

| Name                | Value  | Action                 |
|---------------------|--------|------------------------|
| Zabbix              | server | <a href="#">Remove</a> |
| <a href="#">Add</a> |        |                        |

Add

Cancel

Save the new service.

To add a child service, press on the plus icon next to the Zabbix cluster service (the icon is visible only in *Edit* mode).

| <input type="checkbox"/> Name           | Status | Root cause | Created at | Tags           |       |
|---|--------|------------|------------|----------------|-------|
| <input type="checkbox"/> Zabbix cluster | OK     |            | 2022-05-10 | Zabbix: server | + ↗ ✕ |

Displaying 1 of 1 found

In the service configuration window, enter name *Zabbix server node 1*. Note that the Parent services parameter is already pre-filled with *Zabbix cluster*.

Availability of this service is affected by problems on the host *HA node 1*, marked with `component:HA node 1 problem` tag. In the Problem tags parameter, enter:

- Name: component
- Operation: Equals
- Value: HA node 1

## New service

? X

Service **Tags** Child services

\* Name Zabbix server node 1

Parent services

Zabbix cluster ✕  
type here to search

Select

Problem tags

| Name                | Operation | Value     | Action                 |
|---------------------|-----------|-----------|------------------------|
| component           | Equals    | HA node 1 | <a href="#">Remove</a> |
| <a href="#">Add</a> |           |           |                        |

\* Sort order (0->999)

0

Status calculation rule ⓘ

Most critical of child services

Description

☐ Advanced configuration

Add

Cancel

Switch to the *Tags* tab and add a service tag: `Zabbix server:node 1`. This tag will be used later for service actions and SLA reports.

Service **Tags 1** Child services

| Tags | Name          | Value  | Action |
|------|---------------|--------|--------|
|      | Zabbix server | node 1 | Remove |
|      | Add           |        |        |

Add

Cancel

Save the new service.

Create another child service of Zabbix cluster with name "Zabbix server node 2".

Set the Problem tags as:

- Name: component
- Operation: Equals
- Value: HA node 2

Switch to the *Tags* tab and add a service tag: Zabbix server:node 2.

Save the new service.

**SLA** In this example, expected Zabbix cluster performance is 100% excluding semi-annual one hour maintenance period.

First, you need to add a new service level agreement.

Go to the *Services->SLA* menu section and press Create SLA. Enter name *Zabbix cluster performance* and set the SLO to 100%.

The service Zabbix cluster has a service tag Zabbix:server. To use this SLA for measuring performance of Zabbix cluster, in the *Service tags* parameter, specify:

- Name: Zabbix
- Operation: Equals
- Value: server

## New SLA

? X

### SLA Excluded downtimes

\* Name

\* SLO  %

Reporting period Daily Weekly Monthly Quarterly Annually

Time zone

Schedule 24x7 Custom

\* Effective date

\* Service tags

| Name                                | Operation                           | Value                               | Action                 |
|-------------------------------------|-------------------------------------|-------------------------------------|------------------------|
| <input type="text" value="Zabbix"/> | <input type="text" value="Equals"/> | <input type="text" value="server"/> | <a href="#">Remove</a> |

[Add](#)

Description

[Add](#) [Cancel](#)

In a real-life setup, you can also update desired reporting period, time zone and start date or change the schedule from 24/7 to custom. For this example, the default settings are sufficient.

Switch to the *Excluded downtimes* tab and add downtimes for scheduled maintenance periods to exclude these periods from SLA calculation. In the Excluded downtimes section press the Add link, enter downtime name, planned start time and duration.

## New SLA

? X

### SLA Excluded downtimes 2

Excluded downtimes

| Start time       | Duration | Name            | Action                                      |
|------------------|----------|-----------------|---|
| 2022-01-03 08:00 | 1h       | Maintenance Jan | <a href="#">Edit</a> <a href="#">Remove</a> |
| 2022-07-06 16:00 | 1h       | Maintenance Jul | <a href="#">Edit</a> <a href="#">Remove</a> |

[Add](#)

[Add](#) [Cancel](#)

Press Add to save the new SLA.

Switch to the SLA reports section to view the SLA report for Zabbix cluster.

| Year | SLO  | SLI | Uptime  | Downtime | Error budget |
|------|------|-----|---------|----------|--------------|
| 2022 | 100% | 100 | 36m 53s | 0        | 0            |

The SLA info can also be checked in the *Services* section.



[All services](#) / [Zabbix cluster](#)

## Zabbix cluster

Parent services:

Status: OK

SLA: [Zabbix cluster performance: 100](#) ?

Tags: Zabbix: server

| Name                                 | Status | Re |
|--------------------------------------|--------|----|
| <a href="#">Zabbix server node 1</a> | OK     |    |
| <a href="#">Zabbix server node 2</a> | OK     |    |

## 9 Web monitoring

**Overview** With Zabbix you can check several availability aspects of web sites.

### Attention:

To perform web monitoring Zabbix server must be initially **configured** with cURL (libcurl) support.

To activate web monitoring you need to define web scenarios. A web scenario consists of one or several HTTP requests or "steps". The steps are periodically executed by Zabbix server in a pre-defined order. If a host is monitored by proxy, the steps are executed by the proxy.

Web scenarios are attached to hosts/templates in the same way as items, triggers, etc. That means that web scenarios can also be created on a template level and then applied to multiple hosts in one move.

The following information is collected in any web scenario:

- average download speed per second for all steps of whole scenario
- number of the step that failed
- last error message

The following information is collected in any web scenario step:

- download speed per second
- response time
- response code

For more details, see [web monitoring items](#).

Data collected from executing web scenarios is kept in the database. The data is automatically used for graphs, triggers and notifications.

Zabbix can also check if a retrieved HTML page contains a pre-defined string. It can execute a simulated login and follow a path of simulated mouse clicks on the page.

Zabbix web monitoring supports both HTTP and HTTPS. When running a web scenario, Zabbix will optionally follow redirects (see option *Follow redirects* below). Maximum number of redirects is hard-coded to 10 (using cURL option [CURLOPT\\_MAXREDIRS](#)). All cookies are preserved during the execution of a single scenario.

**Configuring a web scenario** To configure a web scenario:

- Go to: *Configuration* → *Hosts* (or *Templates*)
- Click on *Web* in the row of the host/template
- Click on *Create web scenario* to the right (or on the scenario name to edit an existing scenario)

- Enter parameters of the scenario in the form

The **Scenario** tab allows you to configure the general parameters of a web scenario.

Scenario
Steps
Tags
Authentication

\*

Name

Availability of example.com

\*

Update interval

1m

\*

Attempts

1

Agent

Zabbix

HTTP proxy

[protocol://][user[:password]@]proxy.example.com[:port]

Variables

Name

Value

name

⇒

value

Remove

Add

Headers

Name

Value

name

⇒

value

Remove

Add

Enabled

☒

Add

Cancel

All mandatory input fields are marked with a red asterisk.

Scenario parameters:

| Parameter              | Description   |
|------------------------|---|
| <i>Name</i>            | Unique scenario name.<br><b>User macros</b> are supported. <i>Note</i> that if user macros are used, these macros will be left unresolved in <b>web monitoring item</b> names.  |
| <i>Update interval</i> | How often the scenario will be executed.<br><b>Time suffixes</b> are supported, e.g. 30s, 1m, 2h, 1d.<br><b>User macros</b> are supported. <i>Note</i> that if a user macro is used and its value is changed (e.g. 5m → 30s), the next check will be executed according to the previous value (farther in the future with the example values).  |
| <i>Attempts</i>        | The number of attempts for executing web scenario steps. In case of network problems (timeout, no connectivity, etc) Zabbix can repeat executing a step several times. The figure set will equally affect each step of the scenario. Up to 10 attempts can be specified, default value is 1.<br><i>Note:</i> Zabbix will not repeat a step because of a wrong response code or the mismatch of a required string. |
| <i>Agent</i>           | Select a client agent.<br>Zabbix will pretend to be the selected browser. This is useful when a website returns different content for different browsers.<br>User macros can be used in this field.   |

| Parameter         | Description   |
|-------------------|---|
| <i>HTTP proxy</i> | <p>You can specify an HTTP proxy to use, using the format <code>[protocol://] [username[:password]@]proxy.example.com[:port]</code>. This sets the <a href="#">CURLOPT_PROXY</a> cURL option.</p> <p>The optional <code>protocol://</code> prefix may be used to specify alternative proxy protocols (the protocol prefix support was added in cURL 7.21.7). With no protocol specified, the proxy will be treated as an HTTP proxy.</p> <p>By default, 1080 port will be used.</p> <p>If specified, the proxy will overwrite proxy related environment variables like <code>http_proxy</code>, <code>HTTPS_PROXY</code>. If not specified, the proxy will not overwrite proxy-related environment variables. The entered value is passed on "as is", no sanity checking takes place.</p> <p>You may also enter a SOCKS proxy address. If you specify the wrong protocol, the connection will fail and the item will become unsupported.</p> <p><i>Note</i> that only simple authentication is supported with HTTP proxy.</p> <p>User macros can be used in this field.</p>   |
| <i>Variables</i>  | <p>Variables that may be used in scenario steps (URL, post variables). They have the following format:</p> <pre>{macro1}=value1 {macro2}=value2 {macro3}=regex:&lt;regular expression&gt;</pre> <p>For example:</p> <pre>{username}=Alexei {password}=kj3h5kj34bd {hostid}=regex:hostid is ([0-9]+)</pre> <p>The macros can then be referenced in the steps as <code>{username}</code>, <code>{password}</code> and <code>{hostid}</code>. Zabbix will automatically replace them with actual values. Note that variables with <code>regex:</code> need one step to get the value of the regular expression so the extracted value can only be applied to the step after.</p> <p>If the value part starts with <code>regex:</code> then the part after it is treated as a regular expression that searches the web page and, if found, stores the match in the variable. At least one subgroup must be present so that the matched value can be extracted.</p> <p>User macros and <code>{HOST.*}</code> <b>macros</b> are supported.</p> <p>Variables are automatically URL-encoded when used in query fields or form data for post variables, but must be URL-encoded manually when used in raw post or directly in URL.</p> |
| <i>Headers</i>    | <p>HTTP Headers are used when performing a request. Default and custom headers can be used. Headers will be assigned using default settings depending on the Agent type selected from a drop-down list on a scenario level, and will be applied to all the steps, unless they are custom defined on a step level.</p> <p><b>It should be noted that defining the header on a step level automatically discards all the previously defined headers, except for a default header that is assigned by selecting the 'User-Agent' from a drop-down list on a scenario level.</b></p> <p>However, even the 'User-Agent' default header can be overridden by specifying it on a step level. To unset the header on a scenario level, the header should be named and attributed with no value on a step level.</p> <p>Headers should be listed using the same syntax as they would appear in the HTTP protocol, optionally using some additional features supported by the <a href="#">CURLOPT_HTTPHEADER</a> cURL option.</p> <p>For example:</p> <pre>Accept-Charset=utf-8 Accept-Language=en-US Content-Type=application/xml; charset=utf-8</pre> <p>User macros and <code>{HOST.*}</code> <b>macros</b> are supported.</p>       |
| <i>Enabled</i>    | <p>The scenario is active if this box is checked, otherwise - disabled.</p>   |

Note that when editing an existing scenario, two extra buttons are available in the form:

|  |   |
|--|---|
| <a href="#">Clone</a>                    | Create another scenario based on the properties of the existing one.  |
| <a href="#">Clear history and trends</a> | Delete history and trend data for the scenario. This will make the server perform the scenario immediately after deleting the data. |

**Note:**

If *HTTP proxy* field is left empty, another way for using an HTTP proxy is to set proxy related environment variables.

For HTTP checks - set the **http\_proxy** environment variable for the Zabbix server user. For example, `http_proxy=http://proxy_ip:proxy_port`.

For HTTPS checks - set the **HTTPS\_PROXY** environment variable. For example, `HTTPS_PROXY=http://proxy_ip:proxy_port`. More details are available by running a shell command: `# man curl`.

The **Steps** tab allows you to configure the web scenario steps. To add a web scenario step, click on *Add* in the *Steps* block.

Scenario

Steps 2

Tags

Authentication

\* Steps

|   | Name                 | Timeout | URL                          | Required | Status |
|---|----------------------|---------|------------------------------|----------|--------|
| ⋮ | 1: Site availability | 15s     | http://www.example.com       |          | 200    |
| ⋮ | 2: About             | 15s     | http://www.example.com/about |          | 200    |
| ⋮ | <a href="#">Add</a>  |         |                              |          |        |

**Note:**

Secret **user macros** must not be used in URLs as they will resolve to "\*\*\*\*\*".

### Step of web scenario

| * Name | Site availability |
|--------|-------------------|
|--------|-------------------|

|       |                        |       |
|-------|------------------------|-------|
| * URL | http://www.example.com | Parse |
|-------|------------------------|-------|

Query fields

| Name   | Value                                |                        |
|--|--------------------------------------|------------------------|
| <div><div></div><div></div><div></div><div></div><div></div></div> <input type="text" value="name"/> | ⇒ <input type="text" value="value"/> | <a href="#">Remove</a> |
| <a href="#">Add</a>  |                                      |                        |

|           |           |          |
|-----------|-----------|----------|
| Post type | Form data | Raw data |
|-----------|-----------|----------|

Post fields

| Name                              | Value                              |                        |
|-----------------------------------|------------------------------------|------------------------|
| <input type="text" value="name"/> | <input type="text" value="value"/> | <a href="#">Remove</a> |
| <a href="#">Add</a>               |                                    |                        |

Variables

Name

Value

Add

Remove

Headers

Name

⋮

name

⇒

Value

value

Remove

Add

Follow redirects ☒

|               |      |         |                  |
|---------------|------|---------|------------------|
| Retrieve mode | Body | Headers | Body and headers |
|---------------|------|---------|------------------|

|           |     |
|-----------|-----|
| * Timeout | 15s |
|-----------|-----|

|                 |         |
|-----------------|---------|
| Required string | pattern |
|-----------------|---------|

|                       |     |
|-----------------------|-----|
| Required status codes | 200 |
|-----------------------|-----|

Update Cancel

## Configuring steps

Step parameters:

| Parameter   | Description  |
|-------------|--|
| <i>Name</i> | Unique step name.<br><i>User macros</i> are supported. <i>Note</i> that if user macros are used, these macros will be left unresolved in <i>web monitoring item</i> names. |

| Parameter               | Description  |
|-------------------------|--|
| <i>URL</i>              | <p>URL to connect to and retrieve data. For example:<br/> <a href="https://www.example.com">https://www.example.com</a><br/> <a href="http://www.example.com/download">http://www.example.com/download</a></p> <p>Domain names can be specified in Unicode characters. They are automatically punycode-converted to ASCII when executing the web scenario step.</p> <p>The <i>Parse</i> button can be used to separate optional query fields (like ?name=Admin&amp;password=mypassword) from the URL, moving the attributes and values into <i>Query fields</i> for automatic URL-encoding.</p> <p>Variables can be used in the URL, using the {macro} syntax. Variables can be URL-encoded manually using a {{macro}}.urlencode() syntax.</p> <p>User macros and {HOST.*} <b>macros</b> are supported.</p> <p>Limited to 2048 characters.</p>   |
| <i>Query fields</i>     | <p>HTTP GET variables for the URL.</p> <p>Specified as attribute and value pairs.</p> <p>Values are URL-encoded automatically. Values from scenario variables, user macros or {HOST.*} macros are resolved and then URL-encoded automatically. Using a {{macro}}.urlencode() syntax will double URL-encode them.</p> <p>User macros and {HOST.*} <b>macros</b> are supported.</p>  |
| <i>Post</i>             | <p>HTTP POST variables.</p> <p>In <b>Form data</b> mode, specified as attribute and value pairs.</p> <p>Values are URL-encoded automatically. Values from scenario variables, user macros or {HOST.*} macros are resolved and then URL-encoded automatically.</p> <p>In <b>Raw data</b> mode, attributes/values are displayed on a single line and concatenated with a &amp; symbol.</p> <p>Raw values can be URL-encoded/decoded manually using a {{macro}}.urlencode() or {{macro}}.urldecode() syntax.</p> <p>For example: id=2345&amp;userid={user}</p> <p>If {user} is defined as a variable of the web scenario, it will be replaced by its value when the step is executed. If you wish to URL-encode the variable, substitute {user} with {{user}}.urlencode().</p> <p>User macros and {HOST.*} <b>macros</b> are supported.</p>   |
| <i>Variables</i>        | <p>Step-level variables that may be used for GET and POST functions.</p> <p>Specified as attribute and value pairs.</p> <p>Step-level variables override scenario-level variables or variables from the previous step.</p> <p>However, the value of a step-level variable only affects the step after (and not the current step).</p> <p>They have the following format:</p> <p><b>{macro}=value</b><br/> <b>{macro}=regex:&lt;regular expression&gt;</b></p> <p>For more information see variable description on the <b>scenario</b> level.</p> <p>Variables are automatically URL-encoded when used in query fields or form data for post variables, but must be URL-encoded manually when used in raw post or directly in URL.</p>  |
| <i>Headers</i>          | <p>Custom HTTP headers that will be sent when performing a request.</p> <p>Specified as attribute and value pairs.</p> <p>A header defined on a step level will be used for that particular step.</p> <p><b>It should be noted that defining the header on a step level automatically discards all the previously defined headers, except for a default header that is assigned by selecting the 'User-Agent' from a drop-down list on a scenario level.</b></p> <p>However, even the 'User-Agent' default header can be overridden by specifying it on a step level. For example, assigning the name to a header, but setting no value will unset the default header on a scenario level.</p> <p>User macros and {HOST.*} macros are supported.</p> <p>This sets the <a href="#">CURLOPT_HTTPHEADER</a> cURL option.</p> <p>Specifying custom headers is supported <i>starting with Zabbix 2.4</i>.</p> |
| <i>Follow redirects</i> | <p>Mark the checkbox to follow HTTP redirects.</p> <p>This sets the <a href="#">CURLOPT_FOLLOWLOCATION</a> cURL option.</p>  |
| <i>Retrieve mode</i>    | <p>Select the retrieve mode:</p> <p><b>Body</b> - retrieve only body from the HTTP response</p> <p><b>Headers</b> - retrieve only headers from the HTTP response</p> <p><b>Body and headers</b> - retrieve body and headers from the HTTP response</p>   |

| Parameter                    | Description   |
|------------------------------|---|
| <i>Timeout</i>               | Zabbix will not spend more than the set amount of time on processing the URL (from one second to maximum of 1 hour). Actually this parameter defines the maximum time for making connection to the URL and maximum time for performing an HTTP request. Therefore, Zabbix will not spend more than <b>2 x Timeout</b> seconds on the step.<br><b>Time suffixes</b> are supported, e.g. 30s, 1m, 1h. <b>User macros</b> are supported. |
| <i>Required string</i>       | Required regular expression pattern.<br>Unless retrieved content (HTML) matches the required pattern the step will fail. If empty, no check on required string is performed.<br>For example:<br>Homepage of Zabbix<br>Welcome.*admin<br><b>Note:</b> Referencing <b>regular expressions</b> created in the Zabbix frontend is not supported in this field.<br>User macros and {HOST:*} <b>macros</b> are supported.                   |
| <i>Required status codes</i> | List of expected HTTP status codes. If Zabbix gets a code which is not in the list, the step will fail. If empty, no check on status codes is performed.<br>For example: 200,201,210-299<br>User macros are supported.  |

**Note:**

Any changes in web scenario steps will only be saved when the whole scenario is saved.

See also a [real-life example](#) of how web monitoring steps can be configured.

**Configuring tags** The **Tags** tab allows to define scenario-level **tags**.

The screenshot shows the 'Tags' tab in the Zabbix web scenario configuration. At the top, there are tabs for 'Scenario', 'Steps 2', 'Tags 1', and 'Authentication'. Below the tabs, there are two buttons: 'Scenario tags' (active) and 'Inherited and scenario tags'. The main area contains a table with the following data:

| Name        | Value      | Action |
|-------------|------------|--------|
| Application | Web checks | Remove |

Below the table, there is an 'Add' button.

Tagging allows to filter web scenarios and web monitoring **items**.

**Configuring authentication** The **Authentication** tab allows you to configure scenario authentication options. A green dot next to the tab name indicates that some type of HTTP authentication is enabled.

Scenario
Steps 2
Tags 1
Authentication

HTTP authentication
None

SSL verify peer
☐

SSL verify host
☒

SSL certificate file

SSL key file

SSL key password

Authentication parameters:

| Parameter                   | Description   |
|-----------------------------|---|
| <i>Authentication</i>       | <p>Authentication options.</p> <p><b>None</b> - no authentication used.</p> <p><b>Basic</b> - basic authentication is used.</p> <p><b>NTLM</b> - NTLM (<a href="#">Windows NT LAN Manager</a>) authentication is used.</p> <p><b>Kerberos</b> - Kerberos authentication is used. See also: <a href="#">Configuring Kerberos with Zabbix</a>.</p> <p><b>Digest</b> - Digest authentication is used.</p> <p>Selecting an authentication method will provide two additional fields for entering a user name and password.</p>  |
| <i>SSL verify peer</i>      | <p>User macros can be used in user and password fields.</p> <p>Mark the checkbox to verify the SSL certificate of the web server.</p> <p>The server certificate will be automatically taken from system-wide certificate authority (CA) location. You can override the location of CA files using Zabbix server or proxy configuration parameter <a href="#">SSLCALocation</a>.</p>   |
| <i>SSL verify host</i>      | <p>This sets the <a href="#">CURLOPT_SSL_VERIFYHOST</a> cURL option.</p> <p>Mark the checkbox to verify that the <i>Common Name</i> field or the <i>Subject Alternate Name</i> field of the web server certificate matches.</p>   |
| <i>SSL certificate file</i> | <p>This sets the <a href="#">CURLOPT_SSL_VERIFYHOST</a> cURL option.</p> <p>Name of the SSL certificate file used for client authentication. The certificate file must be in PEM<sup>1</sup> format. If the certificate file contains also the private key, leave the <i>SSL key file</i> field empty. If the key is encrypted, specify the password in <i>SSL key password</i> field. The directory containing this file is specified by Zabbix server or proxy configuration parameter <a href="#">SSLCertLocation</a>.</p> <p>HOST.* macros and user macros can be used in this field.</p> |
| <i>SSL key file</i>         | <p>This sets the <a href="#">CURLOPT_SSLCERT</a> cURL option.</p> <p>Name of the SSL private key file used for client authentication. The private key file must be in PEM<sup>1</sup> format. The directory containing this file is specified by Zabbix server or proxy configuration parameter <a href="#">SSLKeyLocation</a>.</p> <p>HOST.* macros and user macros can be used in this field.</p>   |
| <i>SSL key password</i>     | <p>This sets the <a href="#">CURLOPT_SSLKEY</a> cURL option.</p> <p>SSL private key file password.</p> <p>User macros can be used in this field.</p> <p>This sets the <a href="#">CURLOPT_KEYPASSWD</a> cURL option.</p>  |

#### Attention:

[1] Zabbix supports certificate and private key files in PEM format only. In case you have your certificate and private key data in PKCS #12 format file (usually with extension \*.p12 or \*.pfx) you may generate the PEM file from it using the following commands:

```
openssl pkcs12 -in ssl-cert.p12 -clcerts -nokeys -out ssl-cert.pem
openssl pkcs12 -in ssl-cert.p12 -nocerts -nodes -out ssl-cert.key
```



**Note:**

Zabbix server picks up changes in certificates without a restart.

**Note:**

If you have client certificate and private key in a single file just specify it in a "SSL certificate file" field and leave "SSL key file" field empty. The certificate and key must still be in PEM format. Combining certificate and key is easy:

```
cat client.crt client.key > client.pem
```

**Display** To view web scenarios configured for a host, go to *Monitoring* → *Hosts*, locate the host in the list and click on the *Web* hyperlink in the last column. Click on the scenario name to get detailed information.

**Details of web scenario: Zabbix frontend**

An overview of web scenarios can also be displayed in *Monitoring* → *Dashboard* by a Web monitoring widget.

Recent results of the web scenario execution are available in the *Monitoring* → *Latest data* section.

**Extended monitoring** Sometimes it is necessary to log received HTML page content. This is especially useful if some web scenario step fails. Debug level 5 (trace) serves that purpose. This level can be set in *server* and *proxy* configuration files or using a runtime control option (-R log\_level\_increase="http poller,N", where N is the process number). The following examples demonstrate how extended monitoring can be started provided debug level 4 is already set:

```
# Increase log level of all http pollers:
```

```
zabbix_server -R log_level_increase="http poller"
```

```
# Increase log level of second http poller:  
zabbix_server -R log_level_increase="http poller,2"
```

If extended web monitoring is not required it can be stopped using the `-R log_level_decrease` option.

## 1 Web monitoring items

### Overview

Some new items are automatically added for monitoring when web scenarios are created.

All items inherit tags from the web scenario.

### Scenario items

As soon as a scenario is created, Zabbix automatically adds the following items for monitoring.

| Item  | Description   |
|---|---|
| <i>Download speed for scenario</i><br><Scenario>    | This item will collect information about the download speed (bytes per second) of the whole scenario, i.e. average for all steps.<br>Item key: <code>web.test.in[Scenario,,bps]</code><br>Type: <i>Numeric(float)</i>                                     |
| <i>Failed step of scenario</i><br><Scenario>        | This item will display the number of the step that failed on the scenario. If all steps are executed successfully, 0 is returned.<br>Item key: <code>web.test.fail[Scenario]</code><br>Type: <i>Numeric(unsigned)</i>                                     |
| <i>Last error message of scenario</i><br><Scenario> | This item returns the last error message text of the scenario. A new value is stored only if the scenario has a failed step. If all steps are ok, no new value is collected.<br>Item key: <code>web.test.error[Scenario]</code><br>Type: <i>Character</i> |

The actual scenario name will be used instead of "Scenario".

#### Note:

If the scenario name contains **user macros**, these macros will be left unresolved in web monitoring item names. <br><br>If the scenario name starts with a doublequote or contains a comma or a square bracket, it will be properly quoted in item keys. In other cases no additional quoting will be performed.

#### Note:

Web monitoring items are added with a 30 day history and a 90 day trend retention period.

These items can be used to create triggers and define notification conditions.

### Example 1

To create a "Web scenario failed" trigger, you can define a trigger expression:

```
last(/host/web.test.fail[Scenario])>0
```

Make sure to replace 'Scenario' with the real name of your scenario.

### Example 2

To create a "Web scenario failed" trigger with a useful problem description in the trigger name, you can define a trigger with name:

```
Web scenario "Scenario" failed: {ITEM.VALUE}
```

and trigger expression:

```
length(last(/host/web.test.error[Scenario]))>0 and last(/host/web.test.fail[Scenario])>0
```

Make sure to replace 'Scenario' with the real name of your scenario.

### Example 3

To create a "Web application is slow" trigger, you can define a trigger expression:

```
last(/host/web.test.in[Scenario,,bps])<10000
```

Make sure to replace 'Scenario' with the real name of your scenario.

#### Scenario step items

As soon as a step is created, Zabbix automatically adds the following items for monitoring.

| Item   | Description   |
|--|---|
| <i>Download speed for step &lt;Step&gt; of scenario &lt;Scenario&gt;</i> | This item will collect information about the download speed (bytes per second) of the step.<br>Item key: web.test.in[Scenario,Step,bps]<br>Type: <i>Numeric(float)</i>  |
| <i>Response time for step &lt;Step&gt; of scenario &lt;Scenario&gt;</i>  | This item will collect information about the response time of the step in seconds. Response time is counted from the beginning of the request until all information has been transferred.<br>Item key: web.test.time[Scenario,Step,resp]<br>Type: <i>Numeric(float)</i> |
| <i>Response code for step &lt;Step&gt; of scenario &lt;Scenario&gt;</i>  | This item will collect response codes of the step.<br>Item key: web.test.rspcode[Scenario,Step]<br>Type: <i>Numeric(unsigned)</i>   |

Actual scenario and step names will be used instead of "Scenario" and "Step" respectively.

#### Note:

Web monitoring items are added with a 30 day history and a 90 day trend retention period.

#### Note:

If scenario name starts with a doublequote or contains comma or square bracket, it will be properly quoted in item keys. In other cases no additional quoting will be performed.

These items can be used to create triggers and define notification conditions. For example, to create a "Zabbix GUI login is too slow" trigger, you can define a trigger expression:

```
last(/zabbix/web.test.time[ZABBIX GUI,Login,resp])>3
```

## 2 Real-life scenario

### Overview

This section presents a step-by-step real-life example of how web monitoring can be used.

Let's use Zabbix web monitoring to monitor the web interface of Zabbix. We want to know if it is available, provides the right content and how quickly it works. To do that we also must log in with our user name and password.

### Scenario

#### Step 1

Add a new web scenario.

We will add a scenario to monitor the web interface of Zabbix. The scenario will execute a number of steps.

Go to *Configuration* → *Hosts*, pick a host and click on *Web* in the row of that host. Then click on *Create web scenario*.

Scenario
Steps
Tags
Authentication

\*

Name

Zabbix frontend

\*

Update interval

1m

\*

Attempts

1

Agent

Zabbix

HTTP proxy

[protocol://][user[:password]@]proxy.example.com[:port]

Variables

| Name                |   | Value  |                        |
|---------------------|---|--------|------------------------|
| {password}          | ⇒ | zabbix | <a href="#">Remove</a> |
| {user}              | ⇒ | Admin  | <a href="#">Remove</a> |
| <a href="#">Add</a> |   |        |                        |

Headers

| Name                |   | Value |                        |
|---------------------|---|-------|------------------------|
| name                | ⇒ | value | <a href="#">Remove</a> |
| <a href="#">Add</a> |   |       |                        |

Enabled
☒

Add
Cancel

All mandatory input fields are marked with a red asterisk.

In the new scenario form we will name the scenario as *Zabbix frontend*. We will also create two variables: {user} and {password}. You may also want to add a new *Application:Zabbix frontend* tag in the Tags tab.

## Step 2

Define steps for the scenario.

Click on *Add* button in the *Steps* tab to add individual steps.

### Web scenario step 1

We start by checking that the first page responds correctly, returns with HTTP response code 200 and contains text "Zabbix SIA".



Step of web scenario

\* Name
Log in

\* URL
http://localhost/zabbix/index.php
Parse

Query fields

| Name | Value   |        |
|------|---------|--------|
| name | ⇒ value | Remove |

Add

Post type
Form data
Raw data

Post fields

| Name     | Value        |        |
|----------|--------------|--------|
| name     | ⇒ {user}     | Remove |
| password | ⇒ {password} | Remove |
| enter    | ⇒ Sign in    | Remove |

Add

Variables

| Name  | Value                                    |        |
|-------|--|--------|
| {sid} | ⇒ regex:name="csrf-token" content="([0-" | Remove |

Add

Headers

| Name | Value   |        |
|------|---------|--------|
| name | ⇒ value | Remove |

Add

Follow redirects
☒

Retrieve mode
Body
Headers
Body and headers

\* Timeout
15s

Required string

Required status codes
200

Update

Cancel

#### Attention:

Note that Zabbix frontend uses JavaScript redirect when logging in, thus first we must log in, and only in further steps we may check for logged-in features. Additionally, the login step must use full URL to **index.php** file.

Take note also of how we are getting the content of the {sid} variable (session ID) using a variable syntax with regular expression: `regex:name="csrf-token" content="([0-9a-z]{16})"`. This variable will be required in step 4.

Web scenario step 3

584

Being logged in, we should now verify the fact. To do so, we check for a string that is only visible when logged in - for example, **Administration**.

Step of web scenario

Name

Login check

URL

http://localhost/zabbix/index.php

Parse

Query fields

Name

Value

name

⇒

value

Remove

Add

Post type

Form data

Raw data

Post fields

Name

Value

name

⇒

value

Remove

Add

Variables

Name

Value

name

⇒

value

Remove

Add

Headers

Name

Value

name

⇒

value

Remove

Add

Follow redirects

☒

Retrieve mode

Body

Headers

Body and headers

Timeout

15s

Required string

Administration

Required status codes

200

Update

Cancel

#### Web scenario step 4

Now that we have verified that frontend is accessible and we can log in and retrieve logged-in content, we should also log out - otherwise Zabbix database will become polluted with lots and lots of open session records.







Scenario

Steps 5

Tags 1

Authentication

\* Steps

| Name            | Timeout | URL                               | Required       | Status |
|-----------------|---------|-----------------------------------|----------------|--------|
| 1: First page   | 15s     | http://localhost/zabbix/index.php | Zabbix SIA     | 200    |
| 2: Log in       | 15s     | http://localhost/zabbix/index.php |                | 200    |
| 3: Login check  | 15s     | http://localhost/zabbix/index.php | Administration | 200    |
| 4: Log out      | 15s     | http://localhost/zabbix/index.php |                | 200    |
| 5: Logout check | 15s     | http://localhost/zabbix/index.php | Username       | 200    |
| Add             |         |                                   |                |        |

### Step 3

Save the finished web monitoring scenario.

The scenario will be added to a host. To view web scenario information go to *Monitoring* → *Hosts*, locate the host in the list and click on the Web hyperlink in the last column.

| Web monitoring          |                 |                 |            |        |                            |
|-------------------------|-----------------|-----------------|------------|--------|----------------------------|
| Host                    | Name            | Number of steps | Last check | Status | Tags                       |
| New host                | Zabbix frontend | 5               | 46s        | OK     | Application: Zabbix fro... |
| Displaying 1 of 1 found |                 |                 |            |        |                            |

Click on the scenario name to see more detailed statistics:

Details of web scenario: Zabbix frontend



10 Virtual machine monitoring

**Overview** Support of monitoring VMware environments is available in Zabbix starting with version 2.2.0.

Zabbix can use low-level discovery rules to automatically discover VMware hypervisors and virtual machines and create hosts to monitor them, based on pre-defined host prototypes.

The default dataset in Zabbix offers several ready-to-use templates for monitoring VMware vCenter or ESX hypervisor.

The minimum required VMware vCenter or vSphere version is 5.1.

**Details** The virtual machine monitoring is done in two steps. First, virtual machine data is gathered by *vmware collector* Zabbix processes. Those processes obtain necessary information from VMware web services over the SOAP protocol, pre-process it and store into Zabbix server shared memory. Then, this data is retrieved by pollers using Zabbix simple check **VMware keys**.

Starting with Zabbix version 2.4.4 the collected data is divided into 2 types: VMware configuration data and VMware performance counter data. Both types are collected independently by *vmware collectors*. Because of this it is recommended to enable more collectors than the monitored VMware services. Otherwise retrieval of VMware performance counter statistics might be delayed by the retrieval of VMware configuration data (which takes a while for large installations).

Currently only datastore, network interface and disk device statistics and custom performance counter items are based on the VMware performance counter information.

**Configuration** For virtual machine monitoring to work, Zabbix should be **compiled** with the `--with-libxml2` and `--with-libcurl` compilation options.

The following configuration file options can be used to tune the Virtual machine monitoring:

- **StartVMwareCollectors** - the number of pre-forked vmware collector instances.  
This value depends on the number of VMware services you are going to monitor. For the most cases this should be:  
 $servicenum < StartVMwareCollectors < (servicenum * 2)$   
where *servicenum* is the number of VMware services. E. g. if you have 1 VMware service to monitor set `StartVMwareCollectors` to 2, if you have 3 VMware services, set it to 5. Note that in most cases this value should not be less than 2 and should not be 2 times greater than the number of VMware services that you monitor. Also keep in mind that this value also depends on your VMware environment size and *VMwareFrequency* and *VMwarePerfFrequency* configuration parameters (see below).
- **VMwareCacheSize**
- **VMwareFrequency**
- **VMwarePerfFrequency**
- **VMwareTimeout**

For more details, see the configuration file pages for Zabbix **server** and **proxy**.

**Attention:**

To support datastore capacity metrics Zabbix requires VMware configuration `vpzd.stats.maxQueryMetrics` parameter to be at least 64. See also the VMware knowledge base [article](#).

**Discovery** Zabbix can use a low-level discovery rule to automatically discover VMware hypervisors and virtual machines.

Discovery rule
Preprocessing
LLD macros
Filters
Overrides

\* Name

Type

Simple check

\* Key

\* Host interface

192.0.2.255:10050

User name

Password

\* Update interval

Custom intervals

| Type     | Interval   | Period    |
|----------|------------|-----------|
| Flexible | Scheduling | 50s       |
|          |            | 1-7,00:00 |

Add

\* Keep lost resources period

Description

Discovery of hypervisors.

Enabled

☒

Add

Test

Cancel

All mandatory input fields are marked with a red asterisk.

The discovery rule key in the above screenshot is `vmware.hv.discovery[{$VMWARE.URL}]`.

**Host prototypes** Host prototypes can be created with the low-level discovery rule. When virtual machines are discovered, these prototypes are the basis for generating real hosts. Prototypes, before becoming discovered, cannot have their own items and triggers, other than those from the linked templates.

Discovery rules

|                                   |                             |                   |                    |                  |                   |               |
|-----------------------------------|-----------------------------|-------------------|--------------------|------------------|-------------------|---------------|
| All templates / VMware            | Items 3                     | Triggers          | Graphs             | Dashboards       | Discovery rules 4 | Web scenarios |
| <input type="checkbox"/> Template | Name ▲                      | Items             | Triggers           | Graphs           | Hosts             |               |
| <input type="checkbox"/> VMware   | Discover VMware clusters    | Item prototypes 1 | Trigger prototypes | Graph prototypes | Host prototypes   |               |
| <input type="checkbox"/> VMware   | Discover VMware datastores  | Item prototypes 4 | Trigger prototypes | Graph prototypes | Host prototypes   |               |
| <input type="checkbox"/> VMware   | Discover VMware hypervisors | Item prototypes   | Trigger prototypes | Graph prototypes | Host prototypes 1 |               |
| <input type="checkbox"/> VMware   | Discover VMware VMs         | Item prototypes   | Trigger prototypes | Graph prototypes | Host prototypes 1 |               |

In order for hosts created from a prototype to have unique host names, the *Host name* field must contain at least one **low-level discovery macro**.

Since Zabbix 5.2, discovered hosts may be configured with custom interfaces or inherit the IP of a host the discovery rule belongs to (default). To add one or more custom interface, switch the *Interface* selector from *Inherit* to *Custom* mode, then press [Add](#).

and select the required interface type from the drop-down menu that appears. All supported types of interfaces can be defined for a host prototype: Zabbix agent, SNMP, JMX, IPMI. Interface fields support low-level discovery macros and **user macros**. If several custom interfaces are specified - use the *Default* column to specify the primary interface.

Notes:

- If *Custom* is selected, but no interfaces have been specified the hosts will be created without interfaces.
- If *Inherit* is selected for a host prototype that belongs to a template, discovered hosts will inherit the interface of a host to which the template is linked to.

**Warning:**  
A host will not be created, if the host interface contains incorrect data

HostIPMITagsMacrosInventoryEncryption

\* Host name

{#VM.UUID}

Visible name

{#VM.NAME}

Templates

type here to search

\* Groups

type here to search

Group prototypes

{#MACRO}

Add

Interfaces

InheritCustom

| Type  | IP address   | DNS name    |
|-------|--------------|-------------|
| Agent | 198.51.100.0 |             |
| Agent |              | {#LLDMACRO} |

Add

Monitored by proxy

(no proxy)

Create enabled

☒

Discover

☒

LLD macros can also be used for the visible name, host group prototype fields, tag values, or values of host prototype user macros.

Other options that can be specified for a host prototype are:

- Linkage to existing host groups
- Template linkage
- Encryption

If *Create enabled* is checked, the host will be added in an enabled state. If unchecked, the host will be added, but in a disabled state.

If *Discover* is checked (default), the host will be created. If unchecked, the host will not be created, unless this setting is overridden in the **discovery rule**. This functionality provides additional flexibility when creating discovery rules.

Discovered hosts are prefixed with the name of the discovery rule that created them, in the host list. Discovered hosts can be manually deleted. Discovered hosts will also be automatically deleted, based on the *Keep lost resources period (in days)* value of

the discovery rule. Most of the configuration options are read-only, except for enabling/disabling the host and host inventory.

**Note:**

Zabbix does not support nested host prototypes, i.e. host prototypes are not supported on hosts that are discovered by low-level discovery rule.

**Ready-to-use templates** The default dataset in Zabbix offers several ready-to-use templates for monitoring VMware vCenter or directly ESX hypervisor. These templates contain pre-configured LLD rules as well as a number of built-in checks for monitoring virtual installations.

Templates for VMware vCenter and ESX hypervisor monitoring:

- *VMware* - uses UUID data for corresponding macros;
- *VMware FQDN* - uses FQDN data for corresponding macros.

**Note:**

In order for the *VMware FQDN* template to work correctly each monitored VM should have a unique OS name compliant with FQDN rules and VMware Tools/Open Virtual Machine Tools must be installed on every machine. If these conditions are met, it is recommended to use *VMware FQDN* template. The creation of *VMware FQDN* template became possible after introducing the ability to create hosts with custom interfaces in Zabbix 5.2.

A classic *VMware* template is still available and can be used if FQDN requirements cannot be met. Please keep in mind, that the *VMware* template has a known issue. Hosts for discovered virtual machines will be created with the names saved in the vCenter (for example, VM1, VM2, etc.). If Zabbix agent active is installed on these hosts later with autoregistration enabled, the autoregistration process will read host names as they have been registered upon launch (for example, vm1.example.com, vm2.example.com, etc.) and create new hosts since no name matches have been found. As a result there will be two duplicate hosts for each machine with different names.

Please note:

- The template *VMware Hypervisor* can be manually linked to a host as well as used in discovery;
- The template *VMware Guest* should not be manually linked to a host and can only be used in discovery.

## ≡ Templates

| <input type="checkbox"/> Name ▲                          | Hosts | Items    | Triggers   | Graphs | Dashboards | Discovery   | Web |
|--|-------|----------|------------|--------|------------|-------------|-----|
| <input type="checkbox"/> VMware                          | Hosts | Items 3  | Triggers   | Graphs | Dashboards | Discovery 4 | Web |
| <input type="checkbox"/> VMware FQDN                     | Hosts | Items 3  | Triggers   | Graphs | Dashboards | Discovery 4 | Web |
| <input type="checkbox"/> VMware Guest                    | Hosts | Items 27 | Triggers 1 | Graphs | Dashboards | Discovery 3 | Web |
| <input type="checkbox"/> VMware Hypervisor               | Hosts | Items 26 | Triggers 4 | Graphs | Dashboards | Discovery 2 | Web |
| <input type="checkbox"/> VMWare SD-WAN VeloCloud by HTTP | Hosts | Items 7  | Triggers 5 | Graphs | Dashboards | Discovery 5 | Web |

**Host configuration** To use VMware simple checks the host must have the following user macros defined:

- **{ \$VMWARE.URL }** - VMware service (vCenter or ESX hypervisor) SDK URL (<https://servername/sdk>)
- **{ \$VMWARE.USERNAME }** - VMware service user name
- **{ \$VMWARE.PASSWORD }** - VMware service { \$VMWARE.USERNAME } user password

**Example** The following example demonstrates how to quickly setup VMware monitoring on Zabbix:

- make sure that Zabbix server has been compiled with the required options (`--with-libxml2` and `--with-libcurl`): the log file must contain "VMware monitoring: YES" during server startup.
- set the `StartVMwareCollectors` option in Zabbix server configuration file to 2 or more
- create a new host
- set the host macros required for VMware authentication:

Host macros

Inherited and host macros

| Macro      | Value      |   |
|------------|------------|---|
| {PASSWORD} | *****      |  |
| {URL}      | <url>      | T   |
| {USERNAME} | <username> | T   |

[Add](#)

- link the host to the VMware service template:

Linked templates

Name

Action

Link new templates

VMware X

type here to search

- click on the **Add** button to save the host.

**Extended logging** The data gathered by VMware collector can be logged for detailed debugging using debug level 5. This level can be set in **server** and **proxy** configuration files or using a runtime control option (`-R log_level_increase="vmware collector,N"`, where N is a process number). The following examples demonstrate how extended logging can be started provided debug level 4 is already set:

```
# Increase log level of all vmware collectors:
zabbix_server -R log_level_increase="vmware collector"
```

```
# Increase log level of second vmware collector:
zabbix_server -R log_level_increase="vmware collector,2"
```

If extended logging of VMware collector data is not required it can be stopped using the `-R log_level_decrease` option.

## Troubleshooting

- In case of unavailable metrics, please make sure if they are not made unavailable or turned off by default in recent VMware vSphere versions or if some limits are not placed on performance-metric database queries. See [ZBX-12094](#) for additional details.
- In case of `'config.vpxd.stats.maxQueryMetrics' is invalid or exceeds the maximum number of characters permitted**` error, add a `config.vpxd.stats.maxQueryMetrics` parameter to the vCenter Server settings. The value of this parameter should be the same as the value of `maxQuerysize` in VMware's `web.xml`. See this VMware knowledge base [article](#) for details.

## 1 Virtual machine discovery key fields

The following table lists fields returned by virtual machine related discovery keys.



---

**Item key**

---

| Description  | Field   | Retrieved content  |
|--|---|--|
| vmware.cluster.discovery<br>Performs cluster discovery.  | {#CLUSTER.ID}<br>{#CLUSTER.NAME}  | Cluster identifier.<br>Cluster name.   |
| vmware.datastore.discovery<br>Performs datastore discovery.  | {#DATASTORE}<br>{#DATASTORE.EXTENT}   | Datastore name.<br>JSON object with an array of {instanceName:partitionId}.  |
| vmware.dc.discovery<br>Performs datacenter discovery.  | {#DATACENTER}<br><br>{#DATACENTERID}  | Datacenter name.<br><br>Datacenter ID.   |
| vmware.hv.discovery<br>Performs hypervisor discovery.  | {#HV.UUID}<br><br>{#HV.ID}<br>{#HV.NAME}<br>{#HV.NETNAME}<br>{#HV.IP}   | Unique hypervisor identifier.<br><br>Hypervisor identifier (HostSystem managed object name).<br>Hypervisor name.<br>Hypervisor network host name.<br>Hypervisor IP address, might be empty.<br>In case of an HA configuration with multiple net interfaces, the following selection priority for interface is observed:<br>- prefer the IP which shares the IP-subnet with the vCenter IP<br>- prefer the IP from IP-subnet with default gateway<br>- prefer the IP from interface with the lowest ID<br>This field is supported since Zabbix 5.2.2. |
|  | {#CLUSTER.NAME}<br>{#DATACENTER.NAME}<br>{#PARENT.NAME}   | Cluster name, might be empty.<br>Datacenter name.<br>Name of container that stores the hypervisor.<br>Supported since Zabbix 4.0.3.  |
|  | {#PARENT.TYPE}  | Type of container in which the hypervisor is stored. The values could be Datacenter, Folder, ClusterComputeResource, VMware, where 'VMware' stands for unknown container type.<br>Supported since Zabbix 4.0.3.  |
| vmware.hv.datastore.discovery<br>Performs hypervisor datastore discovery. Note that multiple hypervisors can use the same datastore. | {#DATASTORE}<br><br>{#MULTIPATH.COUNT}<br>{#MULTIPATH.PARTITION.COUNT}  | Datastore name.<br><br>Registered number of datastore paths.<br>Number of available disk partitions.   |
| vmware.vm.discovery<br>Performs virtual machine discovery.   | {#VM.UUID}<br><br>{#VM.ID}<br><br>{#VM.NAME}<br>{#HV.NAME}<br>{#DATACENTER.NAME}<br>{#CLUSTER.NAME}<br>{#VM.IP} | Unique virtual machine identifier.<br><br>Virtual machine identifier (VirtualMachine managed object name).<br>Virtual machine name.<br>Hypervisor name.<br>Datacenter name.<br>Cluster name, might be empty.<br>Virtual machine IP address, might be empty.<br>Supported since Zabbix 5.2.2.   |
|  | {#VM.DNS}   | Virtual machine DNS name, might be empty.<br>Supported since Zabbix 5.2.2.   |
|  | {#VM.GUESTFAMILY}   | Guest virtual machine OS family, might be empty.<br>Supported since Zabbix 5.2.2.  |
|  | {#VM.GUESTFULLNAME}   | Full guest virtual machine OS name, might be empty.<br>Supported since Zabbix 5.2.2.   |
|  | {#VM.FOLDER}  | The chain of virtual machine parent folders, can be used as value for nested groups; folder names are combined with "/". Might be empty.<br>Supported since Zabbix 5.4.2.  |

---

**Item key**

---

|   |             |                         |
|---|-------------|-------------------------|
| vmware.vm.net.if.discovery                            |             |                         |
| Performs virtual machine network interface discovery. | {#IFNAME}   | Network interface name. |
| vmware.vm.vfs.dev.discovery                           |             |                         |
| Performs virtual machine disk device discovery.       | {#DISKNAME} | Disk device name.       |
| vmware.vm.vfs.fs.discovery                            |             |                         |
| Performs virtual machine file system discovery.       | {#FSNAME}   | File system name.       |

---

## 11 Maintenance

**Overview** You can define maintenance periods for hosts and host groups in Zabbix.

Furthermore, it is possible to define maintenance only for a single trigger (or subset of triggers) by specifying trigger tags. In this case maintenance will be activated only for those triggers; all other triggers of the host or host group will not be in maintenance.

There are two maintenance types - with data collection and with no data collection.

During a maintenance "with data collection" triggers are processed as usual and events are created when required. However, problem escalations are paused for hosts/triggers in maintenance, if the *Pause operations for suppressed problems* option is checked in action configuration. In this case, escalation steps that may include sending notifications or remote commands will be ignored for as long as the maintenance period lasts. Note that problem recovery and update operations are not suppressed during maintenance, only escalations.

For example, if escalation steps are scheduled at 0, 30 and 60 minutes after a problem start, and there is a half-hour long maintenance lasting from 10 minutes to 40 minutes after a real problem arises, steps two and three will be executed a half-hour later, or at 60 minutes and 90 minutes (providing the problem still exists). Similarly, if a problem arises during the maintenance, the escalation will start after the maintenance.

To receive problem notifications during the maintenance normally (without delay), you have to uncheck the *Pause operations for suppressed problems* option in action configuration.

**Note:**

If at least one host (used in the trigger expression) is not in maintenance mode, Zabbix will send a problem notification.

Zabbix server must be running during maintenance. Timer processes are responsible for switching host status to/from maintenance at 0 seconds of every minute. Note that when a host enters maintenance, Zabbix server timer processes will read all open problems to check if it is required to suppress those. This may have a performance impact if there are many open problems. Zabbix server will also read all open problems upon startup, even if there are no maintenances configured at the time.

Note that the Zabbix server (or proxy) always collects data regardless of the maintenance type (including "no data" maintenance). The data is later ignored by the server if 'no data collection' is set.

When "no data" maintenance ends, triggers using `nodata()` function will not fire before the next check during the period they are checking.

If a log item is added while a host is in maintenance and the maintenance ends, only new logfile entries since the end of the maintenance will be gathered.

If a timestamped value is sent for a host that is in a "no data" maintenance type (e.g. using **Zabbix sender**) then this value will be dropped however it is possible to send a timestamped value in for an expired maintenance period and it will be accepted.

If maintenance period, hosts, groups or tags are changed by the user, the changes will only take effect after configuration cache synchronization.

**Attention:**


When creating a maintenance period, the **time zone** of the user who creates it is used. However, when recurring maintenance periods (*Daily*, *Weekly*, *Monthly*) are scheduled, the time zone of the Zabbix server is used. To ensure predictable behavior of recurring maintenance periods, it is required to use a common time zone for all parts of Zabbix.


**Configuration** To configure a maintenance period:

- Go to: *Configuration* → *Maintenance*
- Click on *Create maintenance period* (or on the name of an existing maintenance period)
- Enter maintenance parameters in the form

**\* Name**


Maintenance type ☒ With data collection ☐ No data collection

**\* Active since**  

**\* Active till**  

| Period type         | Schedule         | Period | Action                                      |
|---------------------|------------------|--------|---|
| One time only       | 2020-04-17 11:33 | 1y     | <a href="#">Edit</a> <a href="#">Remove</a> |
| <a href="#">Add</a> |                  |        |   |

**Host groups**

**Hosts** ☒ Server2 

**\* At least one host group or host must be selected.**

**Tags** ☒ And/Or ☐ Or

☒ Contains ☐ Equals  [Add](#)

**Description**

All mandatory input fields are marked with a red asterisk.

| Parameter               | Description  |
|-------------------------|--|
| <i>Name</i>             | Name of the maintenance period.  |
| <i>Maintenance type</i> | Two types of maintenance can be set:<br><b>With data collection</b> - data will be collected by the server during maintenance, triggers will be processed<br><b>No data collection</b> - data will not be collected by the server during maintenance |
| <i>Active since</i>     | The date and time when executing maintenance periods becomes active.<br><i>Note:</i> Setting this time alone does not activate a maintenance period; maintenance periods must be configured in <i>Periods</i> (see below).                           |
| <i>Active till</i>      | The date and time when executing maintenance periods stops being active.   |

| Parameter          | Description  |
|--------------------|--|
| <i>Periods</i>     | This block allows you to define the exact days and hours when the maintenance takes place.<br>Clicking on <a href="#">Add</a> opens a popup window with a flexible <i>Maintenance period</i> form where you can define maintenance schedule. See <a href="#">Maintenance periods</a> for a detailed description.   |
| <i>Host groups</i> | Select host groups that the maintenance will be activated for. The maintenance will be activated for all hosts from the specified host group(s). This field is auto-complete, so starting to type in it will display a dropdown of all available host groups.<br>Specifying a parent host group implicitly selects all nested host groups. Thus the maintenance will also be activated on hosts from nested groups.  |
| <i>Hosts</i>       | Select hosts that the maintenance will be activated for. This field is auto-complete, so starting to type in it will display a dropdown of all available hosts.  |
| <i>Tags</i>        | If maintenance tags are specified, maintenance for the selected hosts will be activated, but only problems with matching tags will be suppressed (i.e. no actions will be taken).<br>In case of multiple tags, they are calculated as follows:<br><b>And/Or</b> - all tags must correspond; however tags with the same tag name are calculated by the Or condition<br><b>Or</b> - enough if one tag corresponds<br>There are two ways of matching the tag value:<br><b>Contains</b> - case-sensitive substring match (tag value contains the entered string)<br><b>Equals</b> - case-sensitive string match (tag value equals the entered string)<br>Tags can be specified only if <i>With data collection</i> mode is selected. |
| <i>Description</i> | Description of maintenance period.   |

#### Maintenance periods

The maintenance period window is for scheduling time for a recurring or a one-time maintenance. The form is dynamic with available fields changing based on the *Period type* selected.

| Period type          | Description  |
|----------------------|--|
| <i>One time only</i> | Define the date and time, and the length of the maintenance period.  |
| <i>Daily</i>         | <i>Every day(s)</i> - maintenance frequency: 1 (default) - every day, 2 - every two days, etc.<br><i>At (hour:minute)</i> - time of the day when maintenance starts.<br><i>Maintenance period length</i> - for how long the maintenance will be active.  |
| <i>Weekly</i>        | <i>Every week(s)</i> - maintenance frequency: 1 (default) - every week, 2 - every two weeks, etc.<br><i>Day of week</i> - on which day the maintenance should take place.<br><i>At (hour:minute)</i> - time of the day when maintenance starts.<br><i>Maintenance period length</i> - for how long the maintenance will be active. |

| Period type | Description  |
|-------------|--|
| Monthly     | <p><i>Month</i> - select all months during which the regular maintenance is carried out.</p> <p><i>Date: <b>Day of month</b></i> - Select this option if the maintenance takes place on the same date each month (for example, every 1st day of the month). Then, select the required day in the new field that appears.</p> <p><i>Date: <b>Day of week</b></i> - Select this option if the maintenance takes place only on certain days (for example, every first Monday of the month). Then, in the drop-down select the required week of the month (first, second, third, fourth, or last) and mark the checkboxes for maintenance day(s).</p> <p><i>At (hour:minute)</i> - time of the day when maintenance starts.</p> <p><i>Maintenance period length</i> - for how long the maintenance will be active.</p> |

When done, press *Add* to add the maintenance period to the *Periods* block.

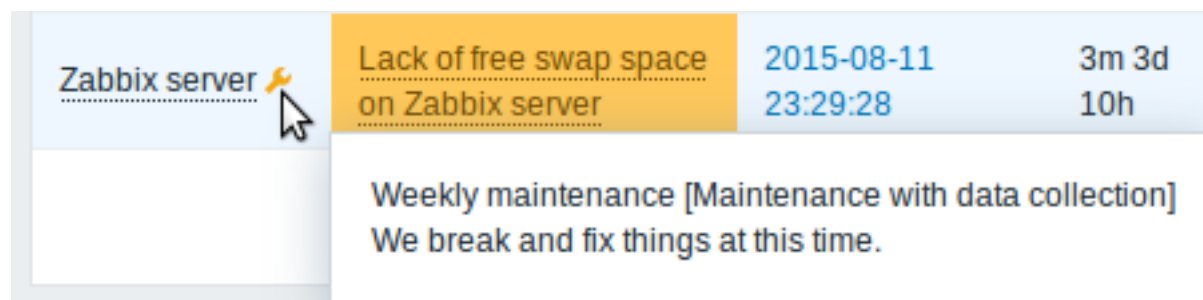
Notes:

- When *Every day/Every week* parameter is greater than 1, the starting day or week is the day/week that the *Active since* time falls on. For example:
  - with *Active since* set to January 1 at 12:00 and a one-hour maintenance set for every two days at 23:00 will result in the first maintenance period starting on January 1 at 23:00, while the second maintenance period will start on January 3 at 23:00;
  - with the same *Active since* time and a one-hour maintenance set for every two days at 01:00, the first maintenance period will start on January 3 at 01:00, while the second maintenance period will start on January 5 at 01:00.
- Daylight Saving Time (**DST**) changes do not affect how long the maintenance will be. -Let's say we have a two-hour maintenance that usually starts at 01:00 and finishes at 03:00:
  - If after one hour of maintenance (at 02:00) a DST change happens and current time changes from 02:00 to 03:00, the maintenance will continue for one more hour till 04:00;
  - If after two hours of maintenance (at 03:00) a DST change happens and current time changes from 03:00 to 02:00, the maintenance will stop because two hours have passed.
  - If a maintenance period is set to 1 day it usually starts at 00:00 and finishes at 00:00 the next day:
  - Since Zabbix calculates days in hours, the actual period of the maintenance is 24 hours. -If current time changes forward one hour, the maintenance will stop at 01:00 the next day. -If current time changes back one hour, the maintenance will stop at 23:00 that day. -If a maintenance period starts during the hour, skipped by DST change: -The maintenance will not start.

## Display Displaying hosts in maintenance

An orange wrench icon  next to the host name indicates that this host is in maintenance in:

- *Monitoring* → *Dashboard*
- *Monitoring* → *Problems*
- *Inventory* → *Hosts* → *Host inventory details*
- *Configuration* → *Hosts* (See 'Status' column)



Maintenance details are displayed when the mouse pointer is positioned over the icon.


Additionally, hosts in maintenance get an orange background in *Monitoring* → *Maps*.

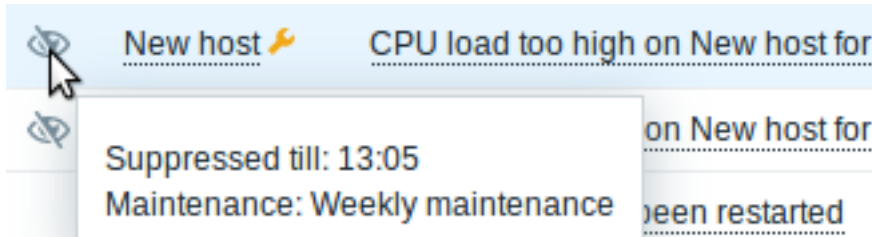
## Displaying suppressed problems

Normally problems for hosts in maintenance are suppressed, i.e. not displayed in the frontend. However, it is also possible to configure that suppressed problems are shown, by selecting the *Show suppressed problems* option in these locations:

- *Monitoring* → *Dashboard* (in *Problem hosts*, *Problems*, *Problems by severity*, *Trigger overview* widget configuration)
- *Monitoring* → *Problems* (in the filter)
- *Monitoring* → *Maps* (in map configuration)

- Global **notifications** (in user profile configuration)

When suppressed problems are displayed, the following icon is displayed: . Rolling a mouse over the icon displays more details:



## 12 Regular expressions

**Overview** [Perl Compatible Regular Expressions](#) (PCRE, PCRE2) are supported in Zabbix.

There are two ways of using regular expressions in Zabbix:

- manually entering a regular expression
- using a global regular expression created in Zabbix

**Regular expressions** You may manually enter a regular expression in supported places. Note that the expression may not start with @ because that symbol is used in Zabbix for referencing global regular expressions.

### Warning:

It's possible to run out of stack when using regular expressions. See the [pcrestack man page](#) for more information.

Note that in multiline matching, the ^ and \$ anchors match at the beginning/end of each line respectively, instead of the beginning/end of the entire string.

See also examples for **correct escaping** in various contexts.

**Global regular expressions** There is an advanced editor for creating and testing complex regular expressions in Zabbix frontend.

Once a regular expression has been created this way, it can be used in several places in the frontend by referring to its name, prefixed with @, for example, @mycustomregexp.

To create a global regular expression:

- Go to: *Administration* → *General*
- Select *Regular expressions* from the dropdown
- Click on *New regular expression*

The **Expressions** tab allows to set the regular expression name and add subexpressions.

Expressions

Test

\* Name

Network interfaces for discovery

\* Expressions

| Expression type | Expression                     | Delimiter | Case s                              |
|-----------------|--------------------------------|-----------|-------------------------------------|
| Result is FALSE | ^Software Loopback Interface   |           | <input checked="" type="checkbox"/> |
| Result is FALSE | ^(In)?[Ll]oop[Bb]ack[0-9._]*\$ |           | <input checked="" type="checkbox"/> |
| Result is FALSE | ^NULL[0-9.]*\$                 |           | <input checked="" type="checkbox"/> |
| Result is FALSE | ^[Ll]o[0-9.]*\$                |           | <input checked="" type="checkbox"/> |
| Result is FALSE | ^[Ss]ystem\$                   |           | <input checked="" type="checkbox"/> |
| Result is FALSE | ^Nu[0-9.]*\$                   |           | <input checked="" type="checkbox"/> |

Add

All mandatory input fields are marked with a red asterisk.

| Parameter              | Description   |
|------------------------|---|
| <i>Name</i>            | Set the regular expression name. Any Unicode characters are allowed.  |
| <i>Expressions</i>     | Click on <i>Add</i> in the Expressions block to add a new subexpression.  |
| <i>Expression type</i> | Select expression type:<br><b>Character string included</b> - match the substring<br><b>Any character string included</b> - match any substring from a delimited list. The delimited list includes a comma (,), a dot (.) or a forward slash (/).<br><b>Character string not included</b> - match any string except the substring<br><b>Result is TRUE</b> - match the regular expression<br><b>Result is FALSE</b> - do not match the regular expression |
| <i>Expression</i>      | Enter substring/regular expression.   |
| <i>Delimiter</i>       | A comma (,), a dot (.) or a forward slash (/) to separate text strings in a regular expression. This parameter is active only when "Any character string included" expression type is selected.   |
| <i>Case sensitive</i>  | A checkbox to specify whether a regular expression is sensitive to capitalization of letters.   |

A forward slash (/) in the expression is treated literally, rather than a delimiter. This way it is possible to save expressions containing a slash, without errors.

#### Attention:

A custom regular expression name in Zabbix may contain commas, spaces, etc. In those cases where that may lead to misinterpretation when referencing (for example, a comma in the parameter of an item key) the whole reference may be put in quotes like this: "@My custom regexp for purpose1, purpose2".

Regular expression names must not be quoted in other locations (for example, in LLD rule properties).

In the **Test** tab the regular expression and its subexpressions can be tested by providing a test string.

Expressions

Test

Test string

lo

Test expressions

Result

| Expression type | Expression                     | Result |
|-----------------|--------------------------------|--------|
| Result is FALSE | ^Software Loopback Interface   | TRUE   |
| Result is FALSE | ^(In)?[Ll]oop[Bb]ack[0-9._]*\$ | TRUE   |
| Result is FALSE | ^NULL[0-9.]*\$                 | TRUE   |
| Result is FALSE | ^[Ll]o[0-9.]*\$                | FALSE  |
| Result is FALSE | ^[Ss]ystem\$                   | TRUE   |
| Result is FALSE | ^Nu[0-9.]*\$                   | TRUE   |
| Combined result |                                | FALSE  |

Results show the status of each subexpression and total custom expression status.

Total custom expression status is defined as *Combined result*. If several sub expressions are defined Zabbix uses AND logical operator to calculate *Combined result*. It means that if at least one Result is False *Combined result* has also False status.

**Default global regular expressions** Zabbix comes with several global regular expression in its default dataset.

| Name                                | Expression  | Matches  |
|-------------------------------------|---|--|
| File systems for discovery          | ^(btrfs ext2 ext3 ext4 jfs reiser xfs ffs ufs gfs jfs2 vxfs hfs ext3 ext4 jfs fat32 zfs)\$  | "reiser" or "xfs" or "ffs" or "ufs" or "jfs" or "jfs2" or "vxfs" or "hfs" or "refs" or "apfs" or "ntfs" or "fat32" or "zfs"  |
| Network interfaces for discovery    | ^Software Loopback Interface  | Strings starting with "Software Loopback Interface".   |
|                                     | ^lo\$   | "lo"   |
|                                     | ^(In)?[Ll]oop[Bb]ack[0-9._]*\$  | Strings that optionally start with "In", then have "L" or "l", then "oop", then "B" or "b", then "ack", which can be optionally followed by any number of digits, dots or underscores. |
|                                     | ^NULL[0-9.]*\$  | Strings starting with "NULL" optionally followed by any number of digits or dots.  |
|                                     | ^[Ll]o[0-9.]*\$   | Strings starting with "Lo" or "lo" and optionally followed by any number of digits or dots.  |
|                                     | ^[Ss]ystem\$  | "System" or "system"   |
|                                     | ^Nu[0-9.]*\$  | Strings starting with "Nu" optionally followed by any number of digits or dots.  |
| Storage devices for SNMP discovery  | ^(Physical memory Virtual memory Memory buffers Cached memory Swap space)\$   | "Physical memory" or "Virtual memory" or "Memory buffers" or "Cached memory" or "Swap space"   |
| Windows service names for discovery | ^(MMCSS gupdate SysmonLog clr_optimization_v2.0.50727_32 CLR_SysmonLog CLR_SysmonLog_v2.0.50727_32 CLR_SysmonLog_v4.0.30319_32)\$ | like "clr_optimization_v2.0.50727_32" and "clr_optimization_v4.0.30319_32" where instead of dots you can put any character except newline.   |



| Name   | Expression                       | Matches                            |
|--|----------------------------------|------------------------------------|
| Windows service startup states for discovery | ^(automatic automatic delayed)\$ | "automatic" or "automatic delayed" |

## Examples Example 1

Use of the following expression in low-level discovery to discover databases except a database with a specific name:

^TESTDATABASE\$

Test string

TESTDATABASE

Test expressions

| Result | Expression type | Expression    | Result |
|--------|-----------------|---------------|--------|
|        | Result is FALSE | ^TESTDATABASE | FALSE  |
|        | Combined result |               | FALSE  |

Chosen *Expression type*: "Result is FALSE". Doesn't match name, containing string "TESTDATABASE".

Example with an inline regex modifier

Use of the following regular expression including an inline modifier (?i) to match the characters "error":

(?i)error

Test string

Sometexthere1345Error1357

Test expressions

| Result | Expression type | Expression | Result |
|--------|-----------------|------------|--------|
|        | Result is TRUE  | (?i)error  | TRUE   |
|        | Combined result |            | TRUE   |

Chosen *Expression type*: "Result is TRUE". Characters "error" are matched.

Another example with an inline regex modifier

Use of the following regular expression including multiple inline modifiers to match the characters after a specific line:

(?<=match (?i)everything(?-i) after this line\n)(?sx).\*# we add s modifier to allow . match newline character

Test string

Some text here for your consideration  
1235kfd345  
match eveRything after this line  
Continuation

Test expressions

Result

| Expression type | Expression   | Result |
|-----------------|--|--------|
| Result is TRUE  | (?<=match (?i)everything(?-i) after this line\n)(?sx).*# we add s modifier to allow . match newline characters | TRUE   |
| Combined result |  | TRUE   |

Chosen Expression type: "Result is TRUE". Characters after a specific line are matched.

Attention:

g modifier can't be specified in line. The list of available modifiers can be found in [pcreyntax man page](#). For more information about PCRE syntax please refer to [PCRE HTML documentation](#).

Regular expression support by location

| Location                  | Regular expression | Global regular expression | Multiline matching | Comments   |
|---------------------------|--------------------|---------------------------|--------------------|--|
| <b>Agent items</b>        |                    |                           |                    |  |
| eventlog[]                | Yes                | Yes                       | Yes                | regex, severity, source, eventid parameters  |
| log[]                     |                    |                           |                    | regex parameter  |
| log.count[]               |                    |                           |                    |  |
| logrt[]                   |                    | Yes/No                    |                    | regex parameter supports both, file_regex parameter supports non-global expressions only |
| logrt.count[]             |                    |                           |                    |  |
| proc.cpu.util[]           |                    | No                        | No                 | cmdline parameter  |
| proc.mem[]                |                    |                           |                    |  |
| proc.num[]                |                    |                           |                    |  |
| sensor[]                  |                    |                           |                    | device and sensor parameters on Linux 2.4  |
| system.hw.macaddr[]       |                    |                           |                    | interface parameter  |
| system.sw.packages[]      |                    |                           |                    | package parameter  |
| vfs.dir.count[]           |                    |                           |                    | regex_incl, regex_excl, regex_excl_dir parameters  |
| vfs.dir.get[]             |                    |                           |                    | regex_incl, regex_excl, regex_excl_dir parameters  |
| vfs.dir.size[]            |                    |                           |                    | regex_incl, regex_excl, regex_excl_dir parameters  |
| vfs.file.regex[]          |                    |                           | Yes                | regex parameter  |
| vfs.file.regmatch[]       |                    |                           |                    |  |
| web.page.regex[]          |                    |                           |                    |  |
| <b>SNMP traps</b>         |                    |                           |                    |  |
| snmptrap[]                | Yes                | Yes                       | No                 | regex parameter  |
| Item value pre-processing | Yes                | No                        | No                 | pattern parameter  |

| Location                                       | Regular expression | Global regular expression | Multiline matching | Comments   |
|--|--------------------|---------------------------|--------------------|--|
| <b>Functions for triggers/calculated items</b> |                    |                           |                    |  |
| count()  | Yes                | Yes                       | Yes                | pattern parameter if operator parameter is <i>regexp</i> or <i>iregexp</i>   |
| countunique()                                  | Yes                | Yes                       |                    |  |
| find()   | Yes                | Yes                       |                    |  |
| logeventid()                                   | Yes                | Yes                       | No                 | pattern parameter  |
| logsource()                                    |                    |                           |                    |  |
| <b>Low-level discovery</b>                     |                    |                           |                    |  |
| Filters  | Yes                | Yes                       | No                 | <i>Regular expression</i> field  |
| Overrides                                      | Yes                | No                        |                    | In <i>matches</i> , does not match options for <i>Operation</i> conditions   |
| <b>Action conditions</b>                       | Yes                | No                        | No                 | In <i>matches</i> , does not match options for <i>Host name</i> and <i>Host metadata</i> autoregistration conditions |
| <b>Web monitoring</b>                          | Yes                | No                        | Yes                | Variables with a <b>regex:</b> prefix<br><i>Required string</i> field  |
| <b>User macro context</b>                      | Yes                | No                        | No                 | In macro context with a <b>regex:</b> prefix   |
| <b>Macro functions</b>                         |                    |                           |                    |  |
| regsub()                                       | Yes                | No                        | No                 | pattern parameter  |
| iregsub()                                      |                    |                           |                    |  |
| <b>Icon mapping</b>                            | Yes                | Yes                       | No                 | <i>Expression</i> field  |
| <b>Value mapping</b>                           | Yes                | No                        | No                 | <i>Value</i> field if mapping type is <i>regexp</i>  |

## 13 Problem acknowledgment

**Overview** Problem events in Zabbix can be acknowledged by users.

If a user gets notified about a problem event, they can go to Zabbix frontend, open the problem update popup window of that problem using one of the ways listed below and acknowledge the problem. When acknowledging, they can enter their comment for it, saying that they are working on it or whatever else they may feel like saying about it.

This way, if another system user spots the same problem, they immediately see if it has been acknowledged and the comments so far.

This way the workflow of resolving problems with more than one system user can take place in a coordinated way.

Acknowledgment status is also used when defining **action operations**. You can define, for example, that a notification is sent to a higher level manager only if an event is not acknowledged for some time.

To acknowledge events and comment on them, a user must have at least read permissions to the corresponding triggers. To change problem severity or close problem, a user must have read-write permissions to the corresponding triggers.

There are **several** ways to access the problem update popup window, which allows acknowledging a problem.

- You may select problems in *Monitoring → Problems* and then click on *Mass update* below the list
- You can click in the *Ack* column showing the acknowledgment status of problems in:
  - *Monitoring → Dashboard (Problems and Problems by severity widgets)*
  - *Monitoring → Problems*
  - *Monitoring → Problems → Event details*

The *Ack* column contains either a 'Yes' or a 'No' link, indicating an acknowledged or an unacknowledged problem respectively. Clicking on the links will take you to the problem update popup window.

- You can click on an unresolved problem cell in:
  - *Monitoring → Dashboard (Trigger overview widget)*

The popup menu contains an *Acknowledge* option that will take you to the problem update window.

**Updating problems** The problem update popup allows to:

- comment on the problem
- view comments and actions so far
- change problem severity
- acknowledge/unacknowledge problem
- manually close problem

Update problem

Problem

/: Disk space is critically low (>90% used)

Message

History

| Time                | User                         | User action | Message |
|---------------------|------------------------------|-------------|---------|
| 2020-05-07 11:27:50 | Admin (Zabbix Administrator) | ✕           |         |
| 2020-05-07 11:27:43 | Admin (Zabbix Administrator) | ✓           | Ok      |

Scope

☒ Only selected problem
 ☐ Selected and all other problems of related triggers 1 event

Change severity

☐ Not classified
 ☐ Information
 ☐ Warning
 ☐ Average
 ☐ High
 ☐ Disaster

Acknowledge

☐

Close problem

☐

\* At least one update operation or message must exist.

Update

Cancel

All mandatory input fields are marked with a red asterisk.

| Parameter      | Description   |
|----------------|---|
| <i>Problem</i> | If only one problem is selected, the problem name is displayed.<br>If several problems are selected, <i>N problems selected</i> is displayed. |
| <i>Message</i> | Enter text to comment on the problem (maximum 2048 characters).   |

| Parameter              | Description   |
|------------------------|---|
| <i>History</i>         | Previous activities and comments on the problem are listed, along with the time and user details.<br>For the meaning of icons used to denote user actions see the <a href="#">event detail</a> page.<br>Note that history is displayed if only one problem is selected for the update.  |
| <i>Scope</i>           | Define the scope of such actions as changing severity, acknowledging or manually closing problems:<br><b>Only selected problem</b> - will affect this event only<br><b>Selected and all other problems of related triggers</b> - in case of acknowledgment/closing problem, will affect this event and all other problems that are not acknowledged/closed so far. If the scope contains problems already acknowledged or closed, these problems will not be acknowledged/closed repeatedly. On the other hand, the number of message and severity change operations are not limited. |
| <i>Change severity</i> | Mark the checkbox and click on the severity button to update problem severity.<br>The checkbox for changing severity is available if read-write permissions exist for at least one of the selected problems. Only those problems that are read-writable will be updated when clicking on <i>Update</i> .<br>If read-write permissions exist for none of the selected triggers, the checkbox is disabled.  |
| <i>Acknowledge</i>     | Mark the checkbox to acknowledge the problem.<br>This checkbox is available if there is at least one unacknowledged problem among the selected. It is not possible to add another acknowledgment for an already acknowledged problem (it is possible to add another comment though).  |
| <i>Unacknowledge</i>   | Mark the checkbox to unacknowledge the problem.<br>This checkbox is available if there is at least one acknowledged problem among the selected.   |
| <i>Close problem</i>   | Mark the checkbox to manually close the selected problem(s).<br>The checkbox for closing a problem is available if the <i>Allow manual close</i> option is checked in <a href="#">trigger configuration</a> for at least one of the selected problems. Only those problems will be closed that are allowed to be closed when clicking on <i>Update</i> .<br>If no problem is manually closeable, the checkbox is disabled.<br>Already closed problems will not be closed repeatedly.  |

**Display** Based on acknowledgment information it is possible to configure how the problem count is displayed in the dashboard or maps. To do that, you have to make selections in the *Problem display* option, available in both [map configuration](#) and the *Problems by severity dashboard widget*. It is possible to display all problem count, unacknowledged problem count as separated from the total or unacknowledged problem count only.

Based on problem update information (acknowledgment, etc.), it is possible to configure update operations - send a message or execute remote commands.

## 14 Configuration export/import

**Overview** Zabbix export/import functionality makes it possible to exchange various configuration entities between one Zabbix system and another.

Typical use cases for this functionality:

- share templates or network maps - Zabbix users may share their configuration parameters
- upload a template to [Zabbix Community templates](#). Then others can download the template and import the file into Zabbix.
- integrate with third-party tools - universal YAML, XML and JSON formats make integration and data import/export possible with third-party tools and applications

What can be exported/imported

Objects that can be exported/imported are:

- [host groups](#) (through Zabbix API only)
- [templates](#)
- [hosts](#)
- [network maps](#)
- [media types](#)
- [images](#)

Export format

Data can be exported using the Zabbix web frontend or [Zabbix API](#). Supported export formats are YAML, XML and JSON.

### Details about export

- All supported elements are exported in one file.
- Host and template entities (items, triggers, graphs, discovery rules) that are inherited from linked templates are not exported. Any changes made to those entities on a host level (such as changed item interval, modified regular expression or added prototypes to the low-level discovery rule) will be lost when exporting; when importing, all entities from linked templates are re-created as on the original linked template.
- Entities created by low-level discovery and any entities depending on them are not exported. For example, a trigger created for an LLD-rule generated item will not be exported.

### Details about import

- Import stops at the first error.
- When updating existing images during image import, "imagetype" field is ignored, i.e. it is impossible to change image type via import.
- When importing hosts/templates using the "Delete missing" option, host/template macros not present in the import file will be deleted from the host/template after the import.
- Empty tags for items, triggers, graphs, discoveryRules, itemPrototypes, triggerPrototypes, graphPrototypes are meaningless i.e. it's the same as if it was missing.
- Import supports YAML, XML and JSON, the import file must have a correct file extension: .yaml and .yml for YAML, .xml for XML and .json for JSON. See [compatibility information](#) about supported XML versions.
- Import supports configuration files only in UTF-8 encoding (with or without [BOM](#)); other encodings (UTF16LE, UTF16BE, UTF32LE, UTF32BE, etc.) will result in an import conversion error.

**YAML base format** The YAML export format contains the following nodes:

- Root node for Zabbix YAML export
- Export version
- Date when export was created in ISO 8601 long format

```
zabbix_export:
  version: '6.0'
  date: '2020-04-22T06:20:11Z'
```

Other nodes are dependent on exported objects.

**XML format** The XML export format contains the following tags:

- Default header for XML documents
- Root tag for Zabbix XML export
- Export version
- Date when export was created in ISO 8601 long format

```
<?xml version="1.0" encoding="UTF-8"?>
<zabbix_export>
  <version>6.0</version>
  <date>2020-04-22T06:20:11Z</date>
</zabbix_export>
```

Other tags are dependent on exported objects.

**JSON format** The JSON export format contains the following objects:

- Root object for Zabbix JSON export
- Export version
- Date when export was created in ISO 8601 long format

```
{
  "zabbix_export": {
    "version": "6.0",
    "date": "2020-04-22T06:20:11Z"
  }
}
```

Other objects are dependent on exported objects.

## 1 Host groups

In the frontend host groups can be **exported** only with host or template export. When a host or template is exported all groups it belongs to are exported with it automatically.

API allows to export host groups independently from hosts or templates.

Export format

```
groups:
  - name: 'Zabbix servers'
```

groups/group

| Parameter | Type          | Description | Details |
|-----------|---------------|-------------|---------|
| name      | <i>string</i> | Group name. |         |

## 2 Templates

Overview

Templates are **exported** with many related objects and object relations.

Template export contains:

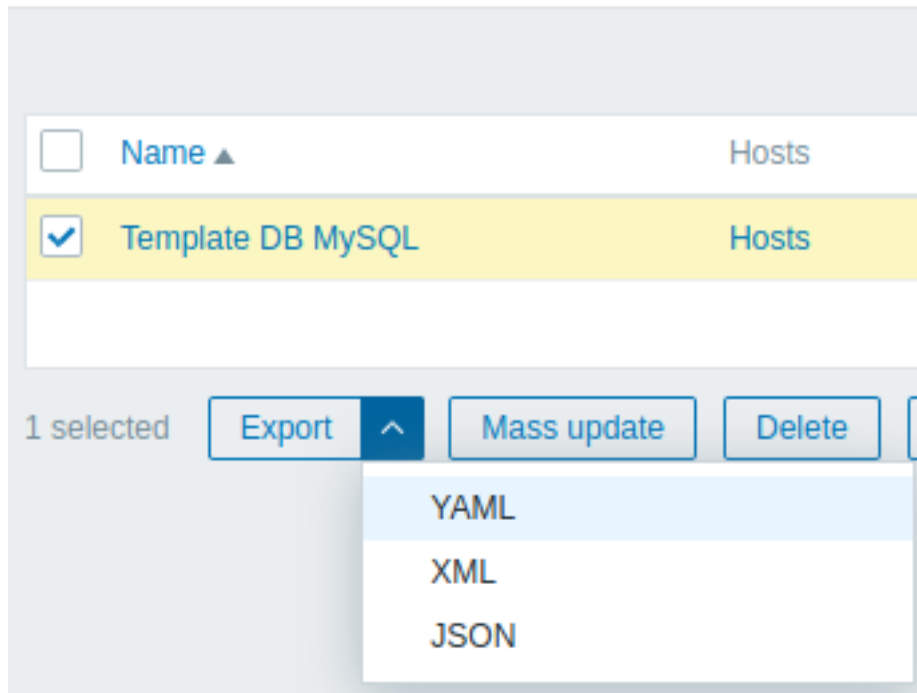
- linked host groups
- template data
- linkage to other templates
- linkage to host groups
- directly linked items
- directly linked triggers
- directly linked graphs
- directly linked dashboards
- directly linked discovery rules with all prototypes
- directly linked web scenarios
- value maps

Exporting

To export templates, do the following:

- Go to: *Configuration* → *Templates*
- Mark the checkboxes of the templates to export
- Click on *Export* below the list

## ≡ Templates



Depending on the selected format, templates are exported to a local file with a default name:

- `zabbix_export_templates.yaml` - in YAML export (default option for export)
- `zabbix_export_templates.xml` - in XML export
- `zabbix_export_templates.json` - in JSON export

### Importing

To import templates, do the following:

- Go to: *Configuration* → *Templates*
- Click on *Import* to the right
- Select the import file
- Mark the required options in import rules
- Click on *Import*



Import

\* Import file

Choose file

template\_power\_apc\_ups\_snmp.xml

| Rules               | Update existing                     | Create new                          | Delete missing           |
|---------------------|-------------------------------------|-------------------------------------|--------------------------|
| Groups              | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                          |
| Templates           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                          |
| Value mappings      | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Template dashboards | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Template linkage    |                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Items               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discovery rules     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Triggers            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Graphs              | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Web scenarios       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Import

Cancel

All mandatory input fields are marked with a red asterisk.

Import rules:

| Rule                   | Description   |
|------------------------|---|
| <i>Update existing</i> | Existing elements will be updated with data taken from the import file. Otherwise, they will not be updated.  |
| <i>Create new</i>      | The import will add new elements using data from the import file. Otherwise, it will not add them.  |
| <i>Delete missing</i>  | <p>The import will remove existing elements not present in the import file. Otherwise, it will not remove them.</p> <p>If <i>Delete missing</i> is marked for template linkage, existing template linkage not present in the import file will be unlinked. Since Zabbix 6.0.13, entities (items, triggers, graphs, etc.) inherited from the unlinked templates will not be removed (unless the <i>Delete missing</i> option is selected for each entity as well).</p> |

On the next screen, you will be able to view the content of a template being imported. If this is a new template all elements will be listed in green. If updating an existing template, new template elements are highlighted in green; removed template elements are highlighted in red; elements that have not changed are listed on a gray background.

## Templates

▼ Updated

▼ Templates

VMware

```
templates:
  template: VMware
- name: VMware
+ name: 'VMware alternative'
- description: "You can discuss this template or leave feedback on our forum"
+ description: "You can discuss this fabulous template or leave feedback on our forum"
groups:
  - name: Templates/Applications
tags:
  - tag: class
    value: software
  - tag: target
    value: vmware
macros:
  - macro: '${VMWARE.PASSWORD}'
    description: 'VMware service {USERNAME} user password'
  - macro: '${VMWARE.URL}'
    description: 'VMware service (vCenter or ESX hypervisor) SDK URL (https://...)'
  - macro: '${VMWARE.USERNAME}'
    description: 'VMware service user name'
```

The menu on the left can be used to navigate through the list of changes. Section *Updated* highlights all changes made to existing template elements. Section *Added* lists new template elements. The elements in each section are grouped by element type; press on the gray arrow down to expand or collapse the group of elements.

## Templates

▼ Updated

▲ Templates

▲ Items

▲ Triggers

▲ Discovery rules

▲ Item prototypes

▼ Dashboards

UPS Summary

▼ Graphs

Capacity of the UPS batteries

▼ Added

▼ Items

Battery capacity

System name

Review template changes, then press *Import* to perform template import. A success or failure message of the import will be displayed in the frontend.

Export format

Export format in YAML:

```
zabbix_export:
  version: '6.0'
  date: '2021-08-31T12:40:55Z'
  groups:
    - uuid: a571c0d144b14fd4a87a9d9b2aa9fcd6
      name: Templates/Applications
  templates:
    - uuid: 56079badd056419383cc26e6a4fcc7e0
      template: VMware
      name: VMware
      description: |
        You can discuss this template or leave feedback on our forum https://www.zabbix.com/forum/zabbix-s

        Template tooling version used: 0.38
  templates:
    - name: 'VMware macros'
  groups:
    - name: Templates/Applications
  items:
    - uuid: 5ce209f4d94f460488a74a92a52d92b1
      name: 'VMware: Event log'
      type: SIMPLE
      key: 'vmware.eventlog[{$VMWARE.URL},skip]'
      history: 7d
      trends: '0'
      value_type: LOG
      username: '{$VMWARE.USERNAME}'
      password: '{$VMWARE.PASSWORD}'
      description: 'Collect VMware event log. See also: https://www.zabbix.com/documentation/6.0/manual'
      tags:
        - tag: Application
          value: VMware
    - uuid: ee2edadb8ce943ef81d25dbbba8667a4
      name: 'VMware: Full name'
      type: SIMPLE
      key: 'vmware.fullname[{$VMWARE.URL}]'
      delay: 1h
      history: 7d
      trends: '0'
      value_type: CHAR
      username: '{$VMWARE.USERNAME}'
      password: '{$VMWARE.PASSWORD}'
      description: 'VMware service full name.'
      preprocessing:
        - type: DISCARD_UNCHANGED_HEARTBEAT
          parameters:
            - 1d
      tags:
        - tag: Application
          value: VMware
    - uuid: a0ec9145f2234fba79a28c57ebdb44d
      name: 'VMware: Version'
      type: SIMPLE
      key: 'vmware.version[{$VMWARE.URL}]'
      delay: 1h
      history: 7d
      trends: '0'
      value_type: CHAR
      username: '{$VMWARE.USERNAME}'
      password: '{$VMWARE.PASSWORD}'
```

```

description: 'VMware service version.'
preprocessing:
  - type: DISCARD_UNCHANGED_HEARTBEAT
    parameters:
      - 1d
tags:
  - tag: Application
    value: VMware
discovery_rules:
- uuid: 16ffc933cce74cf28a6edf306aa99782
  name: 'Discover VMware clusters'
  type: SIMPLE
  key: 'vmware.cluster.discovery[{$VMWARE.URL}]'
  delay: 1h
  username: '{$VMWARE.USERNAME}'
  password: '{$VMWARE.PASSWORD}'
  description: 'Discovery of clusters'
  item_prototypes:
    - uuid: 46111f91dd564a459dbc1d396e2e6c76
      name: 'VMware: Status of "{#CLUSTER.NAME}" cluster'
      type: SIMPLE
      key: 'vmware.cluster.status[{$VMWARE.URL},{#CLUSTER.NAME}]'
      history: 7d
      username: '{$VMWARE.USERNAME}'
      password: '{$VMWARE.PASSWORD}'
      description: 'VMware cluster status.'
      valuemap:
        name: 'VMware status'
      tags:
        - tag: Application
          value: VMware
- uuid: 8fb6a45cbe074b0cb6df53758e2c6623
  name: 'Discover VMware datastores'
  type: SIMPLE
  key: 'vmware.datastore.discovery[{$VMWARE.URL}]'
  delay: 1h
  username: '{$VMWARE.USERNAME}'
  password: '{$VMWARE.PASSWORD}'
  item_prototypes:
    - uuid: 4b61838ba4c34e709b25081ae5b059b5
      name: 'VMware: Average read latency of the datastore {#DATASTORE}'
      type: SIMPLE
      key: 'vmware.datastore.read[{$VMWARE.URL},{#DATASTORE},latency]'
      history: 7d
      username: '{$VMWARE.USERNAME}'
      password: '{$VMWARE.PASSWORD}'
      description: 'Amount of time for a read operation from the datastore (milliseconds).'
      tags:
        - tag: Application
          value: VMware
    - uuid: 5355c401dc244bc588ccd18767577c93
      name: 'VMware: Free space on datastore {#DATASTORE} (percentage)'
      type: SIMPLE
      key: 'vmware.datastore.size[{$VMWARE.URL},{#DATASTORE},pfree]'
      delay: 5m
      history: 7d
      value_type: FLOAT
      units: '%'
      username: '{$VMWARE.USERNAME}'
      password: '{$VMWARE.PASSWORD}'
      description: 'VMware datastore space in percentage from total.'
      tags:

```

```

    - tag: Application
      value: VMware
- uuid: 84f13c4fde2d4a17baaf0c8c1eb4f2c0
  name: 'VMware: Total size of datastore {#DATASTORE}'
  type: SIMPLE
  key: 'vmware.datastore.size[{$VMWARE.URL},{#DATASTORE}]'
  delay: 5m
  history: 7d
  units: B
  username: '{$VMWARE.USERNAME}'
  password: '{$VMWARE.PASSWORD}'
  description: 'VMware datastore space in bytes.'
  tags:
    - tag: Application
      value: VMware
- uuid: 540cd0fbc56c4b8ea19f2ff5839ce00d
  name: 'VMware: Average write latency of the datastore {#DATASTORE}'
  type: SIMPLE
  key: 'vmware.datastore.write[{$VMWARE.URL},{#DATASTORE},latency]'
  history: 7d
  username: '{$VMWARE.USERNAME}'
  password: '{$VMWARE.PASSWORD}'
  description: 'Amount of time for a write operation to the datastore (milliseconds).'
  tags:
    - tag: Application
      value: VMware
- uuid: a5bc075e89f248e7b411d8f960897a08
  name: 'Discover VMware hypervisors'
  type: SIMPLE
  key: 'vmware.hv.discovery[{$VMWARE.URL}]'
  delay: 1h
  username: '{$VMWARE.USERNAME}'
  password: '{$VMWARE.PASSWORD}'
  description: 'Discovery of hypervisors.'
  host_prototypes:
    - uuid: 051a1469d4d045cbbf818fcc843a352e
      host: '{#HV.UUID}'
      name: '{#HV.NAME}'
      group_links:
        - group:
            name: Templates/Applications
      group_prototypes:
        - name: '{#CLUSTER.NAME}'
        - name: '{#DATACENTER.NAME}'
      templates:
        - name: 'VMware Hypervisor'
      macros:
        - macro: '{$VMWARE.HV.UUID}'
          value: '{#HV.UUID}'
          description: 'UUID of hypervisor.'
      custom_interfaces: 'YES'
      interfaces:
        - ip: '{#HV.IP}'
- uuid: 9fd559f4e88c4677a1b874634dd686f5
  name: 'Discover VMware VMs'
  type: SIMPLE
  key: 'vmware.vm.discovery[{$VMWARE.URL}]'
  delay: 1h
  username: '{$VMWARE.USERNAME}'
  password: '{$VMWARE.PASSWORD}'
  description: 'Discovery of guest virtual machines.'
  host_prototypes:

```

```

- uuid: 23b9ae9d6f33414880db1cb107115810
  host: '#{VM.UUID}'
  name: '#{VM.NAME}'
  group_links:
    - group:
        name: Templates/Applications
  group_prototypes:
    - name: '#{CLUSTER.NAME} (vm)'
    - name: '#{DATACENTER.NAME}/{#VM.FOLDER} (vm)'
    - name: '#{HV.NAME}'
  templates:
    - name: 'VMware Guest'
  macros:
    - macro: '${VMWARE.VM.UUID}'
      value: '#{VM.UUID}'
      description: 'UUID of guest virtual machine.'
  custom_interfaces: 'YES'
  interfaces:
    - ip: '#{VM.IP}'
valuemaps:
- uuid: 3c59c22905054d42ac4ee8b72fe5f270
  name: 'VMware status'
  mappings:
    - value: '0'
      newvalue: gray
    - value: '1'
      newvalue: green
    - value: '2'
      newvalue: yellow
    - value: '3'
      newvalue: red

```

## Element tags

Element tag values are explained in the table below.

## Template tags

| Element   | Element property | Required | Type   | Range  | Description   |
|-----------|------------------|----------|--------|--|---|
| templates | uuid             | x        | string |  | Root element for templates.<br>Unique identifier for this template. |
|           | template         | x        | string |  | Unique template name.   |
|           | name             | -        | string |  | Visible template name.  |
|           | description      | -        | text   |  | Template description.   |
| groups    |                  | x        |        |  | Root element for template host groups.                              |
|           | uuid             | x        | string |  | Unique identifier for this host group.                              |
| templates | name             | x        | string |  | Host group name.  |
|           |                  | -        |        |  | Root element for linked templates.                                  |
| tags      | name             | x        | string |  | Template name.  |
|           | tag              | x        | string |  | Root element for template tags.<br>Tag name.                        |
|           | value            | -        | string |  | Tag value.  |
| macros    |                  | -        |        |  | Root element for template user macros.                              |
|           | macro            | x        | string |  | User macro name.  |
|           | type             | -        | string | 0 - TEXT (default)<br>1 - SECRET_TEXT<br>2 - VAULT | Type of the macro.  |
|           | value            | -        | string |  | User macro value.   |
| valuemaps | description      | -        | string |  | User macro description.   |
|           |                  | -        |        |  | Root element for template value maps.                               |
|           | uuid             | x        | string |  | Unique identifier for this value map.                               |
|           | name             | x        | string |  | Value map name.   |
|           | mapping          | -        |        |  | Root element for mappings.  |

| Element | Element property | Required | Type   | Range | Description             |
|---------|------------------|----------|--------|-------|-------------------------|
|         | value            | x        | string |       | Value of a mapping.     |
|         | newvalue         | x        | string |       | New value of a mapping. |

#### Template item tags

| Element | Element property | Required | Type   | Range <sup>1</sup>  | Description  |
|---------|------------------|----------|--------|---|--|
| items   |                  | -        |        |   | Root element for items.  |
|         | uuid             | x        | string |   | Unique identifier for the item.  |
|         | name             | x        | string |   | Item name.   |
|         | type             | -        | string | 0 - ZABBIX_PASSIVE (default)<br>2 - TRAP<br>3 - SIMPLE<br>5 - INTERNAL<br>7 - ZABBIX_ACTIVE<br>10 - EXTERNAL<br>11 - ODBC<br>12 - IPMI<br>13 - SSH<br>14 - TELNET<br>15 - CALCULATED<br>16 - JMX<br>17 - SNMP_TRAP<br>18 - DEPENDENT<br>19 - HTTP_AGENT<br>20 - SNMP_AGENT<br>21 - ITEM_TYPE_SCRIPT | Item type.   |
|         | snmp_oid         | -        | string |   | SNMP object ID.  |
|         | key              | x        | string |   | Required by SNMP items.<br>Item key.   |
|         | delay            | -        | string | Default: 1m   | Update interval of the item.   |
|         |                  |          |        |   | Accepts seconds or a time unit with suffix (30s, 1m, 2h, 1d).<br>Optionally one or more <b>custom intervals</b> can be specified either as flexible intervals or scheduling.<br>Multiple intervals are separated by a semicolon.<br>User macros may be used. A single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported.<br>Flexible intervals may be written as two macros separated by a forward slash (e.g. {\$FLEX_INTERVAL}/{FLEX_PERIOD}). |
|         | history          | -        | string | Default: 90d  | Time period of how long the history data should be stored. A time period using the time suffix, a user macro or LLD macro.   |
|         | trends           | -        | string | Default: 365d   | Time period of how long the trends data should be stored. A time period using the time suffix, a user macro or LLD macro.  |
|         | status           | -        | string | 0 - ENABLED (default)<br>1 - DISABLED   | Item status.   |

| Element | Element<br>property | Required | Type   | Range <sup>1</sup>   | Description  |
|---------|---------------------|----------|--------|--|--|
|         | value_type          | -        | string | 0 - FLOAT<br>1 - CHAR<br>2 - LOG<br>3 - UNSIGNED (default)<br>4 - TEXT                   | Received value type.   |
|         | allowed_hosts       | -        | string |  | List of IP addresses (comma delimited) of hosts allowed sending data for the item.   |
|         | units               | -        | string |  | Used by trapper and HTTP agent items.<br>Units of returned values (bps, B, etc).   |
|         | params              | -        | text   |  | Additional parameters depending on the type of the item:<br>- executed script for Script, SSH and Telnet items;<br>- SQL query for database monitor items;<br>- formula for calculated items.  |
|         | ipmi_sensor         | -        | string |  | IPMI sensor.   |
|         | authtype            | -        | string | Authentication type for SSH agent items:<br>0 - PASSWORD (default)<br>1 - PUBLIC_KEY     | Used only by IPMI items.<br>Authentication type.   |
|         |                     |          |        | Authentication type for HTTP agent items:<br>0 - NONE (default)<br>1 - BASIC<br>2 - NTLM | Used only by SSH and HTTP agent items.   |
|         | username            | -        | string |  | Username for authentication.<br>Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent items.   |
|         | password            | -        | string |  | Required by SSH and Telnet items.<br>When used by JMX agent, password should also be specified together with the username or both properties should be left blank.<br>Password for authentication.<br>Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent items. |
|         | publickey           | -        | string |  | When used by JMX agent, username should also be specified together with the password or both properties should be left blank.<br>Name of the public key file.  |
|         | privatekey          | -        | string |  | Required for SSH agent items.<br>Name of the private key file.   |
|         | port                | -        | string |  | Required for SSH agent items.<br>Custom port monitored by the item.<br>Can contain user macros.  |
|         | description         | -        | text   |  | Used only by SNMP items.<br>Item description.  |



| Element | Element property | Required | Type   | Range <sup>1</sup>  | Description  |
|---------|------------------|----------|--------|---|--|
|         | inventory_link   | -        | string | 0 - NONE<br><br>Capitalized host inventory field name.<br>For example:<br>4 - ALIAS<br>6 - OS_FULL<br>14 - HARDWARE<br>etc. | Host inventory field that is populated by the item.<br><br>Refer to the <a href="#">host inventory page</a> for a list of supported host inventory fields and their IDs. |
|         | logtimefmt       | -        | string |   | Format of the time in log entries.<br>Used only by log items.  |
|         | jmx_endpoint     | -        | string |   | JMX endpoint.  |
|         | url              | -        | string |   | Used only by JMX agent items.<br>URL string.   |
|         | allow_traps      | -        | string | 0 - NO (default)<br>1 - YES   | Required only for HTTP agent items.<br>Allow to populate value as in a trapper item.   |
|         | follow_redirects | -        | string | 0 - NO<br>1 - YES (default)   | Used only by HTTP agent items.<br>Follow HTTP response redirects while polling data.   |
|         | headers          | -        |        |   | Used only by HTTP agent items.<br>Root element for HTTP(S) request headers, where header name is used as key and header value as value.                                  |
|         | name             | x        | string |   | Used only by HTTP agent items.<br>Header name.   |
|         | value            | x        | string |   | Header value.  |
|         | http_proxy       | -        | string |   | HTTP(S) proxy connection string.   |
|         | output_format    | -        | string | 0 - RAW (default)<br>1 - JSON   | Used only by HTTP agent items.<br>How to process response.   |
|         | post_type        | -        | string | 0 - RAW (default)<br>2 - JSON<br>3 - XML  | Used only by HTTP agent items.<br>Type of post data body.  |
|         | posts            | -        | string |   | Used only by HTTP agent items.<br>HTTP(S) request body data.   |
|         | query_fields     | -        |        |   | Used only by HTTP agent items.<br>Root element for query parameters.   |
|         | name             | x        | string |   | Used only by HTTP agent items.<br>Parameter name.  |
|         | value            | -        | string |   | Parameter value.   |
|         | request_method   | -        | string | 0 - GET (default)<br>1 - POST<br>2 - PUT<br>3 - HEAD  | Request method.  |
|         | retrieve_mode    | -        | string | 0 - BODY (default)<br>1 - HEADERS<br>2 - BOTH   | Used only by HTTP agent items.<br>What part of response should be stored.  |
|         | ssl_cert_file    | -        | string |   | Used only by HTTP agent items.<br>Public SSL Key file path.  |
|         | ssl_key_file     | -        | string |   | Used only by HTTP agent items.<br>Private SSL Key file path.   |
|         |                  |          |        |   | Used only by HTTP agent items.   |
|         |                  |          |        |   |  |

| Element       | Element<br>property | Required | Type   | Range <sup>1</sup>          | Description   |
|---------------|---------------------|----------|--------|-----------------------------|---|
|               | ssl_key_password    |          | string |                             | Password for SSL Key file.  |
|               | status_codes        | -        | string |                             | Used only by HTTP agent items.<br>Ranges of required HTTP status codes separated by commas. Supports user macros.<br>Example: 200,200-{\$M},{M},200-400 |
|               | timeout             | -        | string |                             | Used only by HTTP agent items.<br>Item data polling request timeout. Supports user macros.  |
|               | verify_host         | -        | string | 0 - NO (default)<br>1 - YES | Used by HTTP agent and Script items.<br>Whether to validate that the host name for the connection matches the one in the host's certificate.            |
|               | verify_peer         | -        | string | 0 - NO (default)<br>1 - YES | Used only by HTTP agent items.<br>Whether to validate that the host's certificate is authentic.   |
| parameters    |                     | -        |        |                             | Used only by HTTP agent items.<br>Root element for user-defined parameters.   |
|               | name                | x        | string |                             | Used only by Script items.<br>Parameter name.   |
|               | value               | -        | string |                             | Used only by Script items.<br>Parameter value.  |
| value map     |                     | -        |        |                             | Used only by Script items.<br>Value map.  |
|               | name                | x        | string |                             | Name of the value map to use for the item.  |
| preprocessing |                     | -        |        |                             | Root element for item value preprocessing.  |
| step          |                     | -        |        |                             | Individual item value preprocessing step.   |

| Element     | Element property     | Required | Type   | Range <sup>1</sup>  | Description   |
|-------------|----------------------|----------|--------|---|---|
|             | type                 | x        | string | 1 - MULTIPLIER<br>2 - RTRIM<br>3 - LTRIM<br>4 - TRIM<br>5 - REGEX<br>6 - BOOL_TO_DECIMAL<br>7 - OCTAL_TO_DECIMAL<br>8 - HEX_TO_DECIMAL<br>9 - SIMPLE_CHANGE<br>(calculated as<br>(received<br>value-previous value))<br>10 -<br>CHANGE_PER_SECOND<br>(calculated as<br>(received<br>value-previous<br>value)/(time now-time<br>of last check))<br>11 - XMLPATH<br>12 - JSONPATH<br>13 - IN_RANGE<br>14 - MATCHES_REGEX<br>15 -<br>NOT_MATCHES_REGEX<br>16 -<br>CHECK_JSON_ERROR<br>17 -<br>CHECK_XML_ERROR<br>18 -<br>CHECK_REGEX_ERROR<br>19 -<br>DISCARD_UNCHANGED<br>20 - DIS-<br>CARD_UNCHANGED_HEARTBEAT<br>21 - JAVASCRIPT<br>22 -<br>PROMETHEUS_PATTERN<br>23 -<br>PROMETHEUS_TO_JSON<br>24 - CSV_TO_JSON<br>25 - STR_REPLACE<br>26 -<br>CHECK_NOT_SUPPORTED | Type of the item value preprocessing step.                        |
|             | parameters           | -        |        |   | Root element for parameters of the item value preprocessing step. |
|             | parameter            | x        | string |   | Individual parameter of the item value preprocessing step.        |
|             | error_handler        | -        | string | 0 - ORIGINAL_ERROR<br>(default)<br>1 - DISCARD_VALUE<br>2 - CUSTOM_VALUE<br>3 - CUSTOM_ERROR  | Action type used in case of preprocessing step failure.           |
|             | error_handler_params |          | string |   | Error handler parameters used with 'error_handler'.               |
| master_item |                      | -        |        |   | Individual item master item.                                      |
|             |                      |          |        |   | Required by dependent items.                                      |

| Element  | Element property  | Required | Type   | Range <sup>1</sup> | Description   |
|----------|---|----------|--------|--------------------|---|
|          | key   | x        | string |                    | Dependent item master item key value.   |
| triggers | <i>For trigger element tag values, see template trigger tags.</i> | -        |        |                    | Recursion up to 3 dependent items and maximum count of dependent items equal to 29999 are allowed.<br>Root element for simple triggers. |
| tags     |   | -        |        |                    | Root element for item tags.   |
|          | tag   | x        | string |                    | Tag name.   |
|          | value   | -        | string |                    | Tag value.  |

#### Template low-level discovery rule tags

| Element         | Element property   | Required | Type   | Range   | Description  |
|-----------------|--|----------|--------|---|--|
| discovery_rules | <i>For most of the element tag values, see element tag values for a regular item. Only the tags that are specific to low-level discovery rules, are described below.</i> | -        |        |   | Root element for low-level discovery rules.  |
|                 | type   | -        | string | 0 - ZABBIX_PASSIVE (default)<br>2 - TRAP<br>3 - SIMPLE<br>5 - INTERNAL<br>7 - ZABBIX_ACTIVE<br>10 - EXTERNAL<br>11 - ODBC<br>12 - IPMI<br>13 - SSH<br>14 - TELNET<br>16 - JMX<br>18 - DEPENDENT<br>19 - HTTP_AGENT<br>20 - SNMP_AGENT | Item type.   |
|                 | lifetime   | -        | string | Default: 30d  | Time period after which items that are no longer discovered will be deleted. Seconds, time unit with suffix or user macro. |
| filter          |  |          |        |   | Individual filter.   |

| Element            | Element property  | Required | Type      | Range  | Description  |
|--------------------|---|----------|-----------|--|--|
| conditions         | evaltype  | -        | string    | 0 - AND_OR (default)<br>1 - AND<br>2 - OR<br>3 - FORMULA | Logic to use for checking low-level discovery rule filter conditions.  |
|                    | formula   | -        | string    |  | Custom calculation formula for filter conditions.  |
|                    |   | -        |           |  | Root element for filter conditions.  |
|                    | macro   | x        | string    |  | Low-level discovery macro name.  |
|                    | value   | -        | string    |  | Filter value: regular expression or global regular expression.   |
|                    | operator  | -        | string    | 8 - MATCHES_REGEX (default)<br>9 - NOT_MATCHES_REGEX     | Condition operator.  |
|                    | formulaid   | x        | character |  | Arbitrary unique ID that is used to reference a condition from the custom expression. Can only contain capital-case letters. The ID must be defined by the user when modifying filter conditions, but will be generated anew when requesting them afterward. |
| lld_macro_paths    |   | -        |           |  | Root element for LLD macro paths.  |
|                    | lld_macro   | x        | string    |  | Low-level discovery macro name.  |
|                    | path  | x        | string    |  | Selector for value which will be assigned to the corresponding macro.  |
| preprocessing step |   | -        |           |  | LLD rule value preprocessing.  |
|                    |   | -        |           |  | Individual LLD rule value preprocessing step.  |
|                    | <p><i>For most of the element tag values, see element tag values for a template item value preprocessing. Only the tags that are specific to template low-level discovery value preprocessing, are described below.</i></p> |          |           |  |  |

| Element            | Element property   | Required | Type   | Range  | Description  |
|--------------------|--|----------|--------|--|--|
|                    | type   | x        | string | 5 - REGEX<br>11 - XMLPATH<br>12 - JSONPATH<br>15 -<br>NOT_MATCHES_REGEX<br>16 -<br>CHECK_JSON_ERROR<br>17 -<br>CHECK_XML_ERROR<br>20 - DIS-<br>CARD_UNCHANGED_HEARTBEAT<br>21 - JAVASCRIPT<br>23 -<br>PROMETHEUS_TO_JSON<br>24 - CSV_TO_JSON<br>25 - STR_REPLACE | Type of the item value preprocessing step.   |
| trigger_prototypes | <i>For trigger prototype element tag values, see regular <b>template trigger</b> tags.</i> | -        |        |  | Root element for trigger prototypes.   |
| graph_prototypes   | <i>For graph prototype element tag values, see regular <b>template graph</b> tags.</i>     | -        |        |  | Root element for graph prototypes.   |
| host_prototypes    | <i>For host prototype element tag values, see regular <b>host</b> tags.</i>                | -        |        |  | Root element for host prototypes.  |
| item_prototypes    | <i>For item prototype element tag values, see regular <b>template item</b> tags.</i>       | -        |        |  | Root element for item prototypes.  |
| master_item        | key  | x        | string |  | Individual item prototype master item/item prototype data.<br>Dependent item prototype master item/item prototype key value.<br><br>Required for a dependent item. |

Template trigger tags

| Element      | Element property    | Required | Type   | Range <sup>1</sup>   | Description  |
|--------------|---------------------|----------|--------|--|--|
| triggers     | -                   | -        | -      | -  | Root element for triggers.   |
|              | uuid                | x        | string | -  | Unique identifier for this trigger.                                      |
|              | expression          | x        | string | -  | Trigger expression.  |
|              | recovery_mode       | -        | string | 0 - EXPRESSION (default)<br>1 - RECOVERY_EXPRESSION<br>2 - NONE                                    | Basis for generating OK events.  |
|              | recovery_expression | -        | string | -  | Trigger recovery expression.   |
|              | correlation_mode    | -        | string | 0 - DISABLED (default)<br>1 - TAG_VALUE  | Correlation mode (no event correlation or event correlation by tag).     |
|              | correlation_tag     | -        | string | -  | The tag name to be used for event correlation.                           |
|              | name                | x        | string | -  | Trigger name.  |
|              | event_name          | -        | string | -  | Event name.  |
|              | opdata              | -        | string | -  | Operational data.  |
|              | url                 | -        | string | -  | URL associated with the trigger.   |
|              | status              | -        | string | 0 - ENABLED (default)<br>1 - DISABLED  | Trigger status.  |
|              | priority            | -        | string | 0 - NOT_CLASSIFIED (default)<br>1 - INFO<br>2 - WARNING<br>3 - AVERAGE<br>4 - HIGH<br>5 - DISASTER | Trigger severity.  |
|              | description         | -        | text   | -  | Trigger description.   |
|              | type                | -        | string | 0 - SINGLE (default)<br>1 - MULTIPLE   | Event generation type (single problem event or multiple problem events). |
|              | manual_close        | -        | string | 0 - NO (default)<br>1 - YES  | Manual closing of problem events.  |
| dependencies | -                   | -        | -      | -  | Root element for dependencies.   |
|              | name                | x        | string | -  | Dependency trigger name.   |
|              | expression          | x        | string | -  | Dependency trigger expression.   |
| tags         | recovery_expression | -        | string | -  | Dependency trigger recovery expression.                                  |
|              | -                   | -        | -      | -  | Root element for trigger tags.   |
|              | tag                 | x        | string | -  | Tag name.  |
|              | value               | -        | string | -  | Tag value.   |

#### Template graph tags

| Element | Element property | Required | Type    | Range <sup>1</sup>          | Description  |
|---------|------------------|----------|---------|-----------------------------|--|
| graphs  | -                | -        | -       | -                           | Root element for graphs.   |
|         | uuid             | x        | string  | -                           | Unique identifier for this graph.                                      |
|         | name             | x        | string  | -                           | Graph name.  |
|         | width            | -        | integer | 20-65535 (default: 900)     | Graph width, in pixels. Used for preview and for pie/exploded graphs.  |
|         | height           | -        | integer | 20-65535 (default: 200)     | Graph height, in pixels. Used for preview and for pie/exploded graphs. |
|         | yaxismin         | -        | double  | Default: 0                  | Value of Y axis minimum.   |
|         | yaxismax         | -        | double  | Default: 0                  | Used if 'ymin_type_1' is FIXED.<br>Value of Y axis maximum.            |
|         | show_work_period | -        | string  | 0 - NO<br>1 - YES (default) | Used if 'ymax_type_1' is FIXED.<br>Highlight non-working hours.        |
|         | -                | -        | -       | -                           | Used by normal and stacked graphs.                                     |
|         | -                | -        | -       | -                           | -  |

| Element     | Element property | Required | Type    | Range <sup>1</sup>   | Description   |
|-------------|------------------|----------|---------|--|---|
|             | show_triggers    | -        | string  | 0 - NO<br>1 - YES (default)  | Display simple trigger values as a line.  |
|             | type             | -        | string  | 0 - NORMAL (default)<br>1 - STACKED<br>2 - PIE<br>3 - EXPLODED   | Used by normal and stacked graphs.<br>Graph type.   |
|             | show_legend      | -        | string  | 0 - NO<br>1 - YES (default)  | Display graph legend.   |
|             | show_3d          | -        | string  | 0 - NO (default)<br>1 - YES  | Enable 3D style.  |
|             | percent_left     | -        | double  | Default:0  | Used by pie and exploded pie graphs.<br>Show the percentile line for left axis.   |
|             | percent_right    | -        | double  | Default:0  | Used only for normal graphs.<br>Show the percentile line for right axis.  |
|             | ymin_type_1      | -        | string  | 0 - CALCULATED (default)<br>1 - FIXED<br>2 - ITEM  | Used only for normal graphs.<br>Minimum value of Y axis.  |
|             | ymin_item_1      | -        |         |  | Used by normal and stacked graphs.<br>Individual item details.  |
|             | ymax_type_1      | -        | string  | 0 - CALCULATED (default)<br>1 - FIXED<br>2 - ITEM  | Maximum value of Y axis.  |
|             | ymax_item_1      | -        |         |  | Used by normal and stacked graphs.<br>Individual item details.  |
| graph_items | host             | x        | string  |  | Required if 'ymin_type_1' is ITEM.<br>Item host.  |
|             | key              | x        | string  |  | Item key.   |
|             | sortorder        | -        | integer |  | Individual item details.  |
|             | drawtype         | -        | string  | 0 - SINGLE_LINE (default)<br>1 - FILLED_REGION<br>2 - BOLD_LINE<br>3 - DOTTED_LINE<br>4 - DASHED_LINE<br>5 - GRADIENT_LINE | Required if 'ymax_type_1' is ITEM.<br>Item host.<br>Item key.<br>Root element for graph items.<br>Draw order. The smaller value is drawn first.<br>Can be used to draw lines or regions behind (or in front of) another.<br>Draw style of the graph item. |
|             | color            | -        | string  |  | Used only by normal graphs.   |
|             | yaxisside        | -        | string  | 0 - LEFT (default)<br>1 - RIGHT  | Element color (6 symbols, hex).<br>Side of the graph where the graph item's Y scale will be drawn.  |
|             |                  |          |         |  | Used by normal and stacked graphs.  |



| Element | Element property | Required | Type   | Range <sup>1</sup>   | Description   |
|---------|------------------|----------|--------|--|---|
| item    | calc_fnc         | -        | string | 1 - MIN<br>2 - AVG (default)<br>4 - MAX<br>7 - ALL (minimum, average and maximum; used only by simple graphs)<br>9 - LAST (used only by pie and exploded pie graphs) | Data to draw if more than one value exists for an item. |
|         | type             | -        | string | 0 - SIMPLE (default)<br>2 - GRAPH_SUM (value of the item represents the whole pie; used only by pie and exploded pie graphs)   | Graph item type.  |
|         | host             | x        | string |  | Individual item.  |
|         | key              | x        | string |  | Item host.<br>Item key.                                 |

#### Template web scenario tags

| Element   | Element property | Required | Type    | Range <sup>1</sup>                          | Description  |
|-----------|------------------|----------|---------|---|--|
| httptests |                  | -        |         |   | Root element for web scenarios.  |
|           | uuid             | x        | string  |   | Unique identifier for this web scenario.   |
|           | name             | x        | string  |   | Web scenario name.   |
|           | delay            | -        | string  | Default: 1m                                 | Frequency of executing the web scenario.<br>Seconds, time unit with suffix or user macro.  |
|           | attempts         | -        | integer | 1-10 (default: 1)                           | The number of attempts for executing web scenario steps.   |
|           | agent            | -        | string  | Default: Zabbix                             | Client agent. Zabbix will pretend to be the selected browser. This is useful when a website returns different content for different browsers.                        |
| variables | http_proxy       | -        | string  |   | Specify an HTTP proxy to use, using the format:<br><code>http://[username[:password]@]proxy.example.com</code>   |
|           |                  | -        |         |   | Root element for scenario-level variables (macros) that may be used in scenario steps.   |
|           | name             | x        | string  |   | Variable name.   |
| headers   | value            | x        | text    |   | Variable value.  |
|           |                  | -        |         |   | Root element for HTTP headers that will be sent when performing a request. Headers should be listed using the same syntax as they would appear in the HTTP protocol. |
|           | name             | x        | string  |   | Header name.   |
|           | value            | x        | text    |   | Header value.  |
|           | status           | -        | string  | 0 - ENABLED (default)<br>1 - DISABLED       | Web scenario status.   |
|           | authentication   | -        | string  | 0 - NONE (default)<br>1 - BASIC<br>2 - NTLM | Authentication method.   |
|           | http_user        | -        | string  |   | User name used for basic, HTTP or NTLM authentication.   |
|           | http_password    | -        | string  |   | Password used for basic, HTTP or NTLM authentication.  |
|           | verify_peer      | -        | string  | 0 - NO (default)<br>1 - YES                 | Whether to validate that the host's certificate is authentic.  |

| Element      | Element property | Required | Type   | Range <sup>1</sup>                            | Description  |
|--------------|------------------|----------|--------|---|--|
|              | verify_host      | -        | string | 0 - NO (default)<br>1 - YES                   | Whether to validate that the host name for the connection matches the one in the host's certificate.   |
|              | ssl_cert_file    | -        | string |   | Name of the SSL certificate file used for client authentication (must be in PEM format).   |
|              | ssl_key_file     | -        | string |   | Name of the SSL private key file used for client authentication (must be in PEM format).   |
|              | ssl_key_password |          | string |   | SSL private key file password.   |
|              | steps            | x        |        |   | Root element for web scenario steps.   |
|              | name             | x        | string |   | Web scenario step name.  |
|              | url              | x        | string |   | URL for monitoring.  |
| query_fields |                  | -        |        |   | Root element for query fields - an array of HTTP fields that will be added to the URL when performing a request.   |
|              | name             | x        | string |   | Query field name.  |
|              | value            | -        | string |   | Query field value.   |
|              | posts            | -        |        |   | HTTP POST variables as a string (raw post data) or as an array of HTTP fields (form field data).   |
|              | name             | x        | string |   | Post field name.   |
|              | value            | x        | string |   | Post field value.  |
| variables    |                  | -        |        |   | Root element of step-level variables (macros) that should be applied after this step.  |
|              |                  |          |        |   | If the variable value has a 'regex:' prefix, then its value is extracted from the data returned by this step according to the regular expression pattern following the 'regex:' prefix |
|              | name             | x        | string |   | Variable name.   |
|              | value            | x        | text   |   | Variable value.  |
| headers      |                  | -        |        |   | Root element for HTTP headers that will be sent when performing a request. Headers should be listed using the same syntax as they would appear in the HTTP protocol.                   |
|              | name             | x        | string |   | Header name.   |
|              | value            | x        | text   |   | Header value.  |
|              | follow_redirects |          | string | 0 - NO<br>1 - YES (default)                   | Follow HTTP redirects.   |
|              | retrieve_mode    | -        | string | 0 - BODY (default)<br>1 - HEADERS<br>2 - BOTH | HTTP response retrieve mode.   |
|              | timeout          | -        | string | Default: 15s                                  | Timeout of step execution. Seconds, time unit with suffix or user macro.   |
|              | required         | -        | string |   | Text that must be present in the response. Ignored if empty.   |
|              | status_codes     | -        | string |   | A comma delimited list of accepted HTTP status codes. Ignored if empty. For example: 200-201,210-299   |
|              | tags             | -        |        |   | Root element for web scenario tags.  |
|              | tag              | x        | string |   | Tag name.  |
|              | value            | -        | string |   | Tag value.   |

#### Template dashboard tags

| Element    | Element property | Required | Type | Range <sup>1</sup> | Description                           |
|------------|------------------|----------|------|--------------------|---------------------------------------|
| dashboards |                  | -        |      |                    | Root element for template dashboards. |

| Element | Element property | Required | Type    | Range <sup>1</sup>  | Description   |
|---------|------------------|----------|---------|---|---|
| pages   | uuid             | x        | string  |   | Unique identifier for this dashboard.                             |
|         | name             | x        | string  |   | Template dashboard name.  |
|         | display period   | -        | integer |   | Display period of dashboard pages.                                |
|         | auto_start       | -        | string  | 0 - no<br>1 - yes   | Slideshow auto start.   |
|         |                  | -        |         |   | Root element for template dashboard pages.                        |
|         | name             | -        | string  |   | Page name.  |
|         | display period   | -        | integer |   | Page display period.  |
|         | sortorder        | -        | integer |   | Page sorting order.   |
|         |                  | -        |         |   | Root element for template dashboard widgets.                      |
|         | type             | x        | string  |   | Widget type.  |
| widgets | name             | -        | string  |   | Widget name.  |
|         | x                | -        | integer | 0-23  | Horizontal position from the left side of the template dashboard. |
|         | y                | -        | integer | 0-62  | Vertical position from the top of the template dashboard.         |
|         | width            | -        | integer | 1-24  | Widget width.   |
|         | height           | -        | integer | 2-32  | Widget height.  |
|         | hide_header      | -        | string  | 0 - no<br>1 - yes   | Hide widget header.   |
|         |                  | -        |         |   | Root element for the template dashboard widget fields.            |
|         | type             | x        | string  | 0 - INTEGER<br>1 - STRING<br>3 - HOST<br>4 - ITEM<br>5 - ITEM_PROTOTYPE<br>6 - GRAPH<br>7 - GRAPH_PROTOTYPE | Widget field type.  |
|         | name             | x        | string  |   | Widget field name.  |
|         | value            | x        | mixed   |   | Widget field value, depending on the field type.                  |

#### Footnotes

<sup>1</sup> For string values, only the string will be exported (e.g. "ZABBIX\_ACTIVE") without the numbering used in this table. The numbers for range values (corresponding to the API values) in this table is used for ordering only.

### 3 Hosts

#### Overview

Hosts are **exported** with many related objects and object relations.

Host export contains:

- linked host groups
- host data
- template linkage
- host group linkage
- host interfaces
- directly linked items
- directly linked triggers
- directly linked graphs
- directly linked discovery rules with all prototypes
- directly linked web scenarios
- host macros

- host inventory data
- value maps

## Exporting

To export hosts, do the following:

- Go to: *Configuration* → *Hosts*
- Mark the checkboxes of the hosts to export
- Click on *Export* below the list

## ≡ Hosts

| <input type="checkbox"/>            | Name ▲  | Items | Triggers | Graphs | Discovery | Web |
|-------------------------------------|---------|-------|----------|--------|-----------|-----|
| <input checked="" type="checkbox"/> | Server1 | Items | Triggers | Graphs | Discovery | Web |

1 selected

Enable
Disable
Export

YAML
XML
JSON

Mass update
Delete

Depending on the selected format, hosts are exported to a local file with a default name:

- *zabbix\_export\_hosts.yaml* - in YAML export (default option for export)
- *zabbix\_export\_hosts.xml* - in XML export
- *zabbix\_export\_hosts.json* - in JSON export

## Importing

To import hosts, do the following:

- Go to: *Configuration* → *Hosts*
- Click on *Import* to the right
- Select the import file
- Mark the required options in import rules
- Click on *Import*

Import

\* Import file

Choose file

zbx\_export\_hosts.yaml

| Rules            | Update existing                     | Create new                          | Delete missing           |
|------------------|-------------------------------------|-------------------------------------|--------------------------|
| Groups           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                          |
| Hosts            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                          |
| Value mappings   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Template linkage |                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Items            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discovery rules  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Triggers         | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Graphs           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Web scenarios    | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Import

Cancel

A success or failure message of the import will be displayed in the frontend.

Import rules:

| Rule                   | Description  |
|------------------------|--|
| <i>Update existing</i> | Existing elements will be updated with data taken from the import file. Otherwise they will not be updated.  |
| <i>Create new</i>      | The import will add new elements using data from the import file. Otherwise it will not add them.  |
| <i>Delete missing</i>  | <p>The import will remove existing elements not present in the import file. Otherwise it will not remove them.</p> <p>If <i>Delete missing</i> is marked for template linkage, existing template linkage not present in the import file will be unlinked. Since Zabbix 6.0.13, entities (items, triggers, graphs, etc.) inherited from the unlinked templates will not be removed (unless the <i>Delete missing</i> option is selected for each entity as well).</p> |

Export format

Export format in YAML:

```

zabbix_export:
  version: '6.0'
  date: '2023-05-03T11:24:04Z'
  groups:
    - uuid: dc579cd7a1a34222933f24f52a68bcd8
      name: 'Linux servers'
  hosts:
    - host: Example_host
      name: Example_host
      templates:
        - name: 'Zabbix server health'
      groups:
        - name: 'Linux servers'

```

```

items:
- name: Test_item1
  type: ZABBIX_ACTIVE
  key: kernel.maxproc
inventory_mode: DISABLED

```

## Element tags

Element tag values are explained in the table below.

## Host tags

| Element    | Element property | Required | Type   | Range <sup>1</sup>   | Description  |
|------------|------------------|----------|--------|--|--|
| groups     |                  | x        |        |  | Root element for host groups.  |
|            | name             | x        | string |  | Host group name.   |
| hosts      |                  | -        |        |  | Root element for hosts.  |
|            | host             | x        | string |  | Unique host name.  |
|            | name             | -        | string |  | Visible host name.   |
|            | description      | -        | text   |  | Host description.  |
|            | status           | -        | string | 0 - ENABLED (default)<br>1 - DISABLED  | Host status.   |
|            | ipmi_auth        | -        | string | -1 - DEFAULT (default)<br>0 - NONE<br>1 - MD2<br>2 - MD5<br>4 - STRAIGHT<br>5 - OEM<br>6 - RMCP_PLUS | IPMI session authentication type.  |
|            | ipmi_privilege   | -        | string | 1 - CALLBACK<br>2 - USER (default)<br>3 - OPERATOR<br>4 - ADMIN<br>5 - OEM                           | IPMI session privilege level.  |
|            | ipmi_username    | -        | string |  | Username for IPMI checks.  |
|            | ipmi_password    | -        | string |  | Password for IPMI checks.  |
| proxy      |                  | -        |        |  | Proxy.   |
|            | name             | x        | string |  | Name of the proxy (if any) that monitors the host.   |
| templates  |                  | -        |        |  | Root element for linked templates.   |
|            | name             | x        | string |  | Template name.   |
| interfaces |                  | -        |        |  | Root element for host interfaces.  |
|            | default          | -        | string | 0 - NO<br>1 - YES (default)  | Whether this is the primary host interface. There can be only one primary interface of one type on a host. |
|            | type             | -        | string | 1 - ZABBIX (default)<br>2 - SNMP<br>3 - IPMI<br>4 - JMX  | Interface type.  |
|            | useip            | -        | string | 0 - NO<br>1 - YES (default)  | Whether to use IP as the interface for connecting to the host (if not, DNS will be used).                  |
|            | ip               | -        | string |  | IP address, can be either IPv4 or IPv6.  |
|            | dns              | -        | string |  | Required if the connection is made via IP. DNS name.   |
|            | port             | -        | string |  | Required if the connection is made via DNS. Port number. Supports user macros.                             |
|            | interface_ref    | x        | string | Format: if<N>  | Interface reference name to be used in items.  |
| details    |                  | -        |        |  | Root element for interface details.  |
|            | version          | -        | string | 1 - SNMPV1<br>2 - SNMP_V2C (default)<br>3 - SNMP_V3  | Use this SNMP version.   |

| Element        | Element property  | Required | Type   | Range <sup>1</sup>  | Description   |
|----------------|---|----------|--------|---|---|
|                | community   | -        | string |   | SNMP community.   |
|                | contextname   | -        | string |   | Required by SNMPv1 and SNMPv2 items.<br>SNMPv3 context name.  |
|                | securityname  | -        | string |   | Used only by SNMPv3 items.<br>SNMPv3 security name.   |
|                | securitylevel   | -        | string | 0 - NOAUTHNOPRIV (default)<br>1 - AUTHNOPRIV<br>2 - AUTHPRIV                              | Used only by SNMPv3 items.<br>SNMPv3 security level.  |
|                | authprotocol  | -        | string | 0 - MD5 (default)<br>1 - SHA1<br>2 - SHA224<br>3 - SHA256<br>4 - SHA384<br>5 - SHA512     | SNMPv3 authentication protocol.   |
|                | authpassphrase  |          | string |   | Used only by SNMPv3 items.<br>SNMPv3 authentication passphrase.   |
|                | privprotocol  | -        | string | 0 - DES (default)<br>1 - AES128<br>2 - AES192<br>3 - AES256<br>4 - AES192C<br>5 - AES256C | Used only by SNMPv3 items.<br>SNMPv3 privacy protocol.  |
|                | privpassphrase  |          | string |   | Used only by SNMPv3 items.<br>SNMPv3 privacy passphrase.  |
|                | bulk  | -        | string | 0 - NO<br>1 - YES (default)   | Used only by SNMPv3 items.<br>Use bulk requests for SNMP.   |
|                | items   | -        |        |   | Root element for items.   |
|                | <i>For item element tag values, see host item tags.</i> |          |        |   |   |
| tags           |   | -        |        |   | Root element for host tags.   |
|                | tag   | x        | string |   | Tag name.   |
|                | value   | -        | string |   | Tag value.  |
| macros         |   | -        |        |   | Root element for macros.  |
|                | macro   | x        |        |   | User macro name.  |
|                | type  | -        | string | 0 - TEXT (default)<br>1 - SECRET_TEXT<br>2 - VAULT  | Type of the macro.  |
|                | value   | -        | string |   | User macro value.   |
|                | description   | -        | string |   | User macro description.   |
| inventory      |   | -        |        |   | Root element for host inventory.  |
|                | <inventory_property>                                    |          |        |   | Individual inventory property.  |
|                |   |          |        |   | All available inventory properties are listed under the respective tags, e.g. <type>, <name>, <os> (see example above). |
| inventory_mode |   | -        | string | -1 - DISABLED<br>0 - MANUAL (default)<br>1 - AUTOMATIC                                    | Inventory mode.   |
| valuemaps      |   | -        |        |   | Root element for host value maps.   |
|                | name  | x        | string |   | Value map name.   |
|                | mapping   | -        |        |   | Root element for mappings.  |

| Element | Element property | Required | Type   | Range <sup>1</sup> | Description             |
|---------|------------------|----------|--------|--------------------|-------------------------|
|         | value            | x        | string |                    | Value of a mapping.     |
|         | newvalue         | x        | string |                    | New value of a mapping. |

#### Host item tags

| Element | Element property | Required | Type   | Range <sup>1</sup>  | Description  |
|---------|------------------|----------|--------|---|--|
| items   |                  | -        |        |   | Root element for items.  |
|         | name             | x        | string |   | Item name.   |
|         | type             | -        | string | 0 - ZABBIX_PASSIVE (default)<br>2 - TRAP<br>3 - SIMPLE<br>5 - INTERNAL<br>7 - ZABBIX_ACTIVE<br>10 - EXTERNAL<br>11 - ODBC<br>12 - IPMI<br>13 - SSH<br>14 - TELNET<br>15 - CALCULATED<br>16 - JMX<br>17 - SNMP_TRAP<br>18 - DEPENDENT<br>19 - HTTP_AGENT<br>20 - SNMP_AGENT<br>21 - ITEM_TYPE_SCRIPT | Item type.   |
|         | snmp_oid         | -        | string |   | SNMP object ID.  |
|         | key              | x        | string |   | Required by SNMP items.<br>Item key.   |
|         | delay            | -        | string | Default: 1m   | Update interval of the item.   |
|         |                  |          |        |   | Note that <code>delay</code> will be always '0' for trapper items.   |
|         |                  |          |        |   | Accepts seconds or a time unit with suffix (30s, 1m, 2h, 1d).<br>Optionally one or more <b>custom intervals</b> can be specified either as flexible intervals or scheduling.<br>Multiple intervals are separated by a semicolon.<br>User macros may be used. A single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported.<br>Flexible intervals may be written as two macros separated by a forward slash (e.g. <code>{FLEX_INTERVAL}/{FLEX_PERIOD}</code> ). |
|         | history          | -        | string | Default: 90d  | Time period of how long the history data should be stored. A time period using the time suffix, a user macro or LLD macro.   |
|         | trends           | -        | string | Default: 365d   | Time period of how long the trends data should be stored. A time period using the time suffix, a user macro or LLD macro.  |
|         | status           | -        | string | 0 - ENABLED (default)<br>1 - DISABLED   | Item status.   |



| Element | Element property | Required | Type   | Range <sup>1</sup>  | Description  |
|---------|------------------|----------|--------|---|--|
|         | value_type       | -        | string | 0 - FLOAT<br>1 - CHAR<br>2 - LOG<br>3 - UNSIGNED (default)<br>4 - TEXT                                      | Received value type.   |
|         | allowed_hosts    | -        | string |   | List of IP addresses (comma delimited) of hosts allowed sending data for the item.   |
|         | units            | -        | string |   | Used by trapper and HTTP agent items.<br>Units of returned values (bps, B, etc).   |
|         | params           | -        | text   |   | Additional parameters depending on the type of the item:<br>- executed script for Script, SSH and Telnet items;<br>- SQL query for database monitor items;<br>- formula for calculated items.  |
|         | ipmi_sensor      | -        | string |   | IPMI sensor.   |
|         | authtype         | -        | string | Authentication type for SSH agent items:<br>0 - PASSWORD (default)<br>1 - PUBLIC_KEY                        | Used only by IPMI items.<br>Authentication type.   |
|         |                  |          |        | Authentication type for HTTP agent items:<br>0 - NONE (default)<br>1 - BASIC<br>2 - NTLM                    | Used only by SSH and HTTP agent items.   |
|         | username         | -        | string |   | Username for authentication.<br>Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent items.   |
|         | password         | -        | string |   | Required by SSH and Telnet items.<br>When used by JMX agent, password should also be specified together with the username or both properties should be left blank.<br>Password for authentication.<br>Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent items. |
|         | publickey        | -        | string |   | When used by JMX agent, username should also be specified together with the password or both properties should be left blank.<br>Name of the public key file.  |
|         | privatekey       | -        | string |   | Required for SSH agent items.<br>Name of the private key file.   |
|         | description      | -        | text   |   | Required for SSH agent items.<br>Item description.   |
|         | inventory_link   | -        | string | 0 - NONE  | Host inventory field that is populated by the item.  |
|         |                  |          |        | Capitalized host inventory field name.<br>For example:<br>4 - ALIAS<br>6 - OS_FULL<br>14 - HARDWARE<br>etc. | Refer to the <a href="#">host inventory page</a> for a list of supported host inventory fields and their IDs.  |

| Element | Element property | Required | Type   | Range <sup>1</sup>                                   | Description   |
|---------|------------------|----------|--------|--|---|
|         | logtimefmt       | -        | string |  | Format of the time in log entries.<br>Used only by log items.   |
|         | interface_ref    | -        | string | Format: if<N>  | Reference to the host interface.  |
|         | jmx_endpoint     | -        | string |  | JMX endpoint.   |
|         | url              | -        | string |  | Used only by JMX agent items.<br>URL string.  |
|         | allow_traps      | -        | string | 0 - NO (default)<br>1 - YES                          | Required only for HTTP agent items.<br>Allow to populate value as in a trapper item.  |
|         | follow_redirects |          | string | 0 - NO<br>1 - YES (default)                          | Used only by HTTP agent items.<br>Follow HTTP response redirects while polling data.  |
|         | headers          | -        |        |  | Used only by HTTP agent items.<br>Root element for HTTP(S) request headers, where header name is used as key and header value as value.                 |
|         | name             | x        | string |  | Used only by HTTP agent items.<br>Header name.  |
|         | value            | x        | string |  | Header value.   |
|         | http_proxy       | -        | string |  | HTTP(S) proxy connection string.  |
|         | output_format    | -        | string | 0 - RAW (default)<br>1 - JSON                        | Used only by HTTP agent items.<br>How to process response.  |
|         | post_type        | -        | string | 0 - RAW (default)<br>2 - JSON<br>3 - XML             | Used only by HTTP agent items.<br>Type of post data body.   |
|         | posts            | -        | string |  | Used only by HTTP agent items.<br>HTTP(S) request body data.  |
|         | query_fields     | -        |        |  | Used only by HTTP agent items.<br>Root element for query parameters.  |
|         | name             | x        | string |  | Used only by HTTP agent items.<br>Parameter name.   |
|         | value            | -        | string |  | Parameter value.  |
|         | request_method   |          | string | 0 - GET (default)<br>1 - POST<br>2 - PUT<br>3 - HEAD | Request method.   |
|         | retrieve_mode    | -        | string | 0 - BODY (default)<br>1 - HEADERS<br>2 - BOTH        | Used only by HTTP agent items.<br>What part of response should be stored.   |
|         | ssl_cert_file    | -        | string |  | Used only by HTTP agent items.<br>Public SSL Key file path.   |
|         | ssl_key_file     | -        | string |  | Used only by HTTP agent items.<br>Private SSL Key file path.  |
|         | ssl_key_password |          | string |  | Used only by HTTP agent items.<br>Password for SSL Key file.  |
|         | status_codes     | -        | string |  | Used only by HTTP agent items.<br>Ranges of required HTTP status codes separated by commas. Supports user macros.<br>Example: 200,200-{\$M},{M},200-400 |
|         |                  |          |        |  | Used only by HTTP agent items.  |

| Element       | Element<br>property | Required | Type   | Range <sup>1</sup>          | Description  |
|---------------|---------------------|----------|--------|-----------------------------|--|
|               | timeout             | -        | string |                             | Item data polling request timeout. Supports user macros.   |
|               | verify_host         | -        | string | 0 - NO (default)<br>1 - YES | Used by HTTP agent and Script items.<br>Whether to validate that the host name for the connection matches the one in the host's certificate. |
|               | verify_peer         | -        | string | 0 - NO (default)<br>1 - YES | Used only by HTTP agent items.<br>Whether to validate that the host's certificate is authentic.  |
| parameters    |                     | -        |        |                             | Used only by HTTP agent items.<br>Root element for user-defined parameters.  |
|               | name                | x        | string |                             | Used only by Script items.<br>Parameter name.  |
|               | value               | -        | string |                             | Used only by Script items.<br>Parameter value.   |
| value map     |                     | -        |        |                             | Used only by Script items.<br>Value map.   |
|               | name                | x        | string |                             | Name of the value map to use for the item.   |
| preprocessing |                     | -        |        |                             | Root element for item value preprocessing.   |
| step          |                     | -        |        |                             | Individual item value preprocessing step.  |

| Element     | Element property     | Required | Type   | Range <sup>1</sup>  | Description   |
|-------------|----------------------|----------|--------|---|---|
|             | type                 | x        | string | 1 - MULTIPLIER<br>2 - RTRIM<br>3 - LTRIM<br>4 - TRIM<br>5 - REGEX<br>6 - BOOL_TO_DECIMAL<br>7 - OCTAL_TO_DECIMAL<br>8 - HEX_TO_DECIMAL<br>9 - SIMPLE_CHANGE<br>(calculated as<br>(received<br>value-previous value))<br>10 -<br>CHANGE_PER_SECOND<br>(calculated as<br>(received<br>value-previous<br>value)/(time now-time<br>of last check))<br>11 - XMLPATH<br>12 - JSONPATH<br>13 - IN_RANGE<br>14 - MATCHES_REGEX<br>15 -<br>NOT_MATCHES_REGEX<br>16 -<br>CHECK_JSON_ERROR<br>17 -<br>CHECK_XML_ERROR<br>18 -<br>CHECK_REGEX_ERROR<br>19 -<br>DISCARD_UNCHANGED<br>20 - DIS-<br>CARD_UNCHANGED_HEARTBEAT<br>21 - JAVASCRIPT<br>22 -<br>PROMETHEUS_PATTERN<br>23 -<br>PROMETHEUS_TO_JSON<br>24 - CSV_TO_JSON<br>25 - STR_REPLACE<br>26 -<br>CHECK_NOT_SUPPORTED<br>27 - XML_TO_JSON | Type of the item value preprocessing step.                        |
|             | parameters           | -        |        |   | Root element for parameters of the item value preprocessing step. |
|             | parameter            | x        | string |   | Individual parameter of the item value preprocessing step.        |
|             | error_handler        | -        | string | 0 - ORIGINAL_ERROR<br>(default)<br>1 - DISCARD_VALUE<br>2 - CUSTOM_VALUE<br>3 - CUSTOM_ERROR  | Action type used in case of preprocessing step failure.           |
|             | error_handler_params |          | string |   | Error handler parameters used with 'error_handler'.               |
| master_item |                      | -        |        |   | Individual item master item.                                      |
|             |                      |          |        |   | Required by dependent items.                                      |

| Element  | Element property  | Required | Type   | Range <sup>1</sup> | Description   |
|----------|---|----------|--------|--------------------|---|
|          | key   | x        | string |                    | Dependent item master item key value.   |
| triggers |   | -        |        |                    | Recursion up to 3 dependent items and maximum count of dependent items equal to 29999 are allowed.<br>Root element for simple triggers. |
|          | <i>For trigger element tag values, see host trigger tags.</i> |          |        |                    |   |
| tags     |   | -        |        |                    | Root element for item tags.   |
|          | tag   | x        | string |                    | Tag name.   |
|          | value   | -        | string |                    | Tag value.  |

#### Host low-level discovery rule tags

| Element         | Element property   | Required | Type   | Range <sup>1</sup>  | Description  |
|-----------------|--|----------|--------|---|--|
| discovery_rules |  | -        |        |   | Root element for low-level discovery rules.  |
|                 | <i>For most of the element tag values, see element tag values for a regular item. Only the tags that are specific to low-level discovery rules, are described below.</i> |          |        |   |  |
|                 | type   | -        | string | 0 - ZABBIX_PASSIVE (default)<br>2 - TRAP<br>3 - SIMPLE<br>5 - INTERNAL<br>7 - ZABBIX_ACTIVE<br>10 - EXTERNAL<br>11 - ODBC<br>12 - IPMI<br>13 - SSH<br>14 - TELNET<br>16 - JMX<br>18 - DEPENDENT<br>19 - HTTP_AGENT<br>20 - SNMP_AGENT | Item type.   |
|                 | lifetime   | -        | string | Default: 30d  | Time period after which items that are no longer discovered will be deleted. Seconds, time unit with suffix or user macro. |
| filter          |  |          |        |   | Individual filter.   |

| Element            | Element property  | Required | Type      | Range <sup>1</sup>                                       | Description  |
|--------------------|---|----------|-----------|--|--|
| conditions         | evaltype  | -        | string    | 0 - AND_OR (default)<br>1 - AND<br>2 - OR<br>3 - FORMULA | Logic to use for checking low-level discovery rule filter conditions.  |
|                    | formula   | -        | string    |  | Custom calculation formula for filter conditions.  |
|                    |   | -        |           |  | Root element for filter conditions.  |
|                    | macro   | x        | string    |  | Low-level discovery macro name.  |
|                    | value   | -        | string    |  | Filter value: regular expression or global regular expression.   |
|                    | operator  | -        | string    | 8 - MATCHES_REGEX (default)<br>9 - NOT_MATCHES_REGEX     | Condition operator.  |
|                    | formulaid   | x        | character |  | Arbitrary unique ID that is used to reference a condition from the custom expression. Can only contain capital-case letters. The ID must be defined by the user when modifying filter conditions, but will be generated anew when requesting them afterward. |
| lld_macro_paths    |   | -        |           |  | Root element for LLD macro paths.  |
|                    | lld_macro   | x        | string    |  | Low-level discovery macro name.  |
|                    | path  | x        | string    |  | Selector for value which will be assigned to the corresponding macro.  |
| preprocessing step |   | -        |           |  | LLD rule value preprocessing.  |
|                    |   | -        |           |  | Individual LLD rule value preprocessing step.  |
|                    | <i>For most of the element tag values, see element tag values for a host item value preprocessing. Only the tags that are specific to low-level discovery value preprocessing, are described below.</i> |          |           |  |  |

| Element            | Element<br>property   | Required | Type   | Range <sup>1</sup>   | Description   |
|--------------------|---|----------|--------|--|---|
|                    | type  | x        | string | 5 - REGEX<br>11 - XMLPATH<br>12 - JSONPATH<br>15 -<br>NOT_MATCHES_REGEX<br>16 -<br>CHECK_JSON_ERROR<br>17 -<br>CHECK_XML_ERROR<br>20 - DIS-<br>CARD_UNCHANGED_HEARTBEAT<br>21 - JAVASCRIPT<br>23 -<br>PROMETHEUS_TO_JSON<br>24 - CSV_TO_JSON<br>25 - STR_REPLACE<br>27 - XML_TO_JSON | Type of the item value preprocessing step.                        |
| trigger_prototypes | <i>For trigger<br/>prototype<br/>element<br/>tag values,<br/>see regular<br/>host trigger<br/>tags.</i> | -        |        |  | Root element for trigger prototypes.                              |
| graph_prototypes   | <i>For graph<br/>prototype<br/>element<br/>tag values,<br/>see regular<br/>host graph<br/>tags.</i>     | -        |        |  | Root element for graph prototypes.                                |
| host_prototypes    | <i>For host<br/>prototype<br/>element<br/>tag values,<br/>see regular<br/>host tags.</i>                | -        |        |  | Root element for host prototypes.                                 |
| item_prototypes    | <i>For item<br/>prototype<br/>element<br/>tag values,<br/>see regular<br/>host item<br/>tags.</i>       | -        |        |  | Root element for item prototypes.                                 |
| master_item        |   | -        |        |  | Individual item prototype master item/item<br>prototype data.     |
|                    | key   | x        | string |  | Dependent item prototype master item/item<br>prototype key value. |
|                    |   |          |        |  | Required for a dependent item.                                    |

Host trigger tags

| Element      | Element property    | Required | Type   | Range <sup>1</sup>   | Description  |
|--------------|---------------------|----------|--------|--|--|
| triggers     | -                   | -        | -      | -  | Root element for triggers.   |
|              | expression          | x        | string | -  | Trigger expression.  |
|              | recovery_mode       | -        | string | 0 - EXPRESSION (default)<br>1 - RECOVERY_EXPRESSION<br>2 - NONE                                    | Basis for generating OK events.  |
|              | recovery_expression | -        | string | -  | Trigger recovery expression.   |
|              | correlation_mode    | -        | string | 0 - DISABLED (default)<br>1 - TAG_VALUE  | Correlation mode (no event correlation or event correlation by tag).     |
|              | correlation_tag     | -        | string | -  | The tag name to be used for event correlation.                           |
|              | name                | x        | string | -  | Trigger name.  |
|              | event_name          | -        | string | -  | Event name.  |
|              | opdata              | -        | string | -  | Operational data.  |
|              | url                 | -        | string | -  | URL associated with the trigger.   |
|              | status              | -        | string | 0 - ENABLED (default)<br>1 - DISABLED  | Trigger status.  |
|              | priority            | -        | string | 0 - NOT_CLASSIFIED (default)<br>1 - INFO<br>2 - WARNING<br>3 - AVERAGE<br>4 - HIGH<br>5 - DISASTER | Trigger severity.  |
|              | description         | -        | text   | -  | Trigger description.   |
|              | type                | -        | string | 0 - SINGLE (default)<br>1 - MULTIPLE   | Event generation type (single problem event or multiple problem events). |
|              | manual_close        | -        | string | 0 - NO (default)<br>1 - YES  | Manual closing of problem events.  |
| dependencies | -                   | -        | -      | -  | Root element for dependencies.   |
|              | name                | x        | string | -  | Dependency trigger name.   |
|              | expression          | x        | string | -  | Dependency trigger expression.   |
| tags         | recovery_expression | -        | string | -  | Dependency trigger recovery expression.                                  |
|              | -                   | -        | -      | -  | Root element for event tags.   |
|              | tag                 | x        | string | -  | Tag name.  |
|              | value               | -        | string | -  | Tag value.   |

#### Host graph tags

| Element | Element property | Required | Type    | Range <sup>1</sup>          | Description  |
|---------|------------------|----------|---------|-----------------------------|--|
| graphs  | -                | -        | -       | -                           | Root element for graphs.   |
|         | name             | x        | string  | -                           | Graph name.  |
|         | width            | -        | integer | 20-65535 (default: 900)     | Graph width, in pixels. Used for preview and for pie/exploded graphs.  |
|         | height           | -        | integer | 20-65535 (default: 200)     | Graph height, in pixels. Used for preview and for pie/exploded graphs. |
|         | yaxismin         | -        | double  | Default: 0                  | Value of Y axis minimum.   |
|         | yaxismax         | -        | double  | Default: 0                  | Used if 'ymin_type_1' is FIXED.<br>Value of Y axis maximum.            |
|         | show_work_period | -        | string  | 0 - NO<br>1 - YES (default) | Used if 'ymax_type_1' is FIXED.<br>Highlight non-working hours.        |
|         | -                | -        | -       | -                           | Used by normal and stacked graphs.                                     |



| Element     | Element property | Required | Type    | Range <sup>1</sup>   | Description   |
|-------------|------------------|----------|---------|--|---|
|             | show_triggers    | -        | string  | 0 - NO<br>1 - YES (default)  | Display simple trigger values as a line.  |
|             | type             | -        | string  | 0 - NORMAL (default)<br>1 - STACKED<br>2 - PIE<br>3 - EXPLODED   | Used by normal and stacked graphs.<br>Graph type.   |
|             | show_legend      | -        | string  | 0 - NO<br>1 - YES (default)  | Display graph legend.   |
|             | show_3d          | -        | string  | 0 - NO (default)<br>1 - YES  | Enable 3D style.  |
|             | percent_left     | -        | double  | Default:0  | Used by pie and exploded pie graphs.<br>Show the percentile line for left axis.   |
|             | percent_right    | -        | double  | Default:0  | Used only for normal graphs.<br>Show the percentile line for right axis.  |
|             | ymin_type_1      | -        | string  | 0 - CALCULATED (default)<br>1 - FIXED<br>2 - ITEM  | Used only for normal graphs.<br>Minimum value of Y axis.  |
|             | ymin_item_1      | -        |         |  | Used by normal and stacked graphs.<br>Individual item details.  |
|             | ymax_type_1      | -        | string  | 0 - CALCULATED (default)<br>1 - FIXED<br>2 - ITEM  | Maximum value of Y axis.  |
|             | ymax_item_1      | -        |         |  | Used by normal and stacked graphs.<br>Individual item details.  |
| graph_items | host             | x        | string  |  | Required if 'ymin_type_1' is ITEM.<br>Item host.  |
|             | key              | x        | string  |  | Item key.   |
|             | sortorder        | -        | integer |  | Individual item details.  |
|             | drawtype         | -        | string  | 0 - SINGLE_LINE (default)<br>1 - FILLED_REGION<br>2 - BOLD_LINE<br>3 - DOTTED_LINE<br>4 - DASHED_LINE<br>5 - GRADIENT_LINE | Required if 'ymax_type_1' is ITEM.<br>Item host.<br>Item key.<br>Root element for graph items.<br>Draw order. The smaller value is drawn first.<br>Can be used to draw lines or regions behind (or in front of) another.<br>Draw style of the graph item. |
|             | color            | -        | string  |  | Used only by normal graphs.   |
|             | yaxisside        | -        | string  | 0 - LEFT (default)<br>1 - RIGHT  | Element color (6 symbols, hex).<br>Side of the graph where the graph item's Y scale will be drawn.  |
|             |                  |          |         |  | Used by normal and stacked graphs.  |

| Element | Element property | Required | Type   | Range <sup>1</sup>   | Description   |
|---------|------------------|----------|--------|--|---|
| item    | calc_fnc         | -        | string | 1 - MIN<br>2 - AVG (default)<br>4 - MAX<br>7 - ALL (minimum, average and maximum; used only by simple graphs)<br>9 - LAST (used only by pie and exploded pie graphs) | Data to draw if more than one value exists for an item. |
|         | type             | -        | string | 0 - SIMPLE (default)<br>2 - GRAPH_SUM (value of the item represents the whole pie; used only by pie and exploded pie graphs)   | Graph item type.  |
|         |                  | x        |        |  | Individual item.  |
|         | host             | x        | string |  | Item host.  |
|         | key              | x        | string |  | Item key.   |

#### Host web scenario tags

| Element    | Element property | Required | Type    | Range <sup>1</sup>                          | Description  |
|------------|------------------|----------|---------|---|--|
| httpstests |                  | -        |         |   | Root element for web scenarios.  |
|            | name             | x        | string  |   | Web scenario name.   |
|            | delay            | -        | string  | Default: 1m                                 | Frequency of executing the web scenario. Seconds, time unit with suffix or user macro.   |
|            | attempts         | -        | integer | 1-10 (default: 1)                           | The number of attempts for executing web scenario steps.   |
|            | agent            | -        | string  | Default: Zabbix                             | Client agent. Zabbix will pretend to be the selected browser. This is useful when a website returns different content for different browsers.                        |
|            | http_proxy       | -        | string  |   | Specify an HTTP proxy to use, using the format:<br><code>http://[username[:password]@]proxy.example.com</code>   |
| variables  |                  | -        |         |   | Root element for scenario-level variables (macros) that may be used in scenario steps.   |
|            | name             | x        | text    |   | Variable name.   |
|            | value            | x        | text    |   | Variable value.  |
| headers    |                  | -        |         |   | Root element for HTTP headers that will be sent when performing a request. Headers should be listed using the same syntax as they would appear in the HTTP protocol. |
|            | name             | x        | text    |   | Header name.   |
|            | value            | x        | text    |   | Header value.  |
|            | status           | -        | string  | 0 - ENABLED (default)<br>1 - DISABLED       | Web scenario status.   |
|            | authentication   | -        | string  | 0 - NONE (default)<br>1 - BASIC<br>2 - NTLM | Authentication method.   |
|            | http_user        | -        | string  |   | User name used for basic, HTTP or NTLM authentication.   |
|            | http_password    | -        | string  |   | Password used for basic, HTTP or NTLM authentication.  |
|            | verify_peer      | -        | string  | 0 - NO (default)<br>1 - YES                 | Whether to validate that the host's certificate is authentic.  |

| Element | Element property | Required | Type   | Range <sup>1</sup>                            | Description  |
|---------|------------------|----------|--------|---|--|
|         | verify_host      | -        | string | 0 - NO (default)<br>1 - YES                   | Whether to validate that the host name for the connection matches the one in the host's certificate.   |
|         | ssl_cert_file    | -        | string |   | Name of the SSL certificate file used for client authentication (must be in PEM format).   |
|         | ssl_key_file     | -        | string |   | Name of the SSL private key file used for client authentication (must be in PEM format).   |
|         | ssl_key_password |          | string |   | SSL private key file password.   |
|         | steps            | x        |        |   | Root element for web scenario steps.   |
|         | name             | x        | string |   | Web scenario step name.  |
|         | url              | x        | string |   | URL for monitoring.  |
|         | query_fields     | -        |        |   | Root element for query fields - an array of HTTP fields that will be added to the URL when performing a request.   |
|         | name             | x        | string |   | Query field name.  |
|         | value            | -        | string |   | Query field value.   |
|         | posts            | -        |        |   | HTTP POST variables as a string (raw post data) or as an array of HTTP fields (form field data).   |
|         | name             | x        | string |   | Post field name.   |
|         | value            | x        | string |   | Post field value.  |
|         | variables        | -        |        |   | Root element of step-level variables (macros) that should be applied after this step.  |
|         |                  |          |        |   | If the variable value has a 'regex:' prefix, then its value is extracted from the data returned by this step according to the regular expression pattern following the 'regex:' prefix |
|         | name             | x        | string |   | Variable name.   |
|         | value            | x        | string |   | Variable value.  |
|         | headers          | -        |        |   | Root element for HTTP headers that will be sent when performing a request. Headers should be listed using the same syntax as they would appear in the HTTP protocol.                   |
|         | name             | x        | string |   | Header name.   |
|         | value            | x        | string |   | Header value.  |
|         | follow_redirects |          | string | 0 - NO<br>1 - YES (default)                   | Follow HTTP redirects.   |
|         | retrieve_mode    | -        | string | 0 - BODY (default)<br>1 - HEADERS<br>2 - BOTH | HTTP response retrieve mode.   |
|         | timeout          | -        | string | Default: 15s                                  | Timeout of step execution. Seconds, time unit with suffix or user macro.   |
|         | required         | -        | string |   | Text that must be present in the response. Ignored if empty.   |
|         | status_codes     | -        | string |   | A comma delimited list of accepted HTTP status codes. Ignored if empty. For example: 200-201,210-299   |
|         | tags             | -        |        |   | Root element for web scenario tags.  |
|         | tag              | x        | string |   | Tag name.  |
|         | value            | -        | string |   | Tag value.   |

#### Footnotes

<sup>1</sup> For string values, only the string will be exported (e.g. "ZABBIX\_ACTIVE") without the numbering used in this table. The numbers for range values (corresponding to the API values) in this table is used for ordering only.

## 4 Network maps

### Overview

Network map **export** contains:

- all related images
- map structure - all map settings, all contained elements with their settings, map links and map link status indicators

#### **Warning:**

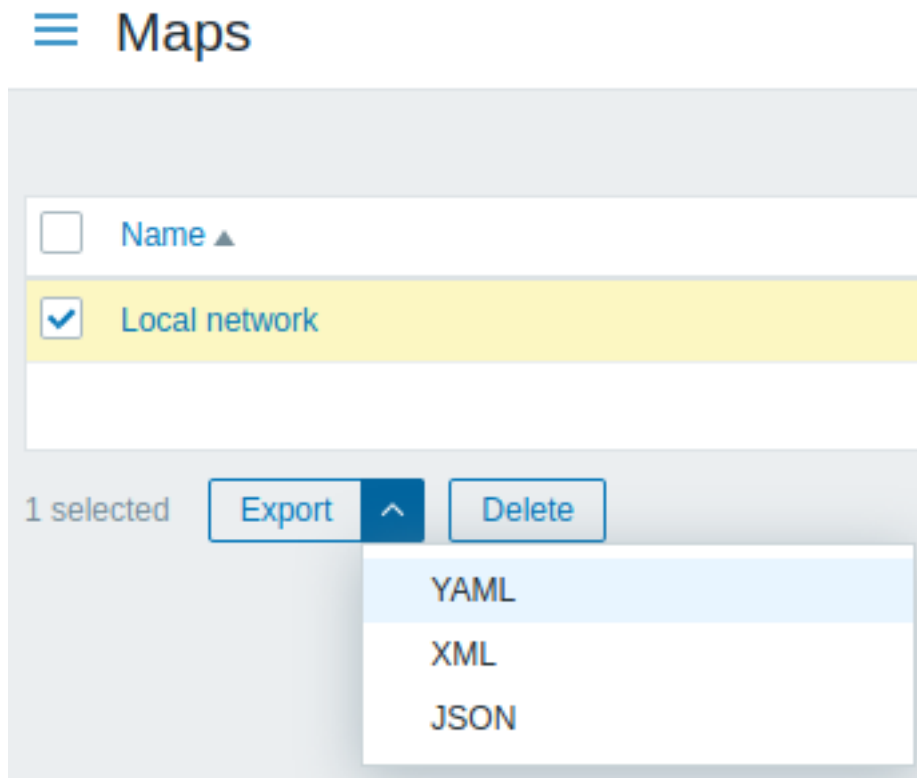
Any host groups, hosts, triggers, other maps or other elements that may be related to the exported map are not exported. Thus, if at least one of the elements the map refers to is missing, importing it will fail.

Network map export/import is supported since Zabbix 1.8.2.

### Exporting

To export network maps, do the following:

- Go to: *Monitoring* → *Maps*
- Mark the checkboxes of the network maps to export
- Click on *Export* below the list



Depending on the selected format, maps are exported to a local file with a default name:

- *zabbix\_export\_maps.yaml* - in YAML export (default option for export)
- *zabbix\_export\_maps.xml* - in XML export
- *zabbix\_export\_maps.json* - in JSON export

### Importing

To import network maps, do the following:

- Go to: *Monitoring* → *Maps*
- Click on *Import* to the right
- Select the import file
- Mark the required options in import rules
- Click on *Import*

Import

\* Import file

Choose file

zbx\_export\_sysmaps.yaml

Rules

Update existing

Create new

Delete missing

Maps

☒
☒

Images

☐
☒

Import

Cancel

All mandatory input fields are marked with a red asterisk.

A success or failure message of the import will be displayed in the frontend.

Import rules:

| Rule                   | Description   |
|------------------------|---|
| <i>Update existing</i> | Existing maps will be updated with data taken from the import file. Otherwise they will not be updated. |
| <i>Create new</i>      | The import will add new maps using data from the import file. Otherwise it will not add them.           |

If you uncheck both map options and check the respective options for images, images only will be imported. Image importing is only available to Super Admin users.

#### Warning:

If replacing an existing image, it will affect all maps that are using this image.

Export format

Export to YAML:

```
zabbix_export:
  version: '6.0'
  date: '2021-08-31T12:55:10Z'
  images:
    - name: Zabbix_server_3D_(128)
      imagetype: '1'
      encodedImage: iVBOR...5CYII=
  maps:
    - name: 'Local network'
      width: '680'
      height: '200'
      label_type: '0'
      label_location: '0'
      highlight: '1'
      expandproblem: '1'
      markelements: '1'
      show_unack: '0'
      severity_min: '0'
      show_suppressed: '0'
      grid_size: '50'
      grid_show: '1'
      grid_align: '1'
      label_format: '0'
      label_type_host: '2'
      label_type_hostgroup: '2'
```

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```

label_type_trigger: '2'
label_type_map: '2'
label_type_image: '2'
label_string_host: ''
label_string_hostgroup: ''
label_string_trigger: ''
label_string_map: ''
label_string_image: ''
expand_macros: '1'
background: { }
iconmap: { }
urls: { }
selements:
  - elementtype: '0'
    elements:
      - host: 'Zabbix server'
    label: |
      {HOST.NAME}
      {HOST.CONN}
    label_location: '0'
    x: '111'
    'y': '61'
    elementsubtype: '0'
    areatype: '0'
    width: '200'
    height: '200'
    viewtype: '0'
    use_iconmap: '0'
    selementid: '1'
    icon_off:
      name: Zabbix_server_3D_(128)
    icon_on: { }
    icon_disabled: { }
    icon_maintenance: { }
    urls: { }
    evaltype: '0'
shapes:
  - type: '0'
    x: '0'
    'y': '0'
    width: '680'
    height: '15'
    text: '{MAP.NAME}'
    font: '9'
    font_size: '11'
    font_color: '000000'
    text_halign: '0'
    text_valign: '0'
    border_type: '0'
    border_width: '0'
    border_color: '000000'
    background_color: ''
    zindex: '0'
lines: { }
links: { }

```

## Element tags

Element tag values are explained in the table below.

| Element | Element property | Type | Range | Description              |
|---------|------------------|------|-------|--------------------------|
| images  |                  |      |       | Root element for images. |

| Element | Element property     | Type    | Range   | Description   |
|---------|----------------------|---------|---|---|
| maps    | name                 | string  |   | Unique image name.  |
|         | imagetype            | integer | 1 - image<br>2 - background   | Image type.   |
|         | encodedImage         |         |   | Base64 encoded image.<br>Root element for maps.   |
|         | name                 | string  |   | Unique map name.  |
|         | width                | integer |   | Map width, in pixels.   |
|         | height               | integer |   | Map height, in pixels.  |
|         | label_type           | integer | 0 - label<br>1 - host IP address<br>2 - element name<br>3 - status only<br>4 - nothing  | Map element label type.   |
|         | label_location       | integer | 0 - bottom<br>1 - left<br>2 - right<br>3 - top  | Map element label location by default.  |
|         | highlight            | integer | 0 - no<br>1 - yes   | Enable icon highlighting for active triggers and host statuses.                               |
|         | expandproblem        | integer | 0 - no<br>1 - yes   | Display problem trigger for elements with a single problem.                                   |
|         | markelements         | integer | 0 - no<br>1 - yes   | Highlight map elements that have recently changed their status.                               |
|         | show_unack           | integer | 0 - count of all problems<br>1 - count of unacknowledged problems<br>2 - count of acknowledged and unacknowledged problems separately | Problem display.  |
|         | severity_min         | integer | 0 - not classified<br>1 - information<br>2 - warning<br>3 - average<br>4 - high<br>5 - disaster                                       | Minimum trigger severity to show on the map by default.                                       |
|         | show_suppressed      | integer | 0 - no<br>1 - yes   | Display problems which would otherwise be suppressed (not shown) because of host maintenance. |
|         | grid_size            | integer | 20, 40, 50, 75 or 100   | Cell size of a map grid in pixels, if "grid_show=1"   |
|         | grid_show            | integer | 0 - yes<br>1 - no   | Display a grid in map configuration.  |
|         | grid_align           | integer | 0 - yes<br>1 - no   | Automatically align icons in map configuration.   |
|         | label_format         | integer | 0 - no<br>1 - yes   | Use advanced label configuration.   |
|         | label_type_host      | integer | 0 - label<br>1 - host IP address<br>2 - element name<br>3 - status only<br>4 - nothing<br>5 - custom label                            | Display as host label, if "label_format=1"  |
|         | label_type_hostgroup | integer | 0 - label<br>2 - element name<br>3 - status only<br>4 - nothing<br>5 - custom label   | Display as host group label, if "label_format=1"  |

| Element   | Element property       | Type    | Range   | Description  |
|-----------|------------------------|---------|---|--|
| urls      | label_type_trigger     | integer | 0 - label<br>2 - element name<br>3 - status only<br>4 - nothing<br>5 - custom label | Display as trigger label, if "label_format=1"  |
|           | label_type_map         | integer | 0 - label<br>2 - element name<br>3 - status only<br>4 - nothing<br>5 - custom label | Display as map label, if "label_format=1"  |
|           | label_type_image       | integer | 0 - label<br>2 - element name<br>4 - nothing<br>5 - custom label                    | Display as image label, if "label_format=1"  |
|           | label_string_host      | string  |   | Custom label for host elements, if "label_type_host=5"                                     |
|           | label_string_hostgroup | string  |   | Custom label for host group elements, if "label_type_hostgroup=5"                          |
|           | label_string_trigger   | string  |   | Custom label for trigger elements, if "label_type_trigger=5"                               |
|           | label_string_map       | string  |   | Custom label for map elements, if "label_type_map=5"                                       |
|           | label_string_image     | string  |   | Custom label for image elements, if "label_type_image=5"                                   |
|           | expand_macros          | integer | 0 - no<br>1 - yes   | Expand macros in labels in map configuration.  |
|           | background             | id      |   | ID of the background image (if any), if "imagetype=2"                                      |
|           | iconmap                | id      |   | ID of the icon mapping (if any).<br>Used by maps or each map element.                      |
|           | name                   | string  |   | Link name.   |
|           | url                    | string  |   | Link URL.  |
|           | elementtype            | integer | 0 - host<br>1 - map<br>2 - trigger<br>3 - host group<br>4 - image                   | Map item type the link belongs to.   |
| selements | elementtype            | integer | 0 - host<br>1 - map<br>2 - trigger<br>3 - host group<br>4 - image                   | Map element type.  |
|           | label                  | string  |   | Icon label.  |
|           | label_location         | integer | -1 - use map default<br>0 - bottom<br>1 - left<br>2 - right<br>3 - top              |  |
|           | x                      | integer |   | Location on the X axis.  |
|           | y                      | integer |   | Location on the Y axis.  |
|           | elementsubtype         | integer | 0 - single host group<br>1 - all host groups  | Element subtype, if "elementtype=3"  |
|           | areatype               | integer | 0 - same as whole map<br>1 - custom size  | Area size, if "elementsubtype=1"   |
|           | width                  | integer |   | Width of area, if "areatype=1"   |
|           | height                 | integer |   | Height of area, if "areatype=1"  |
|           | viewtype               | integer | 0 - place evenly in the area  | Area placement algorithm, if "elementsubtype=1"  |
|           | use_iconmap            | integer | 0 - no<br>1 - yes   | Use icon mapping for this element. Relevant only if iconmapping is activated on map level. |



| Element          | Element property | Type    | Range   | Description   |
|------------------|------------------|---------|---|---|
| tags             | selementid       | id      |   | Unique element record ID.   |
|                  | evaltype         | integer |   | Evaluation type for tags.   |
|                  |                  |         |   | Problem tags (for host and host group elements). If tags are given, only problems with these tags will be displayed on the map. |
| elements         | tag              | string  |   | Tag name.   |
|                  | value            | string  |   | Tag value.  |
|                  | operator         | integer |   | Operator.   |
|                  |                  |         |   | Zabbix entities that are represented on the map (host, host group, map etc).  |
| icon_off         | host             |         |   | Image to use when element is in 'OK' status.  |
| icon_on          |                  |         |   | Image to use when element is in 'Problem' status.   |
| icon_disabled    |                  |         |   | Image to use when element is disabled.  |
| icon_maintenance |                  |         |   | Image to use when element is in maintenance.  |
| shapes           | name             | string  |   | Unique image name.  |
|                  | type             | integer | 0 - rectangle<br>1 - ellipse  | Shape type.   |
|                  | x                | integer |   | X coordinates of the shape in pixels.   |
|                  | y                | integer |   | Y coordinates of the shape in pixels.   |
|                  | width            | integer |   | Shape width.  |
|                  | height           | integer |   | Shape height.   |
|                  | border_type      | integer | 0 - none<br>1 - bold line<br>2 - dotted line<br>3 - dashed line   | Type of the border for the shape.   |
|                  | border_width     | integer |   | Width of the border in pixels.  |
|                  | border_color     | string  |   | Border color represented in hexadecimal code.   |
|                  | text             | string  |   | Text inside of shape.   |
|                  | font             | integer | 0 - Georgia, serif<br>1 - "Palatino Linotype",<br>"Book Antiqua",<br>Palatino, serif<br>2 - "Times New Roman",<br>Times, serif<br>3 - Arial, Helvetica,<br>sans-serif<br>4 - "Arial Black",<br>Gadget, sans-serif<br>5 - "Comic Sans MS",<br>cursive, sans-serif<br>6 - Impact, Charcoal,<br>sans-serif<br>7 - "Lucida Sans<br>Unicode", "Lucida<br>Grande", sans-serif<br>8 - Tahoma, Geneva,<br>sans-serif<br>9 - "Trebuchet MS",<br>Helvetica, sans-serif<br>10 - Verdana, Geneva,<br>sans-serif<br>11 - "Courier New",<br>Courier, monospace<br>12 - "Lucida Console",<br>Monaco, monospace | Text font style.  |
|                  | font_size        | integer |   | Font size in pixels.  |
|                  | font_color       | string  |   | Font color represented in hexadecimal code.   |

| Element      | Element property    | Type    | Range   | Description   |
|--------------|---------------------|---------|---|---|
| lines        | text_halign         | integer | 0 - center<br>1 - left<br>2 - right                             | Horizontal alignment of text.   |
|              | text_valign         | integer | 0 - middle<br>1 - top<br>2 - bottom                             | Vertical alignment of text.   |
|              | background_color    | string  |   | Background (fill) color represented in hexadecimal code.                      |
|              | zindex              | integer |   | Value used to order all shapes and lines (z-index).                           |
|              | x1                  | integer |   | X coordinates of the line point 1 in pixels.                                  |
|              | y1                  | integer |   | Y coordinates of the line point 1 in pixels.                                  |
|              | x2                  | integer |   | X coordinates of the line point 2 in pixels.                                  |
|              | y2                  | integer |   | Y coordinates of the line point 2 in pixels.                                  |
|              | line_type           | integer | 0 - none<br>1 - bold line<br>2 - dotted line<br>3 - dashed line | Line type.  |
|              | line_width          | integer |   | Line width in pixels.   |
| links        | line_color          | string  |   | Line color represented in hexadecimal code.                                   |
|              | zindex              | integer |   | Value used to order all shapes and lines (z-index).                           |
| linktriggers | drawtype            | integer | 0 - line<br>2 - bold line<br>3 - dotted line<br>4 - dashed line | Links between map elements.<br>Link style.                                    |
|              | color               | string  |   | Link color (6 symbols, hex).  |
|              | label               | string  |   | Link label.   |
|              | selementid1         | id      |   | ID of one element to connect.   |
|              | selementid2         | id      |   | ID of the other element to connect.   |
|              | drawtype            | integer | 0 - line<br>2 - bold line<br>3 - dotted line<br>4 - dashed line | Link status indicators.<br>Link style when trigger is in the 'Problem' state. |
| trigger      | color               | string  |   | Link color (6 symbols, hex) when trigger is in the 'Problem' state.           |
|              |                     |         |   | Trigger used for indicating link status.                                      |
|              | description         | string  |   | Trigger name.   |
|              | expression          | string  |   | Trigger expression.   |
|              | recovery_expression | string  |   | Trigger recovery expression.  |

## 5 Media types

### Overview

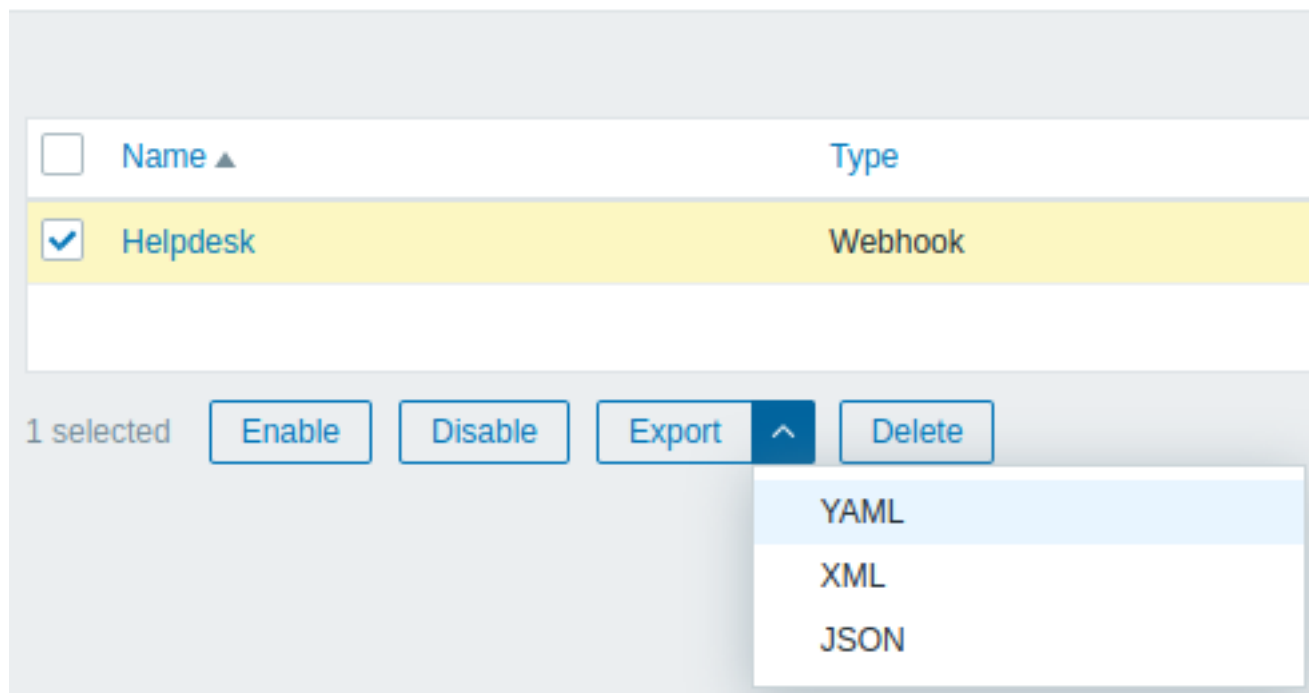
Media types are **exported** with all related objects and object relations.

### Exporting

To export media types, do the following:

- Go to: *Administration* → *Media types*
- Mark the checkboxes of the media types to export
- Click on *Export* below the list

## Media types



| <input type="checkbox"/>            | Name ▲   | Type    |
|-------------------------------------|----------|---------|
| <input checked="" type="checkbox"/> | Helpdesk | Webhook |

1 selected

Enable Disable Export ^ Delete

- YAML
- XML
- JSON

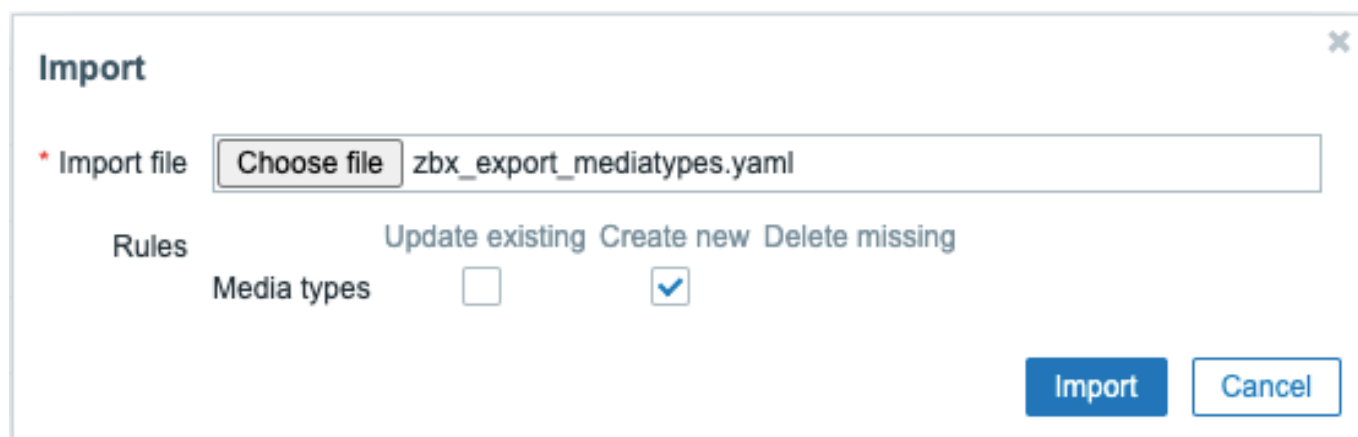
Depending on the selected format, media types are exported to a local file with a default name:

- `zabbix_export_mediatypes.yaml` - in YAML export (default option for export)
- `zabbix_export_mediatypes.xml` - in XML export
- `zabbix_export_mediatypes.json` - in JSON export

### Importing

To import media types, do the following:

- Go to: *Administration* → *Media types*
- Click on *Import* to the right
- Select the import file
- Mark the required options in import rules
- Click on *Import*



**Import**

\* Import file

Rules

Update existing ☐ Create new ☒ Delete missing ☐

Media types

A success or failure message of the import will be displayed in the frontend.

Import rules:

| Rule            | Description   |
|-----------------|---|
| Update existing | Existing elements will be updated with data taken from the import file. Otherwise they will not be updated. |
| Create new      | The import will add new elements using data from the import file. Otherwise it will not add them.           |

| Rule                  | Description   |
|-----------------------|---|
| <i>Delete missing</i> | The import will remove existing elements not present in the import file. Otherwise it will not remove them. |

## Export format

### Export to YAML:

```
zabbix_export:
  version: '6.0'
  date: '2021-08-31T13:34:17Z'
  media_types:
    - name: Pushover
      type: WEBHOOK
      parameters:
        - name: endpoint
          value: 'https://api.pushover.net/1/messages.json'
        - name: eventid
          value: '{EVENT.ID}'
        - name: event_nseverity
          value: '{EVENT.NSEVERITY}'
        - name: event_source
          value: '{EVENT.SOURCE}'
        - name: event_value
          value: '{EVENT.VALUE}'
        - name: expire
          value: '1200'
        - name: message
          value: '{ALERT.MESSAGE}'
        - name: priority_average
          value: '0'
        - name: priority_default
          value: '0'
        - name: priority_disaster
          value: '0'
        - name: priority_high
          value: '0'
        - name: priority_information
          value: '0'
        - name: priority_not_classified
          value: '0'
        - name: priority_warning
          value: '0'
        - name: retry
          value: '60'
        - name: title
          value: '{ALERT.SUBJECT}'
        - name: token
          value: '<PUSHOVER TOKEN HERE>'
        - name: triggerid
          value: '{TRIGGER.ID}'
        - name: url
          value: '{ZABBIX.URL}'
        - name: url_title
          value: Zabbix
        - name: user
          value: '{ALERT.SENDTO}'
      max_sessions: '0'
  script: |
    try {
      var params = JSON.parse(value),
          request = new HttpRequest(),
          data,
```

```

        response,
        severities = [
            {name: 'not_classified', color: '#97AAB3'},
            {name: 'information', color: '#7499FF'},
            {name: 'warning', color: '#FFC859'},
            {name: 'average', color: '#FFA059'},
            {name: 'high', color: '#E97659'},
            {name: 'disaster', color: '#E45959'},
            {name: 'resolved', color: '#009900'},
            {name: 'default', color: '#000000'}
        ],
        priority;

    if (typeof params.HTTPProxy === 'string' && params.HTTPProxy.trim() !== '') {
        request.setProxy(params.HTTPProxy);
    }

    if ([0, 1, 2, 3].indexOf(parseInt(params.event_source)) === -1) {
        throw 'Incorrect "event_source" parameter given: "' + params.event_source + '".\nMust be 0 or 1';
    }

    if (params.event_value !== '0' && params.event_value !== '1'
        && (params.event_source === '0' || params.event_source === '3')) {
        throw 'Incorrect "event_value" parameter given: "' + params.event_value + '".\nMust be 0 or 1';
    }

    if ([0, 1, 2, 3, 4, 5].indexOf(parseInt(params.event_nseverity)) === -1) {
        params.event_nseverity = '7';
    }

    if (params.event_value === '0') {
        params.event_nseverity = '6';
    }

    priority = params['priority_' + severities[params.event_nseverity].name] || params.priority_default;

    if (isNaN(priority) || priority < -2 || priority > 2) {
        throw '"priority" should be -2..2';
    }

    if (params.event_source === '0' && isNaN(params.triggerid)) {
        throw 'field "triggerid" is not a number';
    }

    if (isNaN(params.eventid)) {
        throw 'field "eventid" is not a number';
    }

    if (typeof params.message !== 'string' || params.message.trim() === '') {
        throw 'field "message" cannot be empty';
    }

    data = {
        token: params.token,
        user: params.user,
        title: params.title,
        message: params.message,
        url: (params.event_source === '0')
            ? params.url + '/tr_events.php?triggerid=' + params.triggerid + '&eventid=' + params.eventid
            : params.url,
        url_title: params.url_title,
        priority: priority
    };

```

```

    if (priority == 2) {
        if (isNaN(params.retry) || params.retry < 30) {
            throw 'field "retry" should be a number with value of at least 30 if "priority" is set';
        }

        if (isNaN(params.expire) || params.expire > 10800) {
            throw 'field "expire" should be a number with value of at most 10800 if "priority" is set';
        }

        data.retry = params.retry;
        data.expire = params.expire;
    }

    data = JSON.stringify(data);
    Zabbix.log(4, '[ Pushover Webhook ] Sending request: ' + params.endpoint + '\n' + data);

    request.addHeader('Content-Type: application/json');
    response = request.post(params.endpoint, data);

    Zabbix.log(4, '[ Pushover Webhook ] Received response with status code ' + request.getStatus());

    if (response !== null) {
        try {
            response = JSON.parse(response);
        }
        catch (error) {
            Zabbix.log(4, '[ Pushover Webhook ] Failed to parse response received from Pushover');
            response = null;
        }
    }

    if (request.getStatus() != 200 || response === null || typeof response !== 'object' || (response !== null && typeof response === 'object' && typeof response.errors === 'object' && typeof response.errors[0] === 'string')) {
        throw response.errors[0];
    }
    else {
        throw 'Unknown error. Check debug log for more information.';
    }
}

return 'OK';
}
catch (error) {
    Zabbix.log(4, '[ Pushover Webhook ] Pushover notification failed: ' + error);
    throw 'Pushover notification failed: ' + error;
}
}
description: |
    Please refer to setup guide here: https://git.zabbix.com/projects/ZBX/repos/zabbix/browse/template

    Set token parameter with to your Pushover application key.
    When assigning Pushover media to the Zabbix user - add user key into send to field.
message_templates:
- event_source: TRIGGERS
  operation_mode: PROBLEM
  subject: 'Problem: {EVENT.NAME}'
  message: |
    Problem started at {EVENT.TIME} on {EVENT.DATE}
    Problem name: {EVENT.NAME}
    Host: {HOST.NAME}
    Severity: {EVENT.SEVERITY}
    Operational data: {EVENT.OPDATA}

```

```

    Original problem ID: {EVENT.ID}
    {TRIGGER.URL}
- event_source: TRIGGERS
  operation_mode: RECOVERY
  subject: 'Resolved in {EVENT.DURATION}: {EVENT.NAME}'
  message: |
    Problem has been resolved at {EVENT.RECOVERY.TIME} on {EVENT.RECOVERY.DATE}
    Problem name: {EVENT.NAME}
    Problem duration: {EVENT.DURATION}
    Host: {HOST.NAME}
    Severity: {EVENT.SEVERITY}
    Original problem ID: {EVENT.ID}
    {TRIGGER.URL}
- event_source: TRIGGERS
  operation_mode: UPDATE
  subject: 'Updated problem in {EVENT.AGE}: {EVENT.NAME}'
  message: |
    {USER.FULLNAME} {EVENT.UPDATE.ACTION} problem at {EVENT.UPDATE.DATE} {EVENT.UPDATE.TIME}.
    {EVENT.UPDATE.MESSAGE}

    Current problem status is {EVENT.STATUS}, age is {EVENT.AGE}, acknowledged: {EVENT.ACK.STATUS}
- event_source: DISCOVERY
  operation_mode: PROBLEM
  subject: 'Discovery: {DISCOVERY.DEVICE.STATUS} {DISCOVERY.DEVICE.IPADDRESS}'
  message: |
    Discovery rule: {DISCOVERY.RULE.NAME}

    Device IP: {DISCOVERY.DEVICE.IPADDRESS}
    Device DNS: {DISCOVERY.DEVICE.DNS}
    Device status: {DISCOVERY.DEVICE.STATUS}
    Device uptime: {DISCOVERY.DEVICE.UPTIME}

    Device service name: {DISCOVERY.SERVICE.NAME}
    Device service port: {DISCOVERY.SERVICE.PORT}
    Device service status: {DISCOVERY.SERVICE.STATUS}
    Device service uptime: {DISCOVERY.SERVICE.UPTIME}
- event_source: AUTOREGISTRATION
  operation_mode: PROBLEM
  subject: 'Autoregistration: {HOST.HOST}'
  message: |
    Host name: {HOST.HOST}
    Host IP: {HOST.IP}
    Agent port: {HOST.PORT}

```

## Element tags

Element tag values are explained in the table below.

| Element     | Element property | Required | Type   | Range <sup>1</sup>                                | Description                        |
|-------------|------------------|----------|--------|---|------------------------------------|
| media_types | -                | -        | -      | -   | Root element for media_types.      |
|             | name             | x        | string | -   | Media type name.                   |
|             | type             | x        | string | 0 - EMAIL<br>1 - SMS<br>2 - SCRIPT<br>4 - WEBHOOK | Transport used by the media type.  |
|             | status           | -        | string | 0 - ENABLED (default)<br>1 - DISABLED             | Whether the media type is enabled. |

| Element                         | Element property    | Required | Type    | Range <sup>1</sup>  | Description  |
|---------------------------------|---------------------|----------|---------|---|--|
| Used only by email media type   | max_sessions        | -        | integer | Possible values for SMS: 1 - (default)<br><br>Possible values for other media types: 0-100, 0 - unlimited | The maximum number of alerts that can be processed in parallel.                |
|                                 | attempts            | -        | integer | 1-10 (default: 3)   | The maximum number of attempts to send an alert.                               |
|                                 | attempt_interval    | -        | string  | 0-60s (default: 10s)  | The interval between retry attempts.   |
|                                 | description         | -        | string  |   | Accepts seconds and time unit with suffix. Media type description.             |
|                                 | message_templates   | -        |         |   | Root element for media type message templates.                                 |
|                                 | event_source        | x        | string  | 0 - TRIGGERS<br>1 - DISCOVERY<br>2 -<br>AUTOREGISTRATION<br>3 - INTERNAL<br>4 - SERVICE                   | Event source.  |
|                                 | operation_mode      | -        | string  | 0 - PROBLEM<br>1 - RECOVERY<br>2 - UPDATE   | Operation mode.  |
|                                 | subject             | -        | string  |   | Message subject.   |
|                                 | message             | -        | string  |   | Message body.  |
|                                 | smtp_server         | x        | string  |   | SMTP server.   |
|                                 | smtp_port           | -        | integer | Default: 25   | SMTP server port to connect to.  |
|                                 | smtp_helo           | x        | string  |   | SMTP helo.   |
|                                 | smtp_email          | x        | string  |   | Email address from which notifications will be sent.                           |
| Used only by SMS media type     | smtp_security       | -        | string  | 0 - NONE (default)<br>1 - STARTTLS<br>2 - SSL_OR_TLS  | SMTP connection security level to use.   |
|                                 | smtp_verify_host    | -        | string  | 0 - NO (default)<br>1 - YES   | SSL verify host for SMTP. Optional if smtp_security is STARTTLS or SSL_OR_TLS. |
|                                 | smtp_verify_peer    | -        | string  | 0 - NO (default)<br>1 - YES   | SSL verify peer for SMTP. Optional if smtp_security is STARTTLS or SSL_OR_TLS. |
|                                 | smtp_authentication | -        | string  | 0 - NONE (default)<br>1 - PASSWORD  | SMTP authentication method to use.   |
|                                 | username            | -        | string  |   | Username.  |
|                                 | password            | -        | string  |   | Authentication password.   |
|                                 | content_type        | -        | string  | 0 - TEXT<br>1 - HTML (default)  | Message format.  |
|                                 | gsm_modem           | x        | string  |   | Serial device name of the GSM modem.   |
|                                 | script name         | x        | string  |   | Script name.   |
|                                 | parameters          | -        |         |   | Root element for script parameters.  |
| Used only by webhook media type | script              | x        | string  |   | Script.  |



| Element    | Element property | Required | Type   | Range <sup>1</sup>          | Description  |
|------------|------------------|----------|--------|-----------------------------|--|
|            | timeout          | -        | string | 1-60s (default: 30s)        | Javascript script HTTP request timeout interval.   |
|            | process_tags     | -        | string | 0 - NO (default)<br>1 - YES | Whether to process returned tags.  |
|            | show_event_menu  |          | string | 0 - NO (default)<br>1 - YES | If {EVENT.TAGS.*} were successfully resolved in event_menu_url and event_menu_name fields, this field indicates presence of entry in the event menu. |
|            | event_menu_url   |          | string |                             | URL of the event menu entry. Supports {EVENT.TAGS.*} macro.  |
|            | event_menu_name  |          | string |                             | Name of the event menu entry. Supports {EVENT.TAGS.*} macro.   |
| parameters |                  | -        |        |                             | Root element for webhook media type parameters.  |
|            | name             | x        | string |                             | Webhook parameter name.  |
|            | value            | -        | string |                             | Webhook parameter value.   |

#### Footnotes

<sup>1</sup> For string values, only the string will be exported (e.g. "EMAIL") without the numbering used in this table. The numbers for range values (corresponding to the API values) in this table is used for ordering only.

## 15 Discovery

Please use the sidebar to access content in the Discovery section.

### 1 Network discovery

#### Overview

Zabbix offers automatic network discovery functionality that is effective and very flexible.

With network discovery properly set up you can:

- speed up Zabbix deployment
- simplify administration
- use Zabbix in rapidly changing environments without excessive administration

Zabbix network discovery is based on the following information:

- IP ranges
- Availability of external services (FTP, SSH, WEB, POP3, IMAP, TCP, etc)
- Information received from Zabbix agent (only unencrypted mode is supported)
- Information received from SNMP agent

It does NOT provide:

- Discovery of network topology

Network discovery basically consists of two phases: discovery and actions.

#### Discovery

Zabbix periodically scans the IP ranges defined in **network discovery rules**. The frequency of the check is configurable for each rule individually.

Note that one discovery rule will always be processed by a single discoverer process. The IP range will not be split between multiple discoverer processes.

Each rule has a set of service checks defined to be performed for the IP range.

**Note:**

Discovery checks are processed independently from the other checks. If any checks do not find a service (or fail), other checks will still be processed.

Every check of a service and a host (IP) performed by the network discovery module generates a discovery event.

| Event                     | Check of service result   |
|---------------------------|---|
| <i>Service Discovered</i> | The service is 'up' after it was 'down' or when discovered for the first time.  |
| <i>Service Up</i>         | The service is 'up', after it was already 'up'.   |
| <i>Service Lost</i>       | The service is 'down' after it was 'up'.  |
| <i>Service Down</i>       | The service is 'down', after it was already 'down'.   |
| <i>Host Discovered</i>    | At least one service of a host is 'up' after all services of that host were 'down' or a service is discovered which belongs to a not registered host. |
| <i>Host Up</i>            | At least one service of a host is 'up', after at least one service was already 'up'.  |
| <i>Host Lost</i>          | All services of a host are 'down' after at least one was 'up'.  |
| <i>Host Down</i>          | All services of a host are 'down', after they were already 'down'.  |

## Actions

Discovery events can be the basis of relevant **actions**, such as:

- Sending notifications
- Adding/removing hosts
- Enabling/disabling hosts
- Adding hosts to a group
- Removing hosts from a group
- Linking hosts to/unlinking from a template
- Executing remote scripts

These actions can be configured with respect to the device type, IP, status, uptime/downtime, etc. For full details on configuring actions for network-discovery based events, see action **operation** and **conditions** pages.

Since network discovery actions are event-based, they will be triggered both when a discovered host is online and when it is offline. It is highly recommended to add an action **condition** *Discovery status: up* to avoid such actions as *Add host* being triggered upon *Service Lost/Service Down* events. Otherwise, if a discovered host is manually removed, it will still generate *Service Lost/Service Down* events and will be recreated during the next discovery cycle.

**Note:**

Linking a discovered host to templates will fail collectively if any of the linkable templates has a unique entity (e.g. item key) that is the same as a unique entity (e.g. item key) already existing on the host or on another of the linkable templates.

## Host creation

A host is added if the *Add host* operation is selected. A host is also added, even if the *Add host* operation is missing, if you select operations resulting in actions on a host. Such operations are:

- enable host
- disable host
- add host to a host group
- link template to a host

Created hosts are added to the *Discovered hosts* group (by default, configurable in *Administration* → *General* → *Other*). If you wish hosts to be added to another group, add a *Remove from host groups* operation (specifying "Discovered hosts") and also add an *Add to host groups* operation (specifying another host group), because a host must belong to a host group.

The IP address of the discovered device is the criterion for finding a host in the system. If a host with that IP address and interface type already exists, that host will be the target for performing operations.

If the IP address of the discovered host is changed or the interface is deleted, a new host will be created upon the next discovery.

## Host naming

When adding hosts, a host name is the result of reverse DNS lookup or IP address if reverse lookup fails. Lookup is performed from the Zabbix server or Zabbix proxy, depending on which is doing the discovery. If lookup fails on the proxy, it is not retried on the server. If the host with such a name already exists, the next host would get **\_2** appended to the name, then **\_3** and so on.

It is also possible to override DNS/IP lookup and instead use an item value for host name, for example:

- You may discover multiple servers with Zabbix agent running using a Zabbix agent item for discovery and assign proper names to them automatically, based on the string value returned by this item
- You may discover multiple SNMP network devices using an SNMP agent item for discovery and assign proper names to them automatically, based on the string value returned by this item

If the host name has been set using an item value, it is not updated during the following discovery checks. If it is not possible to set host name using an item value, default value (DNS name) is used.

If a host already exists with the discovered IP address, a new host is not created. However, if the discovery action contains operations (link template, add to host group, etc), they are performed on the existing host.

#### Host removal

Hosts discovered by a network discovery rule are removed automatically from *Monitoring* → *Discovery* if a discovered entity is not in the rule's IP range any more. Hosts are removed immediately.

#### Interface creation when adding hosts

When hosts are added as a result of network discovery, they get interfaces created according to these rules:

- the services detected - for example, if an SNMP check succeeded, an SNMP interface will be created
- if a host responded both to Zabbix agent and SNMP requests, both types of interfaces will be created
- if uniqueness criteria are Zabbix agent or SNMP-returned data, the first interface found for a host will be created as the default one. Other IP addresses will be added as additional interfaces. Action's conditions (such as Host IP) do not impact adding interfaces. *Note* that this will work if all interfaces are discovered by the same discovery rule. If a different discovery rule discovers a different interface of the same host, an additional host will be added.
- if a host responded to agent checks only, it will be created with an agent interface only. If it would start responding to SNMP later, additional SNMP interfaces would be added.
- if 3 separate hosts were initially created, having been discovered by the "IP" uniqueness criteria, and then the discovery rule is modified so that hosts A, B and C have identical uniqueness criteria result, B and C are created as additional interfaces for A, the first host. The individual hosts B and C remain. In *Monitoring* → *Discovery* the added interfaces will be displayed in the "Discovered device" column, in black font and indented, but the "Monitored host" column will only display A, the first created host. "Uptime/Downtime" is not measured for IPs that are considered to be additional interfaces.

#### Changing proxy setting

The hosts discovered by different proxies are always treated as different hosts. While this allows to perform discovery on matching IP ranges used by different subnets, changing proxy for an already monitored subnet is complicated because the proxy changes must be also applied to all discovered hosts.

For example the steps to replace proxy in a discovery rule:

1. disable discovery rule
2. sync proxy configuration
3. replace the proxy in the discovery rule
4. replace the proxy for all hosts discovered by this rule
5. enable discovery rule

## 1 Configuring a network discovery rule

### Overview

To configure a network discovery rule used by Zabbix to discover hosts and services:

- Go to *Configuration* → *Discovery*
- Click on *Create rule* (or on the rule name to edit an existing one)
- Edit the discovery rule attributes

### Rule attributes

\* Name

Local network

Discovery by proxy

No proxy

\* IP range

192.168.1.1-254

\* Update interval

1h

\* Checks

Type

HTTP

HTTPS

SNMPv2 agent "iso.3.6.1.2.1.1.0"

Zabbix agent "system.uname"

Add

Discovery check

Check type

SNMPv2 agent

\* Port range

161

\* SNMP community

public

\* SNMP OID

iso.3.6.1.2.1.1.1.0

Device uniqueness criteria

☐ IP address
 ☒ SNMPv2 agent "iso.3.6.1.2.1.1.0"
 ☐ Zabbix agent "system.uname"

Host name

☐ DNS name
 ☐ IP address
 ☐ SNMPv2 agent "iso.3.6.1.2.1.1.0"
 ☒ Zabbix agent "system.uname"

Visible name

☒ Host name
 ☐ DNS name
 ☐ IP address
 ☐ SNMPv2 agent "iso.3.6.1.2.1.1.0"
 ☐ Zabbix agent "system.uname"

Enabled

☒

Add

Cancel

All mandatory input fields are marked with a red asterisk.

| Parameter                         | Description   |
|-----------------------------------|---|
| <i>Name</i>                       | Unique name of the rule. For example, "Local network".  |
| <i>Discovery by proxy</i>         | What performs discovery:<br><b>no proxy</b> - Zabbix server is doing discovery<br><b>&lt;proxy name&gt;</b> - this proxy performs discovery   |
| <i>IP range</i>                   | The range of IP addresses for discovery. It may have the following formats:<br>Single IP: 192.168.1.33<br>Range of IP addresses: 192.168.1-10.1-255. The range is limited by the total number of covered addresses (less than 64K).<br>IP mask: 192.168.4.0/24<br>supported IP masks:<br>/16 - /30 for IPv4 addresses<br>/112 - /128 for IPv6 addresses<br>List: 192.168.1.1-255, 192.168.2.1-100, 192.168.2.200, 192.168.4.0/24<br>Since Zabbix 3.0.0 this field supports spaces, tabulation and multiple lines.   |
| <i>Update interval</i>            | This parameter defines how often Zabbix will execute the rule.<br>The interval is measured after the execution of previous discovery instance ends so there is no overlap.<br><b>Time suffixes</b> are supported, e.g. 30s, 1m, 2h, 1d, since Zabbix 3.4.0.<br><b>User macros</b> are supported, since Zabbix 3.4.0.<br><i>Note</i> that if a user macro is used and its value is changed (e.g. 1w → 1h), the next check will be executed according to the previous value (far in the future with the example values).  |
| <i>Checks</i>                     | Zabbix will use this list of checks for discovery. Click on <a href="#">Add</a> to configure a new check in a popup window.<br>Supported checks: SSH, LDAP, SMTP, FTP, HTTP, HTTPS, POP, NNTP, IMAP, TCP, Telnet, Zabbix agent, SNMPv1 agent, SNMPv2 agent, SNMPv3 agent, ICMP ping.<br>A protocol-based discovery uses the <b>net.tcp.service[]</b> functionality to test each host, except for SNMP which queries an SNMP OID. Zabbix agent is tested by querying an item in unencrypted mode. Please see <b>agent items</b> for more details.<br>The 'Ports' parameter may be one of following:<br>Single port: 22<br>Range of ports: 22-45<br>List: 22-45,55,60-70    |
| <i>Device uniqueness criteria</i> | Uniqueness criteria may be:<br><b>IP address</b> - do not process multiple single-IP devices. If a device with the same IP already exists it will be considered already discovered and a new host will not be added.<br><b>&lt;discovery check&gt;</b> - either Zabbix agent or SNMP agent check.<br><i>Note</i> that uniqueness criteria used during discovery is not the same as host identification in the system when performing actions. Uniqueness criteria during discovery define whether two or more discovered devices are the same (or different), whereas only the IP address is the criterion for host identification in Zabbix (see <b>Host creation</b> ). |
| <i>Host name</i>                  | Set the technical host name of a created host using:<br><b>DNS name</b> - DNS name (default)<br><b>IP address</b> - IP address<br><b>&lt;discovery check&gt;</b> - received string value of the discovery check (e.g. Zabbix agent, SNMP agent check)<br>See also: <b>Host naming</b> .   |
| <i>Visible name</i>               | This option is supported since 4.2.0.<br>Set the visible host name of a created host using:<br><b>Host name</b> - technical host name (default)<br><b>DNS name</b> - DNS name<br><b>IP address</b> - IP address<br><b>&lt;discovery check&gt;</b> - received string value of the discovery check (e.g. Zabbix agent, SNMP agent check)<br>See also: <b>Host naming</b> .  |
| <i>Enabled</i>                    | This option is supported since 4.2.0.<br>With the check-box marked the rule is active and will be executed by Zabbix server.<br>If unmarked, the rule is not active. It won't be executed.  |

#### A real life scenario

In this example, we would like to set up network discovery for the local network having an IP range of 192.168.1.1-192.168.1.254.

In our scenario we want to:

- discover those hosts that have Zabbix agent running
- run discovery every 10 minutes
- add a host to monitoring if the host uptime is more than 1 hour
- remove hosts if the host downtime is more than 24 hours
- add Linux hosts to the "Linux servers" group
- add Windows hosts to the "Windows servers" group
- use the template *Linux* for Linux hosts
- use the template *Windows* for Windows hosts

#### Step 1

Defining a network discovery rule for our IP range.

| * Name                      | Local network  |  |      |         |                             |   |                     |  |
|-----------------------------|--|--|------|---------|-----------------------------|---|---------------------|--|
| Discovery by proxy          | No proxy   |  |      |         |                             |   |                     |  |
| * IP range                  | 192.168.1.1-254  |  |      |         |                             |   |                     |  |
| * Update interval           | 10m  |  |      |         |                             |   |                     |  |
| * Checks                    | <table><thead><tr><th>Type</th><th>Actions</th></tr></thead><tbody><tr><td>Zabbix agent "system.uname"</td><td><a href="#">Edit</a> <a href="#">Remove</a></td></tr><tr><td><a href="#">Add</a></td><td></td></tr></tbody></table> |  | Type | Actions | Zabbix agent "system.uname" | <a href="#">Edit</a> <a href="#">Remove</a> | <a href="#">Add</a> |  |
| Type                        | Actions  |  |      |         |                             |   |                     |  |
| Zabbix agent "system.uname" | <a href="#">Edit</a> <a href="#">Remove</a>  |  |      |         |                             |   |                     |  |
| <a href="#">Add</a>         |  |  |      |         |                             |   |                     |  |
| Device uniqueness criteria  | <input checked="" type="radio"/> IP address<br><input type="radio"/> Zabbix agent "system.uname"   |  |      |         |                             |   |                     |  |
| Host name                   | <input type="radio"/> DNS name<br><input type="radio"/> IP address<br><input checked="" type="radio"/> Zabbix agent "system.uname"   |  |      |         |                             |   |                     |  |
| Visible name                | <input checked="" type="radio"/> Host name<br><input type="radio"/> DNS name<br><input type="radio"/> IP address<br><input type="radio"/> Zabbix agent "system.uname"  |  |      |         |                             |   |                     |  |
| Enabled                     | <input checked="" type="checkbox"/>  |  |      |         |                             |   |                     |  |

Zabbix will try to discover hosts in the IP range of 192.168.1.1-192.168.1.254 by connecting to Zabbix agents and getting the value from the **system.uname** key. The value received from the agent can be used to name the hosts and also to apply different actions

for different operating systems. For example, link Windows servers to the template *Windows*, Linux servers to the template *Linux*.

The rule will be executed every 10 minutes.

When this rule is added, Zabbix will automatically start the discovery and generation of the discovery-based events for further processing.

## Step 2

Defining a discovery **action** for adding the discovered Linux servers to the respective group/template.

| Action              | Operations  |       |      |   |                                      |   |                                   |   |   |   |  |
|---------------------|---|-------|------|---|--------------------------------------|---|-----------------------------------|---|---|---|--|
| * Name              | Add discovered Linux servers  |       |      |   |                                      |   |                                   |   |   |   |  |
| Type of calculation | And <span>▼</span> A and B and C and D  |       |      |   |                                      |   |                                   |   |   |   |  |
| Conditions          | <table><thead><tr><th>Label</th><th>Name</th></tr></thead><tbody><tr><td>A</td><td>Received value contains <i>Linux</i></td></tr><tr><td>B</td><td>Discovery status equals <i>Up</i></td></tr><tr><td>C</td><td>Service type equals <i>Zabbix agent</i></td></tr><tr><td>D</td><td>Uptime/Downtime is greater than or equals 3600</td></tr></tbody></table> <a href="#">Add</a> | Label | Name | A | Received value contains <i>Linux</i> | B | Discovery status equals <i>Up</i> | C | Service type equals <i>Zabbix agent</i> | D | Uptime/Downtime is greater than or equals 3600 |
| Label               | Name  |       |      |   |                                      |   |                                   |   |   |   |  |
| A                   | Received value contains <i>Linux</i>  |       |      |   |                                      |   |                                   |   |   |   |  |
| B                   | Discovery status equals <i>Up</i>   |       |      |   |                                      |   |                                   |   |   |   |  |
| C                   | Service type equals <i>Zabbix agent</i>   |       |      |   |                                      |   |                                   |   |   |   |  |
| D                   | Uptime/Downtime is greater than or equals 3600  |       |      |   |                                      |   |                                   |   |   |   |  |

The action will be activated if:

- the "Zabbix agent" service is "up"
- the value of system.uname (the Zabbix agent key we used in rule definition) contains "Linux"
- Uptime is 1 hour (3600 seconds) or more

| Action          | Operations  |
|-----------------|---|
| Default subject | Discovery: {DISCOVERY.DEVICE.STATUS}, {DISCOVERY.DEVICE.IPADDRESS}  |
| Default message | Discovery rule: {DISCOVERY.RULE.NAME}<br><br>Device IP: {DISCOVERY.DEVICE.IPADDRESS}<br>Device DNS: {DISCOVERY.DEVICE.DNS}<br>Device status: {DISCOVERY.DEVICE.STATUS}<br>Device uptime: {DISCOVERY.DEVICE.UPTIME}<br><br>Device service name: {DISCOVERY.SERVICE.NAME} |
| Operations      | <a href="#">Details</a><br><b>Add to host groups:</b> Linux servers<br><b>Link to templates:</b> Linux<br><a href="#">Add</a>   |

The action will execute the following operations:

- add the discovered host to the "Linux servers" group (and also add host if it wasn't added previously)

- link host to the *Linux* template. Zabbix will automatically start monitoring the host using items and triggers from the "Linux" template.

### Step 3

Defining a discovery action for adding the discovered Windows servers to the respective group/template.

| Action              | Operations  |       |      |   |  |   |                                   |   |   |   |  |
|---------------------|---|-------|------|---|--|---|-----------------------------------|---|---|---|--|
| * Name              | Add discovered Windows servers  |       |      |   |  |   |                                   |   |   |   |  |
| Type of calculation | And <span>▼</span> A and B and C and D  |       |      |   |  |   |                                   |   |   |   |  |
| Conditions          | <table border="1"> <thead> <tr> <th>Label</th> <th>Name</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Received value contains <i>Windows</i></td> </tr> <tr> <td>B</td> <td>Discovery status equals <i>Up</i></td> </tr> <tr> <td>C</td> <td>Service type equals <i>Zabbix agent</i></td> </tr> <tr> <td>D</td> <td>Uptime/Downtime is greater than or equals 3600</td> </tr> </tbody> </table> <a href="#">Add</a> | Label | Name | A | Received value contains <i>Windows</i> | B | Discovery status equals <i>Up</i> | C | Service type equals <i>Zabbix agent</i> | D | Uptime/Downtime is greater than or equals 3600 |
| Label               | Name  |       |      |   |  |   |                                   |   |   |   |  |
| A                   | Received value contains <i>Windows</i>  |       |      |   |  |   |                                   |   |   |   |  |
| B                   | Discovery status equals <i>Up</i>   |       |      |   |  |   |                                   |   |   |   |  |
| C                   | Service type equals <i>Zabbix agent</i>   |       |      |   |  |   |                                   |   |   |   |  |
| D                   | Uptime/Downtime is greater than or equals 3600  |       |      |   |  |   |                                   |   |   |   |  |

| Action          | Operations  |
|-----------------|---|
| Default subject | Discovery: {DISCOVERY.DEVICE.STATUS}, {DISCOVERY.DEVICE.IPADDRESS}  |
| Default message | Discovery rule: {DISCOVERY.RULE.NAME}<br><br>Device IP: {DISCOVERY.DEVICE.IPADDRESS}<br>Device DNS: {DISCOVERY.DEVICE.DNS}<br>Device status: {DISCOVERY.DEVICE.STATUS}<br>Device uptime: {DISCOVERY.DEVICE.UPTIME}<br><br>Device service name: {DISCOVERY.SERVICE.NAME} |
| Operations      | Details<br><b>Add to host groups:</b> Windows servers<br><br><b>Link to templates:</b> Windows<br><br><a href="#">Add</a>   |

### Step 4

Defining a discovery action for removing lost servers.



| Action              | Operations  |       |      |   |   |   |                              |   |                                  |
|---------------------|---|-------|------|---|---|---|------------------------------|---|----------------------------------|
| * Name              | Remove lost servers   |       |      |   |   |   |                              |   |                                  |
| Type of calculation | And <span>▼</span> A and B and C  |       |      |   |   |   |                              |   |                                  |
| Conditions          | <table border="1"> <thead> <tr> <th>Label</th> <th>Name</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Uptime/Downtime is greater than or equals 86400</td> </tr> <tr> <td>B</td> <td>Discovery status equals Down</td> </tr> <tr> <td>C</td> <td>Service type equals Zabbix agent</td> </tr> </tbody> </table><br><a href="#">Add</a> | Label | Name | A | Uptime/Downtime is greater than or equals 86400 | B | Discovery status equals Down | C | Service type equals Zabbix agent |
| Label               | Name  |       |      |   |   |   |                              |   |                                  |
| A                   | Uptime/Downtime is greater than or equals 86400   |       |      |   |   |   |                              |   |                                  |
| B                   | Discovery status equals Down  |       |      |   |   |   |                              |   |                                  |
| C                   | Service type equals Zabbix agent  |       |      |   |   |   |                              |   |                                  |

| Action          | Operations  |         |        |             |   |
|-----------------|---|---------|--------|-------------|---|
| Default subject | Discovery: {DISCOVERY.DEVICE.STATUS}, {DISCOVERY.DEVICE.IPADDRESS}  |         |        |             |   |
| Default message | Discovery rule: {DISCOVERY.RULE.NAME}<br><br>Device IP: {DISCOVERY.DEVICE.IPADDRESS}<br>Device DNS: {DISCOVERY.DEVICE.DNS}<br>Device status: {DISCOVERY.DEVICE.STATUS}<br>Device uptime: {DISCOVERY.DEVICE.UPTIME}<br><br>Device service name: {DISCOVERY.SERVICE.NAME} |         |        |             |   |
| Operations      | <table border="1"> <thead> <tr> <th>Details</th> <th>Action</th> </tr> </thead> <tbody> <tr> <td>Remove host</td> <td> <a href="#">Edit</a> <a href="#">Remove</a> </td> </tr> </tbody> </table><br><a href="#">Add</a>   | Details | Action | Remove host | <a href="#">Edit</a> <a href="#">Remove</a> |
| Details         | Action  |         |        |             |   |
| Remove host     | <a href="#">Edit</a> <a href="#">Remove</a>   |         |        |             |   |

A server will be removed if "Zabbix agent" service is 'down' for more than 24 hours (86400 seconds).

## 2 Active agent autoregistration

### Overview

It is possible to allow active Zabbix agent autoregistration, after which the server can start monitoring them. This way new hosts can be added for monitoring without configuring them manually on the server.

Autoregistration can happen when a previously unknown active agent asks for checks.

The feature might be very handy for automatic monitoring of new Cloud nodes. As soon as you have a new node in the Cloud Zabbix will automatically start the collection of performance and availability data of the host.

Active agent autoregistration also supports the monitoring of added hosts with passive checks. When the active agent asks for checks, providing it has the 'ListenIP' or 'ListenPort' configuration parameters defined in the configuration file, these are sent along to the server. (If multiple IP addresses are specified, the first one is sent to the server.)

Server, when adding the new autoregistered host, uses the received IP address and port to configure the agent. If no IP address value is received, the one used for the incoming connection is used. If no port value is received, 10050 is used.

It is possible to specify that the host should be autoregistered with a **DNS name** as the default agent interface.

Autoregistration is rerun:

- if host **metadata** information changes:
  - due to HostMetadata changed and agent restarted
  - due to value returned by HostMetadataItem changed
- for manually created hosts with metadata missing
- if a host is manually changed to be monitored by another Zabbix proxy
- if autoregistration for the same host comes from a new Zabbix proxy

## Configuration

### Specify server

Make sure you have the Zabbix server identified in the agent **configuration file** - `zabbix_agentd.conf`

`ServerActive=10.0.0.1`

Unless you specifically define a *Hostname* in `zabbix_agentd.conf`, the system hostname of agent location will be used by server for naming the host. The system hostname in Linux can be obtained by running the 'hostname' command.

If *Hostname* is defined in Zabbix agent configuration as a comma-delimited list of hosts, hosts will be created for all listed host-names.

Restart the agent after making any changes to the configuration file.

### Action for active agent autoregistration

When server receives an autoregistration request from an agent it calls an **action**. An action of event source "Autoregistration" must be configured for agent autoregistration.

#### Note:

Setting up **network discovery** is not required to have active agents autoregister.

In the Zabbix frontend, go to *Configuration* → *Actions*, select *Autoregistration actions* and click on *Create action*:

- In the Action tab, give your action a name
- Optionally specify **conditions**. You can do a substring match or regular expression match in the conditions for host name/host metadata. If you are going to use the "Host metadata" condition, see the next section.
- In the Operations tab, add relevant operations, such as - 'Add host', 'Add to host group' (for example, *Discovered hosts*), 'Link to templates', etc.

#### Note:

If the hosts that will be autoregistering are likely to be supported for active monitoring only (such as hosts that are firewalled from your Zabbix server) then you might want to create a specific template like *Template\_Linux-active* to link to.

Created hosts are added to the *Discovered hosts* group (by default, configurable in *Administration* → *General* → **Other**). If you wish hosts to be added to another group, add a *Remove from host group* operation (specifying "Discovered hosts") and also add an *Add to host group* operation (specifying another host group), because a host must belong to a host group.

### Secure autoregistration

A secure way of autoregistration is possible by configuring PSK-based authentication with encrypted connections.

The level of encryption is configured globally in *Administration* → *General* → **Autoregistration**. It is possible to select no encryption, TLS encryption with PSK authentication or both (so that some hosts may register without encryption while others through encryption).

Authentication by PSK is verified by Zabbix server before adding a host. If successful, the host is added and **Connections from/to host** are set to 'PSK' only with identity/pre-shared key the same as in the global autoregistration setting.

#### Attention:

To ensure security of autoregistration on installations using proxies, encryption between Zabbix server and proxy should be enabled.

### Using DNS as default interface

HostInterface and HostInterfaceItem **configuration parameters** allow to specify a custom value for the host interface during autoregistration.

More specifically, they are useful if the host should be autoregistered with a DNS name as the default agent interface rather than its IP address. In that case the DNS name should be specified or returned as the value of either HostInterface or HostInterfaceItem

parameters. Note that if the value of one of the two parameters changes, the autoregistered host interface is updated. So it is possible to update the default interface to another DNS name or update it to an IP address. For the changes to take effect though, the agent has to be restarted.

**Note:**

If `HostInterface` or `HostInterfaceItem` parameters are not configured, the `listen_dns` parameter is resolved from the IP address. If such resolving is configured incorrectly, it may break autoregistration because of invalid hostname.

#### Using host metadata

When agent is sending an autoregistration request to the server it sends its hostname. In some cases (for example, Amazon cloud nodes) a hostname is not enough for Zabbix server to differentiate discovered hosts. Host metadata can be optionally used to send other information from an agent to the server.

Host metadata is configured in the agent **configuration file** - `zabbix_agentd.conf`. There are 2 ways of specifying host metadata in the configuration file:

`HostMetadata`

`HostMetadataItem`

See the description of the options in the link above.

**Attention:**

An autoregistration attempt happens every time an active agent sends a request to refresh active checks to the server. The delay between requests is specified in the **RefreshActiveChecks** parameter of the agent. The first request is sent immediately after the agent is restarted.

#### Example 1

Using host metadata to distinguish between Linux and Windows hosts.

Say you would like the hosts to be autoregistered by the Zabbix server. You have active Zabbix agents (see "Configuration" section above) on your network. There are Windows hosts and Linux hosts on your network and you have "Linux by Zabbix agent" and "Windows by Zabbix agent" templates available in your Zabbix frontend. So at host registration, you would like the appropriate Linux/Windows template to be applied to the host being registered. By default, only the hostname is sent to the server at autoregistration, which might not be enough. In order to make sure the proper template is applied to the host you should use host metadata.

#### Frontend configuration

The first thing to do is to configure the frontend. Create 2 actions. The first action:

- Name: Linux host autoregistration
- Conditions: Host metadata contains *Linux*
- Operations: Link to templates: Linux

**Note:**

You can skip an "Add host" operation in this case. Linking to a template requires adding a host first so the server will do that automatically.

The second action:

- Name: Windows host autoregistration
- Conditions: Host metadata contains *Windows*
- Operations: Link to templates: Windows

#### Agent configuration

Now you need to configure the agents. Add the next line to the agent configuration files:

```
HostMetadataItem=system.uname
```

This way you make sure host metadata will contain "Linux" or "Windows" depending on the host an agent is running on. An example of host metadata in this case:

```
Linux: Linux server3 3.2.0-4-686-pae #1 SMP Debian 3.2.41-2 i686 GNU/Linux
```

```
Windows: Windows WIN-OPXGGSTYNH0 6.0.6001 Windows Server 2008 Service Pack 1 Intel IA-32
```

Do not forget to restart the agent after making any changes to the configuration file.

#### Example 2

## Step 1

Using host metadata to allow some basic protection against unwanted hosts registering.

### Frontend configuration

Create an action in the frontend, using some hard-to-guess secret code to disallow unwanted hosts:

- Name: Autoregistration action Linux
- Conditions:
  - Type of calculation: AND
  - Condition (A): Host metadata contains //Linux//
  - Condition (B): Host metadata contains //21df83bf21bf0be663090bb8d4128558ab9b95fba66a6dbf834f8b91ae5e08ae//
- Operations:
  - Send message to users: Admin via all media
  - Add to host groups: Linux servers
  - Link to templates: Linux

Please note that this method alone does not provide strong protection because data is transmitted in plain text. Configuration cache reload is required for changes to have an immediate effect.

### Agent configuration

Add the next line to the agent configuration file:

```
HostMetadata=Linux 21df83bf21bf0be663090bb8d4128558ab9b95fba66a6dbf834f8b91ae5e08ae
```

where "Linux" is a platform, and the rest of the string is the hard-to-guess secret text.

Do not forget to restart the agent after making any changes to the configuration file.

## Step 2

It is possible to add additional monitoring for an already registered host.

### Frontend configuration

Update the action in the frontend:

- Name: Autoregistration action Linux
- Conditions:
  - Type of calculation: AND
  - Condition (A): Host metadata contains Linux
  - Condition (B): Host metadata contains 21df83bf21bf0be663090bb8d4128558ab9b95fba66a6dbf834f8b91ae5e08ae
- Operations:
  - Send message to users: Admin via all media
  - Add to host groups: Linux servers
  - Link to templates: Linux
  - Link to templates: MySQL by Zabbix Agent

### Agent configuration

Update the next line in the agent configuration file:

```
HostMetadata=MySQL on Linux 21df83bf21bf0be663090bb8d4128558ab9b95fba66a6dbf834f8b91ae5e08ae
```

Do not forget to restart the agent after making any changes to the configuration file.

## 3 Low-level discovery

**Overview** Low-level discovery provides a way to automatically create items, triggers, and graphs for different entities on a computer. For instance, Zabbix can automatically start monitoring file systems or network interfaces on your machine, without the need to create items for each file system or network interface manually. Additionally, it is possible to configure Zabbix to remove unneeded entities automatically based on actual results of periodically performed discovery.

A user can define their own types of discovery, provided they follow a particular JSON protocol.

The general architecture of the discovery process is as follows.

First, a user creates a discovery rule in "Configuration" → "Templates" → "Discovery" column. A discovery rule consists of (1) an item that discovers the necessary entities (for instance, file systems or network interfaces) and (2) prototypes of items, triggers, and graphs that should be created based on the value of that item.

An item that discovers the necessary entities is like a regular item seen elsewhere: the server asks a Zabbix agent (or whatever the type of the item is set to) for a value of that item, the agent responds with a textual value. The difference is that the value the agent responds with should contain a list of discovered entities in a JSON format. While the details of this format are only important for implementers of custom discovery checks, it is necessary to know that the returned value contains a list of macro → value pairs. For instance, item "net.if.discovery" might return two pairs: "{#IFNAME}" → "lo" and "{#IFNAME}" → "eth0".

These macros are used in names, keys and other prototype fields where they are then substituted with the received values for creating real items, triggers, graphs or even hosts for each discovered entity. See the full list of [options](#) for using LLD macros.

When the server receives a value for a discovery item, it looks at the macro → value pairs and for each pair generates real items, triggers, and graphs, based on their prototypes. In the example with "net.if.discovery" above, the server would generate one set of items, triggers, and graphs for the loopback interface "lo", and another set for interface "eth0".

Note that since **Zabbix 4.2**, the format of the JSON returned by low-level discovery rules has been changed. It is no longer expected that the JSON will contain the "data" object. Low-level discovery will now accept a normal JSON containing an array, in order to support new features such as the item value preprocessing and custom paths to low-level discovery macro values in a JSON document.

Built-in discovery keys have been updated to return an array of LLD rows at the root of JSON document. Zabbix will automatically extract a macro and value if an array field uses the {#MACRO} syntax as a key. Any new native discovery checks will use the new syntax without the "data" elements. When processing a low-level discovery value first the root is located (array at \$. or \$.data).

While the "data" element has been removed from all native items related to discovery, for backward compatibility Zabbix will still accept the JSON notation with a "data" element, though its use is discouraged. If the JSON contains an object with only one "data" array element, then it will automatically extract the content of the element using JSONPath \$.data. Low-level discovery now accepts optional user-defined LLD macros with a custom path specified in JSONPath syntax.

**Warning:**  
As a result of the changes above, newer agents no longer will be able to work with an older Zabbix server.

See also: [Discovered entities](#)

**Configuring low-level discovery** We will illustrate low-level discovery based on an example of file system discovery.

To configure the discovery, do the following:

- Go to: *Configuration* → *Templates* or *Hosts*
- Click on *Discovery* in the row of an appropriate template/host

## Templates

| <input type="checkbox"/> Name ▲         | Hosts | Items    | Triggers    | Graphs   | Dashboards   | Discovery   |
|---|-------|----------|-------------|----------|--------------|-------------|
| <input type="checkbox"/> Linux OS agent | Hosts | Items 43 | Triggers 15 | Graphs 8 | Dashboards 3 | Discovery 3 |

- Click on *Create discovery rule* in the upper right corner of the screen
- Fill in the discovery rule form with the required details

### Discovery rule

The discovery rule form contains five tabs, representing, from left to right, the data flow during discovery:

- *Discovery rule* - specifies, most importantly, the built-in item or custom script to retrieve discovery data
- *Preprocessing* - applies some preprocessing to the discovered data
- *LLD macros* - allows to extract some macro values to use in discovered items, triggers, etc
- *Filters* - allows to filter the discovered values
- *Overrides* - allows to modify items, triggers, graphs or host prototypes when applying to specific discovered objects

The **Discovery rule** tab contains the item key to use for discovery (as well as some general discovery rule attributes):

Discovery rule
Preprocessing
LLD macros
Filters 4
Overrides

\* Name
Mounted filesystem discovery

Type
Zabbix agent

\* Key
vfs.fs.discovery

\* Update interval
1h

Custom intervals

Type
Interval
Period

Flexible
Scheduling
50s
1-7,00:00-24:00

Add

\* Keep lost resources period
30d

Description
Discovery of file systems of different types.

Enabled
☒

Add
Test
Cancel

All mandatory input fields are marked with a red asterisk.

| Parameter               | Description   |
|-------------------------|---|
| <i>Name</i>             | Name of discovery rule.   |
| <i>Type</i>             | The type of check to perform discovery.<br>In this example we are using a <i>Zabbix agent</i> item type.<br>The discovery rule can also be a <b>dependent item</b> , depending on a regular item. It cannot depend on another discovery rule. For a dependent item, select the respective type ( <i>Dependent item</i> ) and specify the master item in the 'Master item' field. The master item must exist.  |
| <i>Key</i>              | Enter the discovery item key (up to 2048 characters).<br>For example, you may use the built-in "vfs.fs.discovery" item key to return a JSON with the list of file systems present on the computer and their types.<br>Note that another option for filesystem discovery is using discovery results by the "vfs.fs.get" agent key, supported since Zabbix 4.4.5 (see <b>example</b> ).   |
| <i>Update interval</i>  | This field specifies how often Zabbix performs discovery. In the beginning, when you are just setting up file system discovery, you might wish to set it to a small interval, but once you know it works you can set it to 30 minutes or more, because file systems usually do not change very often.<br><b>Time suffixes</b> are supported, e.g. 30s, 1m, 2h, 1d, since Zabbix 3.4.0.<br><b>User macros</b> are supported, since Zabbix 3.4.0.<br><i>Note:</i> The update interval can only be set to '0' if custom intervals exist with a non-zero value. If set to '0', and a custom interval (flexible or scheduled) exists with a non-zero value, the item will be polled during the custom interval duration.<br><i>Note</i> that for an existing discovery rule the discovery can be performed immediately by pushing the <b>Check now</b> button. |
| <i>Custom intervals</i> | You can create custom rules for checking the item:<br><b>Flexible</b> - create an exception to the <i>Update interval</i> (interval with different frequency)<br><b>Scheduling</b> - create a custom polling schedule.<br>For detailed information see <b>Custom intervals</b> . Scheduling is supported since Zabbix 3.0.0.  |

| Parameter                         | Description  |
|-----------------------------------|--|
| <i>Keep lost resources period</i> | This field allows you to specify the duration for how long the discovered entity will be retained (won't be deleted) once its discovery status becomes "Not discovered anymore" (between 1 hour to 25 years; or "0").<br><b>Time suffixes</b> are supported, e.g. 2h, 1d, since Zabbix 3.4.0.<br><b>User macros</b> are supported, since Zabbix 3.4.0.<br><i>Note:</i> If set to "0", entities will be deleted immediately. Using "0" is not recommended, since just wrongly editing the filter may end up in the entity being deleted with all the historical data. |
| <i>Description</i>                | Enter a description.   |
| <i>Enabled</i>                    | If checked, the rule will be processed.  |

**Note:**

Discovery rule history is not preserved.

## Preprocessing

The **Preprocessing** tab allows to define transformation rules to apply to the result of discovery. One or several transformations are possible in this step. Transformations are executed in the order in which they are defined. All preprocessing is done by Zabbix server.

See also:

- [Preprocessing details](#)
- [Preprocessing testing](#)

Discovery rule
Preprocessing 2
LLD macros
Filters
Overrides

| Preprocessing steps | Name               | Parameters |
|---------------------|--------------------|------------|
| 1:                  | Regular expression | pattern    |
| 2:                  | JSONPath           | \$.pool    |
| Add                 |                    |            |

| Type           |                           | Description  |
|----------------|---------------------------|--|
| Transformation |                           |  |
| Text           | <i>Regular expression</i> | Match the received value to the <pattern> regular expression and replace value with the extracted <output>. The regular expression supports extraction of maximum 10 captured groups with the \N sequence.<br>Parameters:<br><b>pattern</b> - regular expression<br><b>output</b> - output formatting template. An \N (where N=1...9) escape sequence is replaced with the Nth matched group. A \0 escape sequence is replaced with the matched text.<br>If you mark the <i>Custom on fail</i> checkbox, it is possible to specify custom error-handling options: either to discard the value, set a specified value or set a specified error message.   |
|                | <i>Replace</i>            | Find the search string and replace it with another (or nothing). All occurrences of the search string will be replaced.<br>Parameters:<br><b>search string</b> - the string to find and replace, case-sensitive (required)<br><b>replacement</b> - the string to replace the search string with. The replacement string may also be empty effectively allowing to delete the search string when found.<br>It is possible to use escape sequences to search for or replace line breaks, carriage return, tabs and spaces "\n \r \t \s"; backslash can be escaped as "\\" and escape sequences can be escaped as "\\n". Escaping of line breaks, carriage return, tabs is automatically done during low-level discovery.<br>Supported since 5.0.0. |

| Type                                     |   |
|--|---|
| Structured data                          |   |
| <i>JSONPath</i>                          | <p>Extract value or fragment from JSON data using <a href="#">JSONPath functionality</a>.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to specify custom error-handling options: either to discard the value, set a specified value or set a specified error message.</p>  |
| <i>XML XPath</i>                         | <p>Extract value or fragment from XML data using XPath functionality.</p> <p>For this option to work, Zabbix server must be compiled with libxml support.</p> <p>Examples:</p> <p><code>number(/document/item/value)</code> will extract 10 from<br/> <code>&lt;document&gt;&lt;item&gt;&lt;value&gt;10&lt;/value&gt;&lt;/item&gt;&lt;/document&gt;</code></p> <p><code>number(/document/item/@attribute)</code> will extract 10 from <code>&lt;document&gt;&lt;item attribute="10"&gt;&lt;/item&gt;&lt;/document&gt;</code></p> <p><code>/document/item</code> will extract <code>&lt;item&gt;&lt;value&gt;10&lt;/value&gt;&lt;/item&gt;</code> from<br/> <code>&lt;document&gt;&lt;item&gt;&lt;value&gt;10&lt;/value&gt;&lt;/item&gt;&lt;/document&gt;</code></p> <p>Note that namespaces are not supported.</p> <p>Supported since 4.4.0.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to specify custom error-handling options: either to discard the value, set a specified value or set a specified error message.</p> |
| <i>CSV to JSON</i>                       | <p>Convert CSV file data into JSON format.</p> <p>For more information, see: <a href="#">CSV to JSON preprocessing</a>.</p> <p>Supported since 4.4.0.</p>   |
| <i>XML to JSON</i>                       | <p>Convert data in XML format to JSON.</p> <p>For more information, see: <a href="#">Serialization rules</a>.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to specify custom error-handling options: either to discard the value, set a specified value or set a specified error message.</p>  |
| Custom scripts                           |   |
| <i>JavaScript</i>                        | <p>Enter JavaScript code in the block that appears when clicking in the parameter field or on the pencil icon.</p> <p>Note that available JavaScript length depends on the <a href="#">database used</a>.</p> <p>For more information, see: <a href="#">Javascript preprocessing</a></p>  |
| Validation                               |   |
| <i>Does not match regular expression</i> | <p>Specify a regular expression that a value must not match.</p> <p>E.g. <code>Error: (.*)\.</code></p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to specify custom error-handling options: either to discard the value, set a specified value or set a specified error message.</p>  |
| <i>Check for error in JSON</i>           | <p>Check for an application-level error message located at JSONPath. Stop processing if succeeded and message is not empty; otherwise continue processing with the value that was before this preprocessing step. Note that these external service errors are reported to user as is, without adding preprocessing step information.</p> <p>E.g. <code>\$.errors</code>. If a JSON like <code>{"errors": "e1"}</code> is received, the next preprocessing step will not be executed.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to specify custom error-handling options: either to discard the value, set a specified value or set a specified error message.</p>   |
| <i>Check for error in XML</i>            | <p>Check for an application-level error message located at xpath. Stop processing if succeeded and message is not empty; otherwise continue processing with the value that was before this preprocessing step. Note that these external service errors are reported to user as is, without adding preprocessing step information.</p> <p>No error will be reported in case of failing to parse invalid XML.</p> <p>Supported since 4.4.0.</p> <p>If you mark the <i>Custom on fail</i> checkbox, it is possible to specify custom error-handling options: either to discard the value, set a specified value or set a specified error message.</p>  |
| Throttling                               |   |
| <i>Discard unchanged with heartbeat</i>  | <p>Discard a value if it has not changed within the defined time period (in seconds).</p> <p>Positive integer values are supported to specify the seconds (minimum - 1 second). Time suffixes can be used in this field (e.g. 30s, 1m, 2h, 1d). User macros and low-level discovery macros can be used in this field.</p> <p>Only one throttling option can be specified for a discovery item.</p> <p>E.g. 1m. If identical text is passed into this rule twice within 60 seconds, it will be discarded.</p> <p><i>Note:</i> Changing item prototypes does not reset throttling. Throttling is reset only when preprocessing steps are changed.</p>   |



| Type  |
|---|
| Prometheus  |
| <i>Prometheus to JSON</i> Convert required Prometheus metrics to JSON.<br>See <a href="#">Prometheus checks</a> for more details. |

Note that if the discovery rule has been applied to the host via template then the content of this tab is read-only.

Custom macros

The **LLD macros** tab allows to specify custom low-level discovery macros.

Custom macros are useful in cases when the returned JSON does not have the required macros already defined. So, for example:

- The native `vfs.fs.discovery` key for filesystem discovery returns a JSON with some pre-defined LLD macros such as `{#FSNAME}`, `{#FSTYPE}`. These macros can be used in item, trigger prototypes (see subsequent sections of the page) directly; defining custom macros is not needed;
- The `vfs.fs.get` agent item also returns a JSON with **filesystem data**, but without any pre-defined LLD macros. In this case you may define the macros yourself, and map them to the values in the JSON using JSONPath:

Discovery rule   Preprocessing   **LLD macros 2**   Filters   Overrides

LLD macros

LLD macro

JSONPath

{#FSNAME}

\$.fsname

{#FSTYPE}

\$.fstype

Add

The extracted values can be used in discovered items, triggers, etc. Note that values will be extracted from the result of discovery and any preprocessing steps so far.

| Parameter | Description   |
|-----------|---|
| LLD macro | Name of the low-level discovery macro, using the following syntax: <code>{#MACRO}</code> .  |
| JSONPath  | Path that is used to extract LLD macro value from an LLD row, using JSONPath syntax.<br>The values extracted from the returned JSON are used to replace the LLD macros in item, trigger, etc. prototype fields.<br>JSONPath can be specified using the dot notation or the bracket notation. Bracket notation should be used in case of any special characters and Unicode, like <code>\$['unicode + special chars #1']</code> [ <code>'unicode + special chars #2'</code> ].<br><br>For example, <code>\$.foo</code> will extract "bar" and "baz" from this JSON: <code>[{"foo": "bar"}, {"foo": "baz"}]</code><br>Note that <code>\$.foo</code> will extract "bar" and "baz" also from this JSON: <code>{"data": [{"foo": "bar"}, {"foo": "baz"}]}</code> because a single "data" object is processed automatically (for <b>backwards compatibility</b> with the low-level discovery implementation in Zabbix versions before 4.2). |

Filter

A filter can be used to generate real items, triggers, and graphs only for entities that match the criteria. The **Filters** tab contains discovery rule filter definitions allowing to filter discovery values:

Discovery rule   Preprocessing   LLD macros   **Filters 4**   Overrides

Type of calculation

And   (A and B) and (C and D)

Filters

Label

Macro

Regular expression

A

{FSNAME}

matches

{\$VFS.FS.FSNAME.MATCHES}

B

{FSNAME}

does not match

{\$VFS.FS.FSNAME.NOT\_MATCHES}

C

{FSTYPE}

matches

{\$VFS.FS.FSTYPE.MATCHES}

D

{FSTYPE}

does not match

{\$VFS.FS.FSTYPE.NOT\_MATCHES}

Add

| Parameter                  | Description  |
|----------------------------|--|
| <i>Type of calculation</i> | <p>The following options for calculating filters are available:</p> <p><b>And</b> - all filters must be passed;</p> <p><b>Or</b> - enough if one filter is passed;</p> <p><b>And/Or</b> - uses <i>And</i> with different macro names and <i>Or</i> with the same macro name;</p> <p><b>Custom expression</b> - offers the possibility to define a custom calculation of filters. The formula must include all filters in the list. Limited to 255 symbols.</p>   |
| <i>Filters</i>             | <p>The following filter condition operators are available: <i>matches</i>, <i>does not match</i>, <i>exists</i>, <i>does not exist</i>.</p> <p><i>Matches</i> and <i>does not match</i> operators expect a <a href="#">Perl Compatible Regular Expression</a> (PCRE). For instance, if you are only interested in C:, D:, and E: file systems, you could put {#FSNAME} into "Macro" and "^C ^D ^E" regular expression into "Regular expression" text fields. Filtering is also possible by file system types using {#FSTYPE} macro (e.g. "^ext ^reiserfs") and by drive types (supported only by Windows agent) using {#FSDRIVETYPE} macro (e.g., "fixed"). You can enter a regular expression or reference a global <a href="#">regular expression</a> in "Regular expression" field.</p> <p>In order to test a regular expression you can use "grep -E", for example: <code>for f in ext2 nfs reiserfs smbfs; do echo \$f   grep -E '^ext ^reiserfs'    echo "SKIP: \$f"; done</code></p> <p>{#FSDRIVETYPE} macro on Windows is supported since Zabbix <b>3.0.0</b>.</p> <p><i>Exists</i> and <i>does not exist</i> operators allow to filter entities based on the presence or absence of the specified LLD macro in the response (supported since version 5.4.0). Defining several filters is supported since Zabbix <b>2.4.0</b>.</p> <p>Note that if a macro from the filter is missing in the response, the found entity will be ignored, unless a "does not exist" condition is specified for this macro.</p> <p>A warning will be displayed, if the absence of a macro affects the expression result. For example, if {#B} is missing in:</p> <p>{#A} matches 1 and {#B} matches 2 - will give a warning</p> <p>{#A} matches 1 or {#B} matches 2 - no warning.</p> <p>This flexible warning logic is supported since Zabbix 6.0.11.</p> |

#### Warning:

A mistake or a typo in the regular expression used in the LLD rule (for example, an incorrect "File systems for discovery" regular expression) may cause deletion of thousands of configuration elements, historical values, and events for many hosts.

#### Attention:

Zabbix database in MySQL must be created as case-sensitive if file system names that differ only by case are to be discovered correctly.

## Override

The **Override** tab allows setting rules to modify the list of item, trigger, graph and host prototypes or their attributes for discovered objects that meet given criteria.

| Discovery rule | Preprocessing | LLD macros                           | Filters         | Overrides 1            |
|----------------|---------------|--------------------------------------|-----------------|------------------------|
| Overrides      |               |                                      |                 |                        |
|                |               | Name                                 | Stop processing | Action                 |
|                |               | 1: Set trigger with threshold of 50% | Yes             | <a href="#">Remove</a> |
|                |               | <a href="#">Add</a>                  |                 |                        |

Overrides (if any) are displayed in a reorderable drag-and-drop list and executed in the order in which they are defined. To configure details of a new override, click on [Add](#) in the *Overrides* block. To edit an existing override, click on the override name. A popup

window will open allowing to edit the override rule details.

Override

\* Name

Set trigger with threshold of 50%

If filter matches

Continue overrides

Stop processing

Filters

Label Macro

A

{#FSNAME}

matches

Regular expression

^Vtmp\$

Add

.....

Operations

Condition

Trigger prototype does not equal *Disk space is low (used > 50%)*

Add

.....

All mandatory parameters are marked with red asterisks.

| Parameter         | Description   |
|-------------------|---|
| Name              | A unique (per LLD rule) override name.  |
| If filter matches | Defines whether next overrides should be processed when filter conditions are met:<br><b>Continue overrides</b> - subsequent overrides will be processed.<br><b>Stop processing</b> - operations from preceding (if any) and this override will be executed, subsequent overrides will be ignored for matched LLD rows.                       |
| Filters           | Determines to which discovered entities the override should be applied. Override filters are processed after discovery rule filters and have the same functionality.  |
| Operations        | Override operations are displayed with these details:<br><b>Condition</b> - an object type (item prototype/trigger prototype/graph prototype/host prototype) and a condition to be met (equals/does not equal/contains/does not contain/matches/does not match)<br><b>Action</b> - links for editing and removing an operation are displayed. |

Configuring an operation

To configure details of a new operation, click on [Add](#) in the Operations block. To edit an existing operation, click on [Edit](#) next to the operation. A popup window where you can edit the operation details will open.

## New operation

Object

Condition

Create enabled ☐ Original

Discover ☒

Severity ☐ Original

Tags ☐ Original

Add

| Parameter   | Description   |
|---|---|
| <i>Object</i>   | Four types of objects are available:<br>Item prototype<br>Trigger prototype<br>Graph prototype<br>Host prototype  |
| <i>Condition</i>  | Allows filtering entities to which the operation should be applied.   |
| <i>Operator</i>   | Supported operators:<br><b>equals</b> - apply to this prototype<br><b>does not equal</b> - apply to all prototypes, except this<br><b>contains</b> - apply, if prototype name contains this string<br><b>does not contain</b> - apply, if prototype name does not contain this string<br><b>matches</b> - apply, if prototype name matches regular expression<br><b>does not match</b> - apply, if prototype name does not match regular expression |
| <i>Pattern</i>  | A <b>regular expression</b> or a string to search for.  |
| <i>Object:</i><br><i>Item</i><br><i>pro-</i><br><i>to-</i><br><i>type</i> |   |
| <i>Create enabled</i>   | When the checkbox is marked, the buttons will appear, allowing to override original item prototype settings:<br><i>Yes</i> - the item will be added in an enabled state.<br><i>No</i> - the item will be added to a discovered entity but in a disabled state.  |
| <i>Discover</i>   | When the checkbox is marked, the buttons will appear, allowing to override original item prototype settings:<br><i>Yes</i> - the item will be added.<br><i>No</i> - the item will not be added.   |
| <i>Update interval</i>  | When the checkbox is marked, two options will appear, allowing to set different interval for the item:<br><i>Delay</i> - Item update interval. <b>User macros</b> and <b>time suffixes</b> (e.g. 30s, 1m, 2h, 1d) are supported. Should be set to 0 if <i>Custom interval</i> is used.<br><i>Custom interval</i> - click <a href="#">Add</a> to specify flexible/scheduling intervals. For detailed information see <b>Custom intervals</b> .       |
| <i>History storage period</i>   | When the checkbox is marked, the buttons will appear, allowing to set different history storage period for the item:<br><i>Do not keep history</i> - if selected, the history will not be stored.<br><i>Storage period</i> - if selected, an input field for specifying storage period will appear to the right. <b>User macros</b> and <b>LLD macros</b> are supported.  |

| Parameter                           | Description  |
|-------------------------------------|--|
| <i>Trend storage period</i>         | When the checkbox is marked, the buttons will appear, allowing to set different trend storage period for the item:<br><i>Do not keep trends</i> - if selected, the trends will not be stored.<br><i>Storage period</i> - if selected, an input field for specifying storage period will appear to the right. <b>User macros</b> and <b>LLD macros</b> are supported. |
| <i>Tags</i>                         | When the checkbox is marked, a new block will appear, allowing to specify tag-value pairs.<br>These tags will be appended to the tags specified in the item prototype, even if the tag names match.  |
| Object:<br><i>Trigger prototype</i> |  |
| <i>Create enabled</i>               | When the checkbox is marked, the buttons will appear, allowing to override original trigger prototype settings:<br><i>Yes</i> - the trigger will be added in an enabled state.<br><i>No</i> - the trigger will be added to a discovered entity, but in a disabled state.   |
| <i>Discover</i>                     | When the checkbox is marked, the buttons will appear, allowing to override original trigger prototype settings:<br><i>Yes</i> - the trigger will be added.<br><i>No</i> - the trigger will not be added.   |
| <i>Severity</i>                     | When the checkbox is marked, trigger severity buttons will appear, allowing to modify trigger severity.  |
| <i>Tags</i>                         | When the checkbox is marked, a new block will appear, allowing to specify tag-value pairs.<br>These tags will be appended to the tags specified in the trigger prototype, even if the tag names match.   |
| Object:<br><i>Graph prototype</i>   |  |
| <i>Discover</i>                     | When the checkbox is marked, the buttons will appear, allowing to override original graph prototype settings:<br><i>Yes</i> - the graph will be added.<br><i>No</i> - the graph will not be added.   |
| Object:<br><i>Host prototype</i>    |  |
| <i>Create enabled</i>               | When the checkbox is marked, the buttons will appear, allowing to override original host prototype settings:<br><i>Yes</i> - the host will be created in an enabled state.<br><i>No</i> - the host will be created in a disabled state.  |
| <i>Discover</i>                     | When the checkbox is marked, the buttons will appear, allowing to override original host prototype settings:<br><i>Yes</i> - the host will be discovered.<br><i>No</i> - the host will not be discovered.  |
| <i>Link templates</i>               | When the checkbox is marked, an input field for specifying templates will appear. Start typing the template name or click on <i>Select</i> next to the field and select templates from the list in a popup window.<br>All templates linked to a host prototype will be replaced by templates from this override.   |
| <i>Tags</i>                         | When the checkbox is marked, a new block will appear, allowing to specify tag-value pairs.<br>These tags will be appended to the tags specified in the host prototype, even if the tag names match.  |

| Parameter             | Description  |
|-----------------------|--|
| <i>Host inventory</i> | When the checkbox is marked, the buttons will appear, allowing to select different inventory <b>mode</b> for the host prototype:<br><i>Disabled</i> - do not populate host inventory<br><i>Manual</i> - provide details manually<br><i>Automated</i> - auto-fill host inventory data based on collected metrics. |

Form buttons

Buttons at the bottom of the form allow to perform several operations.

|                    |   |
|--------------------|---|
| <b>Add</b>         | Add a discovery rule. This button is only available for new discovery rules.  |
| <b>Update</b>      | Update the properties of a discovery rule. This button is only available for existing discovery rules.  |
| <b>Clone</b>       | Create another discovery rule based on the properties of the current discovery rule.  |
| <b>Execute now</b> | Perform discovery based on the discovery rule immediately. The discovery rule must already exist. See <b>more details</b> .<br>Note that when performing discovery immediately, configuration cache is not updated, thus the result will not reflect very recent changes to discovery rule configuration. |
| <b>Test</b>        | Test the discovery rule configuration. Use this button to verify the configuration settings (such as connectivity and parameter correctness) without permanently applying any changes.  |
| <b>Delete</b>      | Delete the discovery rule.  |
| <b>Cancel</b>      | Cancel the editing of discovery rule properties.  |

**Discovered entities** The screenshots below illustrate how discovered items, triggers, and graphs look like in the host’s configuration. Discovered entities are prefixed with an orange link to a discovery rule they come from.

Items

| All hosts / Zabbix server   Enabled <b>ZBX</b> SNMP   IPMI   JMX <b>Items 140</b> Triggers 77   Graphs 14   Discovery rules 6   Web scenarios |   |            |                                 |          |
|---|---|------------|---------------------------------|----------|
| <input type="checkbox"/>  | Name ▲  | Triggers   | Key                             | Interval |
| <input type="checkbox"/>  | ... Mounted filesystem discovery: <a href="#">Get filesystems</a> : FS [/]: Get data            |            | vfs.fs.dependent[/,data]        |          |
| <input type="checkbox"/>  | ... Mounted filesystem discovery: <a href="#">FS [/]: Get data</a> : FS [/]: Inodes: Free, in % | Triggers 2 | vfs.fs.dependent.inode[/,pfree] |          |
| <input type="checkbox"/>  | ... Mounted filesystem discovery: <a href="#">FS [/]: Get data</a> : FS [/]: Option: Read-only  | Triggers 1 | vfs.fs.dependent[/,readonly]    |          |
| <input type="checkbox"/>  | ... Mounted filesystem discovery: <a href="#">FS [/]: Get data</a> : FS [/]: Space: Available   |            | vfs.fs.dependent.size[/,free]   |          |
| <input type="checkbox"/>  | ... Mounted filesystem discovery: <a href="#">FS [/]: Get data</a> : FS [/]: Space: Total       |            | vfs.fs.dependent.size[/,total]  |          |
| <input type="checkbox"/>  | ... Mounted filesystem discovery: <a href="#">FS [/]: Get data</a> : FS [/]: Space: Used        |            | vfs.fs.dependent.size[/,used]   |          |
| <input type="checkbox"/>  | ... Mounted filesystem discovery: <a href="#">FS [/]: Get data</a> : FS [/]: Space: Used, in %  | Triggers 2 | vfs.fs.dependent.size[/,pused]  |          |

Note that discovered entities will not be created in case there are already existing entities with the same uniqueness criteria, for example, an item with the same key or graph with the same name. An error message is displayed in this case in the frontend that the low-level discovery rule could not create certain entities. The discovery rule itself, however, will not turn unsupported because some entity could not be created and had to be skipped. The discovery rule will go on creating/updating other entities.

Items (similarly, triggers and graphs) created by a low-level discovery rule will be deleted automatically if a discovered entity (file system, interface, etc) stops being discovered (or does not pass the filter anymore). In this case the items, triggers and graphs will be deleted after the days defined in the *Keep lost resources period* field pass.

When discovered entities become 'Not discovered anymore', a lifetime indicator is displayed in the item list. Move your mouse pointer over it and a message will be displayed indicating how many days are left until the item is deleted.

1m
7d
1y
Zabbix agent
Enabled

The item is not discovered anymore and will be deleted in 29d 23h 44m (on 2015-08-31 at 23:27).

If entities were marked for deletion, but were not deleted at the expected time (disabled discovery rule or item host), they will be deleted the next time the discovery rule is processed.

Entities containing other entities, which are marked for deletion, will not update if changed on the discovery rule level. For example, LLD-based triggers will not update if they contain items that are marked for deletion.

## Triggers

All hosts / Zabbix server
Enabled
ZBX
SNMP
IPMI
JMX
Items 140
Triggers 77
Graphs 14
Discovery rules 6

| <input type="checkbox"/> | Severity | Value | Name ▲  | Operational data                            |
|--------------------------|----------|-------|---|---|
| <input type="checkbox"/> | Warning  | OK    | Mounted filesystem discovery: Linux: FS [/]: Running out of free inodes<br><b>Depends on:</b><br>Zabbix server: Linux: FS [/]: Running out of free inodes | Free inodes: {ITEM.LASTVALUE1}              |
| <input type="checkbox"/> | Warning  | OK    | Mounted filesystem discovery: Linux: FS [/]: Space is low<br><b>Depends on:</b><br>Zabbix server: Linux: FS [/]: Space is critically low                  | Space used:<br>{ITEM.LASTVALUE1}.fmtnum(1)% |

## Graphs

All hosts / Remote proxy: New host
Enabled
ZBX
SNMP
IPMI
JMX
Items 142
Triggers 76
Graphs 27
Discovery rules 7

| <input type="checkbox"/> | Name ▲   |
|--------------------------|--|
| <input type="checkbox"/> | Mounted filesystem discovery: FS [ext4(/)]: Space usage graph, in % (relative to max available)                                      |
| <input type="checkbox"/> | Mounted filesystem discovery: FS [ext4(/)]: Space utilization chart (relative to total)  |
| <input type="checkbox"/> | Mounted filesystem discovery: FS [ext4(/var/snap/firefox/common/host-hunspell)]: Space usage graph, in % (relative to max available) |
| <input type="checkbox"/> | Mounted filesystem discovery: FS [ext4(/var/snap/firefox/common/host-hunspell)]: Space utilization chart (relative to total)         |

**Other types of discovery** More detail and how-tos on other types of out-of-the-box discovery is available in the following sections:

- discovery of **network interfaces**;
- discovery of **CPUs and CPU cores**;
- discovery of **SNMP OIDs**;
- discovery of **JMX objects**;
- discovery using **ODBC SQL queries**;
- discovery of **Windows services**;
- discovery of **host interfaces** in Zabbix.

For more detail on the JSON format for discovery items and an example of how to implement your own file system discoverer as a Perl script, see [creating custom LLD rules](#).

### 1 Item prototypes

Once a rule is created, go to the items for that rule and press "Create item prototype" to create an item prototype.

Note how the {#FSNAME} macro is used where a file system name is required. The use of a low-level discovery macro is mandatory in the item key to make sure that the discovery is processed correctly. When the discovery rule is processed, this macro will be substituted with the discovered file system.

Item prototype

Tags

Preprocessing

\* Name

{#FSNAME}: Used space

Type

Zabbix agent

\* Key

vfs.fs.size[{#FSNAME},used]

Sel

Type of information

Numeric (unsigned)

Units

B

\* Update interval

1m

Custom intervals

Type

Interval

Period

Flexible

Scheduling

50s

1-7,00:00-24:00

Add

\* History storage period

Do not keep history

Storage period

7d

\* Trend storage period

Do not keep trends

Storage period

365d

Value mapping

type here to search

Sel

Description

Used storage in Bytes

Create enabled

☒

Discover

☒

Add

Test

Cancel

Low-level discovery macros and user macros are supported in item prototype configuration and item value preprocessing parameters. Note that when used in update intervals, a single macro has to fill the whole field. Multiple macros in one field or macros mixed with text are not supported.

Note:

Context-specific escaping of low-level discovery macros is performed for safe use in regular expression and XPath preprocessing parameters.

Attributes that are specific for item prototypes:

| Parameter      | Description   |
|----------------|---|
| Create enabled | If checked the item will be added in an enabled state.<br>If unchecked, the item will be added to a discovered entity, but in a disabled state. |



| Parameter       | Description   |
|-----------------|---|
| <i>Discover</i> | If checked (default) the item will be added to a discovered entity.<br>If unchecked, the item will not be added to a discovered entity, unless this setting is <b>overridden</b> in the discovery rule. |

We can create several item prototypes for each file system metric we are interested in:

## ≡ Item prototypes

[All templates](#) / [Template Module Windows filesystems](#)
[Discovery list](#) / [Mounted filesystem discovery](#)

[Item prototypes 3](#)
[Trigger prototypes 2](#)
[Graph prototypes 1](#)
[Host prototypes](#)

| <input type="checkbox"/>     | Name ▲                                       | Key                          | Interval |
|------------------------------|--|------------------------------|----------|
| <input type="checkbox"/> ... | <a href="#">{#FSNAME}: Space utilization</a> | vfs.fs.size[{#FSNAME},pused] | 1m       |
| <input type="checkbox"/> ... | <a href="#">{#FSNAME}: Total space</a>       | vfs.fs.size[{#FSNAME},total] | 1m       |
| <input type="checkbox"/> ... | <a href="#">{#FSNAME}: Used space</a>        | vfs.fs.size[{#FSNAME},used]  | 1m       |

0 selected
[Create enabled](#)
[Create disabled](#)
[Mass update](#)
[Delete](#)

Click on the three-dot icon to open the menu for the specific item prototype with these options:

- *Create trigger prototype* - create a trigger prototype based on this item prototype
- *Trigger prototypes* - click to see a list with links to already-configured trigger prototypes of this item prototype
- *Create dependent item* - create a dependent item for this item prototype

**Mass update** option is available if you want to update properties of several item prototypes at once.

## 2 Trigger prototypes

We create trigger prototypes in a similar way as item prototypes:

Trigger prototype      Dependencies

|        |  |
|--------|--|
| * Name | Free disk space is less than 20% on volume {#FSNAME} |
|--------|--|

|          |                |             |         |         |      |          |
|----------|----------------|-------------|---------|---------|------|----------|
| Severity | Not classified | Information | Warning | Average | High | Critical |
|----------|----------------|-------------|---------|---------|------|----------|

|              |   |
|--------------|---|
| * Expression | {Template OS Linux:vfs.fs.size[{#FSNAME},pfree].last(0)}<20 |
|--------------|---|

## Expression constructor

| OK event generation | Expression | Recovery expression | None |
|---------------------|------------|---------------------|------|
|                     |            |                     |      |

| PROBLEM event generation mode | Single | Multiple |
|-------------------------------|--------|----------|
|-------------------------------|--------|----------|

OK event closes    All problems    All problems if tag values match

## Tags

tag

value

Add

Allow manual close ☐

URL

### Description

Create enabled ☒

Discover 

Add

Cancel

| Parameter             | Description   |
|-----------------------|---|
| <i>Create enabled</i> | If checked the trigger will be added in an enabled state.<br>If unchecked, the trigger will be added to a discovered entity, but in a disabled state. |

| Parameter       | Description   |
|-----------------|---|
| <i>Discover</i> | If checked (default) the trigger will be added to a discovered entity.<br>If unchecked, the trigger will not be added to a discovered entity, unless this setting is <b>overridden</b> in the discovery rule. |

When real triggers are created from the prototypes, there may be a need to be flexible as to what constant ('20' in our example) is used for comparison in the expression. See how **user macros with context** can be useful to accomplish such flexibility.

You can define **dependencies** between trigger prototypes as well (supported since Zabbix 3.0). To do that, go to the *Dependencies* tab. A trigger prototype may depend on another trigger prototype from the same low-level discovery (LLD) rule or on a regular trigger. A trigger prototype may not depend on a trigger prototype from a different LLD rule or on a trigger created from trigger prototype. Host trigger prototype cannot depend on a trigger from a template.

## Trigger prototypes

[All templates](#) / [Template OS Linux](#)
[Discovery list](#) / [Mounted filesystem discovery](#)
[Item prototypes](#) 5

| <input type="checkbox"/> | SEVERITY | NAME ▲   | EXPRESSION   |
|--------------------------|----------|--|--------------|
| <input type="checkbox"/> | Warning  | Free disk space is less than 20% on volume {#FSNAME} | {Template OS |
| <input type="checkbox"/> | Warning  | Free inodes is less than 20% on volume {#FSNAME}     | {Template OS |

### 3 Graph prototypes

We can create graph prototypes, too:

Graph prototype
Preview

\* Name

{#FSNAME}: Disk space usage

\* Width

600

\* Height

340

Graph type

Pie

Show legend

☒

3D view

☒

\* Items

|    | Name  | Type   |
|----|---|--------|
| 1: | Template Module Linux filesystems by Zabbix agent: {#FSNAME}: Total space | Graph  |
| 2: | Template Module Linux filesystems by Zabbix agent: {#FSNAME}: Used space  | Simple |

Add
Add prototype

Discover

☒

Add

Cancel

Attributes that are specific for graph prototypes:

| Parameter       | Description  |
|-----------------|--|
| <i>Discover</i> | <p>If checked (default) the graph will be added to a discovered entity.</p> <p>If unchecked, the graph will not be added to a discovered entity, unless this setting is <b>overridden</b> in the discovery rule.</p> |

| Graph prototypes  |  |       |
|---|--|-------|
| All templates / Template OS Linux Discovery list / Mounted filesystem discovery Item prototypes 5 |  |       |
| <input type="checkbox"/> NAME ▲   |  | WIDTH |
| <input type="checkbox"/> Disk space usage {#FSNAME}   |  | 600   |

Finally, we have created a discovery rule that looks as shown below. It has five item prototypes, two trigger prototypes, and one graph prototype.

# ≡ Discovery rules

|  |   |  |  |                          |                        |                            |                                   |
|--|---|--|--|--------------------------|------------------------|----------------------------|-----------------------------------|
| <a href="#">All templates</a> / <a href="#">Template Module Linux filesystems...</a> |   |  | <a href="#">Items</a>                        | <a href="#">Triggers</a> | <a href="#">Graphs</a> | <a href="#">Dashboards</a> | <a href="#">Discovery rules</a>   |
| <input type="checkbox"/>   | Template  |  | Name ▲                                       |                          |                        |                            | Items                             |
| <input type="checkbox"/>   | Template Module Linux filesystems by Zabbix agent |  | <a href="#">Mounted filesystem discovery</a> |                          |                        |                            | <a href="#">Item prototypes 4</a> |

*Note:* For configuring host prototypes, see the section about [host prototype](#) configuration in virtual machine monitoring.

## 4 Notes on low-level discovery

Using LLD macros in user macro contexts

LLD macros may be used inside user macro context, for example, in [trigger prototypes](#).

Multiple LLD rules for the same item

Since Zabbix agent version 3.2 it is possible to define several low-level discovery rules with the same discovery item.

To do that you need to define the Alias agent [parameter](#), allowing to use altered discovery item keys in different discovery rules, for example `vfs.fs.discovery[foo]`, `vfs.fs.discovery[bar]`, etc.

Data limits for return values

There is no limit for low-level discovery rule JSON data if it is received directly by Zabbix server. This is because the return values are processed without being stored in a database.

There is also no limit for custom low-level discovery rules. However, if custom low-level discovery rule data is retrieved using a user parameter, the user parameter [return value limit](#) applies.

If data has to go through Zabbix proxy, it has to store this data in the database. In such a case, [database limits](#) apply.

## 5 Discovery rules

Please use the sidebar to see discovery rule configuration examples for various cases.

### 1 Discovery of mounted filesystems

Overview

It is possible to discover mounted filesystems and their properties (mountpoint name, filesystem type, filesystem size and inode statistics).

To do that, you may use a combination of:

- the `vfs.fs.get` agent item as the master item
- dependent low-level discovery rule and item prototypes

Configuration

Master item

Create a Zabbix agent item using the following key:

`vfs.fs.get`

| Item  | Tags | Preprocessing |
|---|------|---------------|
| <div> <div>* Name</div> <div>vfs.fs.get item</div> </div>             |      |               |
| <div> <div>Type</div> <div>Zabbix agent</div> </div>                  |      |               |
| <div> <div>* Key</div> <div>vfs.fs.get</div> </div>                   |      |               |
| <div> <div>* Host interface</div> <div>127.0.0.1 : 10050</div> </div> |      |               |
| <div> <div>Type of information</div> <div>Text</div> </div>           |      |               |

Set the type of information to "Text" for possibly big JSON data.

The data returned by this item will contain something like the following for a mounted filesystem:

```
{
  "fsname": "/",
  "fstype": "rootfs",
  "bytes": {
    "total": 1000,
    "free": 500,
    "used": 500,
    "pfree": 50.00,
    "pused": 50.00
  },
  "inodes": {
    "total": 1000,
    "free": 500,
    "used": 500,
    "pfree": 50.00,
    "pused": 50.00
  }
}
```

Dependent LLD rule

Create a low-level discovery rule as "Dependent item" type:

| Discovery rule  | Preprocessing | LLD macros | Filters | Overrides |
|---|---------------|------------|---------|-----------|
| <div> <div>* Name</div> <div>Discovery rule for vfs.fs.get</div> </div>         |               |            |         |           |
| <div> <div>Type</div> <div>Dependent item</div> </div>                          |               |            |         |           |
| <div> <div>* Key</div> <div>fs.mountpoint.discovery</div> </div>                |               |            |         |           |
| <div> <div>* Master item</div> <div>Zabbix server: vfs.fs.get item</div> </div> |               |            |         |           |
| <div> <div>* Keep lost resources period</div> <div>30d</div> </div>             |               |            |         |           |

As master item select the `vfs.fs.get` item we created.

In the "LLD macros" tab define custom macros with the corresponding JSONPath:

| Discovery rule         | Preprocessing | LLD macros 2           | Filters | Overrides |
|------------------------|---------------|------------------------|---------|-----------|
| LLD macros             |               |                        |         |           |
| LLD macro              |               | JSONPath               |         |           |
| <code>{#FSNAME}</code> |               | <code>\$.fsname</code> |         |           |
| <code>{#FSTYPE}</code> |               | <code>\$.fstype</code> |         |           |
| <a href="#">Add</a>    |               |                        |         |           |

Dependent item prototype

Create an item prototype with "Dependent item" type in this LLD rule. As master item for this prototype select the `vfs.fs.get` item we created.

| Item prototype  | Tags | Preprocessing |
|---|------|---------------|
| * Name <code>Free disk space on {#FSNAME}, type: {#FSTYPE}</code> |      |               |
| Type <code>Dependent item</code>                                  |      |               |
| * Key <code>free[{#FSNAME}]</code>                                |      |               |
| * Master item <code>Zabbix server: vfs.fs.get item</code>         |      |               |
| Type of information <code>Numeric (unsigned)</code>               |      |               |

Note the use of custom macros in the item prototype name and key:

- Name: Free disk space on `{#FSNAME}`, type: `{#FSTYPE}`
- Key: Free`[{#FSNAME}]`

As type of information, use:

- *Numeric (unsigned)* for metrics like 'free', 'total', 'used'
- *Numeric (float)* for metrics like 'pfree', 'pused' (percentage)

In the item prototype "Preprocessing" tab select JSONPath and use the following JSONPath expression as parameter:

```
$. [?(@.fsname=='{#FSNAME}')].bytes.free.first()
```

| Item prototype   | Tags | Preprocessing 1 |
|--|------|-----------------|
| Preprocessing steps  |      |                 |
| Name   |      |                 |
| Parameters   |      |                 |
| 1: <code>JSONPath</code>                                       |      |                 |
| <code>\$. [?(@.fsname=='{#FSNAME}')].bytes.free.first()</code> |      |                 |
| <a href="#">Add</a>  |      |                 |

When discovery starts, one item per each mountpoint will be created. This item will return the number of free bytes for the given mountpoint.

## 2 Discovery of network interfaces

In a similar way as **file systems** are discovered, it is possible to also discover network interfaces.

Item key

The item key to use in the **discovery rule** is

`net.if.discovery`

This item is supported since Zabbix agent 2.0.

Supported macros

You may use the `{#IFNAME}` macro in the discovery rule **filter** and prototypes of items, triggers and graphs.

Examples of item prototypes that you might wish to create based on "net.if.discovery":

- "net.if.in[{#IFNAME},bytes]",
- "net.if.out[{#IFNAME},bytes]".

Note that on Windows `{#IFGUID}` is also returned.

## 3 Discovery of CPUs and CPU cores

In a similar way as **file systems** are discovered, it is possible to also discover CPUs and CPU cores.

Item key

The item key to use in the **discovery rule** is

`system.cpu.discovery`

This item is supported since Zabbix agent 2.4.

Supported macros

This discovery key returns two macros - `{#CPU.NUMBER}` and `{#CPU.STATUS}` identifying the CPU order number and status respectively. It enumerates processors from 0 to N - 1, where N is total processor count.

```
[
  {
    "{#CPU.NUMBER}": 0,
    "{#CPU.STATUS}": "online"
  },
  {
    "{#CPU.NUMBER}": 1,
    "{#CPU.STATUS}": "offline"
  },
  {
    "{#CPU.NUMBER}": 2,
    "{#CPU.STATUS}": "unknown" /* "unknown" is only on Windows */
  },
  {
    "{#CPU.NUMBER}": 3,
    "{#CPU.STATUS}": "online"
  }
]
```

Note that a clear distinction cannot be made between actual, physical processors, cores and hyperthreads. `{#CPU.STATUS}` on Linux, UNIX and BSD systems returns the status of the processor, which can be either "online" or "offline". On Windows systems, this same macro may represent a third value - "unknown" - which indicates that a processor has been detected, but no information has been collected for it yet.

CPU discovery relies on the agent's collector process to remain consistent with the data provided by the collector and save resources on obtaining the data. This has the effect of this item key not working with the test (-t) command line flag of the agent binary, which will return a NOT\_SUPPORTED status and an accompanying message indicating that the collector process has not been started.



Item prototypes that can be created based on CPU discovery include, for example:

- `system.cpu.util[{#CPU.NUMBER},<type>,<mode>]`
- `system.hw.cpu[{#CPU.NUMBER},<info>]`

For detailed item key description, see [Zabbix agent item keys](#).

Notes on discovered performance counter items on NUMA systems

Some [Windows performance counters](#) might be not available for some of the logical processors at NUMA systems.

For example, items discovered with an item prototype with the key below might work only for the first NUMA node. Items for the other NUMA nodes might be in unsupported state.

```
perf_counter[\\Processor({#CPU.NUMBER})\\% Processor Time,60]
```

Also, a discovery rule with key "system.cpu.discovery" does not provide any low-level discovery macro values to substitute into such performance counters as:

```
perf_counter["\\Processor Information(<NUMA node index>,<CPU index in NUMA node>)\\% Processor Time",60]
```

While `system.cpu.util` items rely on different performance counters to monitor CPU utilization percentage depending on the processor group count and processor count. Also, there is a rare bug related to [processor groups on Windows](#).

## 4 Discovery of SNMP OIDs

Overview

In this section we will perform an [SNMP discovery](#) on a switch.

Item key

Unlike with file system and network interface discovery, the item does not necessarily has to have an "snmp.discovery" key - item type of SNMP agent is sufficient.

To configure the discovery rule, do the following:

- Go to: *Configuration* → *Templates*
- Click on *Discovery* in the row of an appropriate template

### ≡ Templates

| <input type="checkbox"/> | Name ▲          | Hosts | Items | Triggers | Graphs | Dashboards   | Discovery   |
|--------------------------|-----------------|-------|-------|----------|--------|--------------|-------------|
| <input type="checkbox"/> | Interfaces SNMP | Hosts | Items | Triggers | Graphs | Dashboards 1 | Discovery 1 |

- Click on *Create discovery rule* in the upper right corner of the screen
- Fill in the discovery rule form with the required details as in the screenshot below

Discovery rule
Preprocessing
LLD macros
Filters 12
Overrides

\* Name

Network interfaces discovery

Type

SNMP agent

\* Key

net.if.discovery

\* SNMP OID

discovery[#{#IFALIAS},1.3.6.1.2.1.31.1.1.18,#{#IFNAME},1.3.6.1.2.1.31.1.1.1,#{#IF

\* Update interval

1h

Custom intervals

| Type     | Interval   | Period          |
|----------|------------|-----------------|
| Flexible | Scheduling | 50s             |
|          |            | 1-7,00:00-24:00 |

Add

\* Keep lost resources period

30d

Description

Discovering interfaces from IF-MIB.

All mandatory input fields are marked with a red asterisk.

The OIDs to discover are defined in SNMP OID field in the following format: `discovery[#{#MACRO1}, oid1, #{#MACRO2}, oid2, ...,]`

where `{#MACRO1}`, `{#MACRO2}` ... are valid lld macro names and `oid1`, `oid2`... are OIDs capable of generating meaningful values for these macros. A built-in macro `{#SNMPINDEX}` containing index of the discovered OID is applied to discovered entities. The discovered entities are grouped by `{#SNMPINDEX}` macro value.

To understand what we mean, let us perform few snmpwalks on our switch:

```
$ snmpwalk -v 2c -c public 192.168.1.1 IF-MIB::ifDescr
IF-MIB::ifDescr.1 = STRING: WAN
IF-MIB::ifDescr.2 = STRING: LAN1
IF-MIB::ifDescr.3 = STRING: LAN2
```

```
$ snmpwalk -v 2c -c public 192.168.1.1 IF-MIB::ifPhysAddress
IF-MIB::ifPhysAddress.1 = STRING: 8:0:27:90:7a:75
IF-MIB::ifPhysAddress.2 = STRING: 8:0:27:90:7a:76
IF-MIB::ifPhysAddress.3 = STRING: 8:0:27:2b:af:9e
```

And set SNMP OID to: `discovery[#{#IFDESCR}, ifDescr, #{#IFPHYSADDRESS}, ifPhysAddress]`

Now this rule will discover entities with `{#IFDESCR}` macros set to **WAN**, **LAN1** and **LAN2**, `{#IFPHYSADDRESS}` macros set to **8:0:27:90:7a:75**, **8:0:27:90:7a:76**, and **8:0:27:2b:af:9e**, `{#SNMPINDEX}` macros set to the discovered OIDs indexes **1**, **2** and **3**:

```
[
  {
    "#{#SNMPINDEX}": "1",
    "#{#IFDESCR}": "WAN",
    "#{#IFPHYSADDRESS}": "8:0:27:90:7a:75"
  },
  {
    "#{#SNMPINDEX}": "2",
    "#{#IFDESCR}": "LAN1",
    "#{#IFPHYSADDRESS}": "8:0:27:90:7a:76"
  },
  {
    "#{#SNMPINDEX}": "3",
    "#{#IFDESCR}": "LAN2",
```

```

    "{#IFPHYSADDRESS}": "8:0:27:2b:af:9e"
  }
]

```

If an entity does not have the specified OID, then the corresponding macro will be omitted for this entity. For example if we have the following data:

```

ifDescr.1 "Interface #1"
ifDescr.2 "Interface #2"
ifDescr.4 "Interface #4"

```

```

ifAlias.1 "eth0"
ifAlias.2 "eth1"
ifAlias.3 "eth2"
ifAlias.5 "eth4"

```

Then in this case SNMP discovery `discovery[{#IFDESCR}, ifDescr, {#IFALIAS}, ifAlias]` will return the following structure:

```

[
  {
    "{#SNMPINDEX}": 1,
    "{#IFDESCR}": "Interface #1",
    "{#IFALIAS}": "eth0"
  },
  {
    "{#SNMPINDEX}": 2,
    "{#IFDESCR}": "Interface #2",
    "{#IFALIAS}": "eth1"
  },
  {
    "{#SNMPINDEX}": 3,
    "{#IFALIAS}": "eth2"
  },
  {
    "{#SNMPINDEX}": 4,
    "{#IFDESCR}": "Interface #4"
  },
  {
    "{#SNMPINDEX}": 5,
    "{#IFALIAS}": "eth4"
  }
]

```

#### Item prototypes

The following screenshot illustrates how we can use these macros in item prototypes:

Item prototype   Tags   Preprocessing 2

\* Name

Interface {#IFNAME}({#IFALIAS}): Bits received

Type

SNMP agent

\* Key

net.if.in[ifHCInOctets.{#SNMPINDEX}]

Type of information

Numeric (unsigned)

\* SNMP OID

1.3.6.1.2.1.31.1.1.1.6.{#SNMPINDEX}

Units

bps

\* Update interval

3m

You can create as many item prototypes as needed:

## Item prototypes

| All templates / Linux SNMP   Discovery list / Network interfaces discovery   Item prototypes 9   Trigger prototypes 4   Graph prototypes 1   Host prototypes |   |   |          |         |        |            |                |  |
|--|---|---|----------|---------|--------|------------|----------------|--|
| <input type="checkbox"/>   | Name ▲  | Key   | Interval | History | Trends | Type       | Create enabled |  |
| <input type="checkbox"/>   | ... Interface {#IFNAME}({#IFALIAS}): Bits received                | net.if.in[ifHCInOctets.{#SNMPINDEX}]            | 3m       | 7d      | 365d   | SNMP agent | Yes            |  |
| <input type="checkbox"/>   | ... Interface {#IFNAME}({#IFALIAS}): Bits sent                    | net.if.out[ifHCOutOctets.{#SNMPINDEX}]          | 3m       | 7d      | 365d   | SNMP agent | Yes            |  |
| <input type="checkbox"/>   | ... Interface {#IFNAME}({#IFALIAS}): Inbound packets discarded    | net.if.in.discards[ifInDiscards.{#SNMPINDEX}]   | 3m       | 7d      | 365d   | SNMP agent | Yes            |  |
| <input type="checkbox"/>   | ... Interface {#IFNAME}({#IFALIAS}): Inbound packets with errors  | net.if.in.errors[ifInErrors.{#SNMPINDEX}]       | 3m       | 7d      | 365d   | SNMP agent | Yes            |  |
| <input type="checkbox"/>   | ... Interface {#IFNAME}({#IFALIAS}): Interface type               | net.if.type[ifType.{#SNMPINDEX}]                | 1h       | 7d      | 0d     | SNMP agent | Yes            |  |
| <input type="checkbox"/>   | ... Interface {#IFNAME}({#IFALIAS}): Operational status           | net.if.status[ifOperStatus.{#SNMPINDEX}]        | 1m       | 7d      | 0      | SNMP agent | Yes            |  |
| <input type="checkbox"/>   | ... Interface {#IFNAME}({#IFALIAS}): Outbound packets discarded   | net.if.out.discards[ifOutDiscards.{#SNMPINDEX}] | 3m       | 7d      | 365d   | SNMP agent | Yes            |  |
| <input type="checkbox"/>   | ... Interface {#IFNAME}({#IFALIAS}): Outbound packets with errors | net.if.out.errors[ifOutErrors.{#SNMPINDEX}]     | 3m       | 7d      | 365d   | SNMP agent | Yes            |  |
| <input type="checkbox"/>   | ... Interface {#IFNAME}({#IFALIAS}): Speed                        | net.if.speed[ifHighSpeed.{#SNMPINDEX}]          | 5m       | 7d      | 0d     | SNMP agent | Yes            |  |

## Trigger prototypes

The following screenshot illustrates how we can use these macros in trigger prototypes:



Graph prototype

Preview

\* Name

Interface {#IFNAME}({#IFALIAS}): Network traffic

\* Width

900

\* Height

200

Graph type

Normal

Show legend

☒

Show working time

☒

Show triggers

☒

Percentile line (left)

☐

Percentile line (right)

☐

Y axis MIN value

Calculated

Y axis MAX value

Calculated

\* Items

|    | Name   | Function | Draw style    | Y axis side | Color |
|----|--|----------|---------------|-------------|-------|
| 1: | SNMP host: Interface {#IFNAME}({#IFALIAS}): Bits received                | avg      | Gradient line | Left        |       |
| 2: | SNMP host: Interface {#IFNAME}({#IFALIAS}): Bits sent                    | avg      | Bold line     | Left        |       |
| 3: | SNMP host: Interface {#IFNAME}({#IFALIAS}): Outbound packets with errors | avg      | Line          | Right       |       |
| 4: | SNMP host: Interface {#IFNAME}({#IFALIAS}): Inbound packets with errors  | avg      | Line          | Right       |       |
| 5: | SNMP host: Interface {#IFNAME}({#IFALIAS}): Outbound packets discarded   | avg      | Line          | Right       |       |
| 6: | SNMP host: Interface {#IFNAME}({#IFALIAS}): Inbound packets discarded    | avg      | Line          | Right       |       |

[Add](#)
[Add prototype](#)

## Graph prototypes

|                            |  |  |   |                   |                      |                    |                 |
|----------------------------|--|--|---|-------------------|----------------------|--------------------|-----------------|
| All templates / Linux SNMP |  |  | Discovery list / Network interfaces discovery | Item prototypes 9 | Trigger prototypes 4 | Graph prototypes 1 | Host prototypes |
| <input type="checkbox"/>   | Name ▲   |  |   |                   |                      | Width              | Height          |
| <input type="checkbox"/>   | Interface {#IFNAME}({#IFALIAS}): Network traffic |  |   |                   |                      | 900                | 200             |

A summary of our discovery rule:

|                            |            |                              |             |                   |              |                      |                    |
|----------------------------|------------|------------------------------|-------------|-------------------|--------------|----------------------|--------------------|
| All templates / Linux SNMP |            | Items 26                     | Triggers 10 | Graphs 5          | Dashboards 2 | Discovery rules 5    | Web scenarios      |
| <input type="checkbox"/>   | Template   | Name ▲                       |             | Items             |              | Triggers             | Graphs             |
| <input type="checkbox"/>   | Linux SNMP | Network interfaces discovery |             | Item prototypes 9 |              | Trigger prototypes 4 | Graph prototypes 1 |

## Discovered entities

When server runs, it will create real items, triggers and graphs based on the values the SNMP discovery rule returns. In the host configuration they are prefixed with an orange link to a discovery rule they come from.

## Items

| All hosts / SNMP host Enabled <b>SNMP</b> Items 81 Triggers 23 Graphs 14 Discovery rules 6 Web scenarios |   |            |                                      |          |         |        |            |         |  |
|--|---|------------|--------------------------------------|----------|---------|--------|------------|---------|--|
| <input type="checkbox"/>   | Name ▲  | Triggers   | Key                                  | Interval | History | Trends | Type       | Status  |  |
| <input type="checkbox"/>   | ... <b>Network interfaces discovery:</b> Interface enp4s0(): Bits received                | Triggers 1 | net.if.in[ifHCInOctets.2]            | 3m       | 7d      | 365d   | SNMP agent | Enabled |  |
| <input type="checkbox"/>   | ... <b>Network interfaces discovery:</b> Interface enp4s0(): Bits sent                    | Triggers 1 | net.if.out[ifHCOutOctets.2]          | 3m       | 7d      | 365d   | SNMP agent | Enabled |  |
| <input type="checkbox"/>   | ... <b>Network interfaces discovery:</b> Interface enp4s0(): Inbound packets discarded    |            | net.if.in.discards[ifInDiscards.2]   | 3m       | 7d      | 365d   | SNMP agent | Enabled |  |
| <input type="checkbox"/>   | ... <b>Network interfaces discovery:</b> Interface enp4s0(): Inbound packets with errors  | Triggers 1 | net.if.in.errors[ifInErrors.2]       | 3m       | 7d      | 365d   | SNMP agent | Enabled |  |
| <input type="checkbox"/>   | ... <b>Network interfaces discovery:</b> Interface enp4s0(): Interface type               | Triggers 1 | net.if.type[ifType.2]                | 1h       | 7d      | 0d     | SNMP agent | Enabled |  |
| <input type="checkbox"/>   | ... <b>Network interfaces discovery:</b> Interface enp4s0(): Operational status           | Triggers 2 | net.if.status[ifOperStatus.2]        | 1m       | 7d      | 0      | SNMP agent | Enabled |  |
| <input type="checkbox"/>   | ... <b>Network interfaces discovery:</b> Interface enp4s0(): Outbound packets discarded   |            | net.if.out.discards[ifOutDiscards.2] | 3m       | 7d      | 365d   | SNMP agent | Enabled |  |
| <input type="checkbox"/>   | ... <b>Network interfaces discovery:</b> Interface enp4s0(): Outbound packets with errors | Triggers 1 | net.if.out.errors[ifOutErrors.2]     | 3m       | 7d      | 365d   | SNMP agent | Enabled |  |
| <input type="checkbox"/>   | ... <b>Network interfaces discovery:</b> Interface enp4s0(): Speed                        | Triggers 2 | net.if.speed[ifHighSpeed.2]          | 5m       | 7d      | 0d     | SNMP agent | Enabled |  |

## Triggers

|                          |             |       |  |   |  |         |      |          |             |           |                   |               |
|--------------------------|-------------|-------|--|---|--|---------|------|----------|-------------|-----------|-------------------|---------------|
| All hosts / SNMP host    |             |       |  |   |  | Enabled | SNMP | Items 81 | Triggers 23 | Graphs 14 | Discovery rules 6 | Web scenarios |
| <input type="checkbox"/> | Severity    | Value | Name ▲   | Operational data  | Expression   |         |      |          |             |           |                   |               |
| <input type="checkbox"/> | Information | OK    | Network interfaces discovery: Interface enp4s0(): Ethernet has changed to lower speed than it was before<br>Depends on: SNMP host: Interface enp4s0(): Link down | Current reported speed: {ITEM.LASTVALUE1}                               | Problem: <b>change</b> (/SNMP host/net.if.speed[ifHighSpeed.2])<0 and <b>last</b> (/SNMP host/net.if.speed[ifHighSpeed.2])>0 and ( <b>last</b> (/SNMP host/net.if.type[ifType.2])=6 or <b>last</b> (/SNMP host/net.if.type[ifType.2])=7 or <b>last</b> (/SNMP host/net.if.type[ifType.2])=11 or <b>last</b> (/SNMP host/net.if.type[ifType.2])=62 or <b>last</b> (/SNMP host/net.if.type[ifType.2])=69 or <b>last</b> (/SNMP host/net.if.type[ifType.2])=117 ) and ( <b>last</b> (/SNMP host/net.if.status[ifOperStatus.2])<2)<br>Recovery: ( <b>change</b> (/SNMP host/net.if.speed[ifHighSpeed.2])>0 and <b>last</b> (/SNMP host/net.if.speed[ifHighSpeed.2],#2)>0) or ( <b>last</b> (/SNMP host/net.if.status[ifOperStatus.2])=2) |         |      |          |             |           |                   |               |
| <input type="checkbox"/> | Warning     | OK    | Network interfaces discovery: Interface enp4s0(): High bandwidth usage<br>Depends on: SNMP host: Interface enp4s0(): Link down                                   | In: {ITEM.LASTVALUE1}, out: {ITEM.LASTVALUE3}, speed: {ITEM.LASTVALUE2} | Problem: ( <b>avg</b> (/SNMP host/net.if.in[ifHCInOctets.2],15m)>({\$IF.UTIL.MAX:"enp4s0"}/100)* <b>last</b> (/SNMP host/net.if.speed[ifHighSpeed.2]) or <b>avg</b> (/SNMP host/net.if.out[ifHCOutOctets.2],15m)>({\$IF.UTIL.MAX:"enp4s0"}/100)* <b>last</b> (/SNMP host/net.if.speed[ifHighSpeed.2])) and <b>last</b> (/SNMP host/net.if.speed[ifHighSpeed.2])>0<br>Recovery: <b>avg</b> (/SNMP host/net.if.in[ifHCInOctets.2],15m)<(({\$IF.UTIL.MAX:"enp4s0"}-3)/100)* <b>last</b> (/SNMP host/net.if.speed[ifHighSpeed.2]) and <b>avg</b> (/SNMP host/net.if.out[ifHCOutOctets.2],15m)<(({\$IF.UTIL.MAX:"enp4s0"}-3)/100)* <b>last</b> (/SNMP host/net.if.speed[ifHighSpeed.2])   |         |      |          |             |           |                   |               |
| <input type="checkbox"/> | Warning     | OK    | Network interfaces discovery: Interface enp4s0(): High error rate<br>Depends on: SNMP host: Interface enp4s0(): Link down  | errors in: {ITEM.LASTVALUE1}, errors out: {ITEM.LASTVALUE2}             | Problem: <b>min</b> (/SNMP host/net.if.in.errors[ifInErrors.2],5m)>{\$IF.ERRORS.WARN:"enp4s0"} or <b>min</b> (/SNMP host/net.if.out.errors[ifOutErrors.2],5m)>{\$IF.ERRORS.WARN:"enp4s0"}<br>Recovery: <b>max</b> (/SNMP host/net.if.in.errors[ifInErrors.2],5m)<{\$IF.ERRORS.WARN:"enp4s0"}*0.8 and <b>max</b> (/SNMP host/net.if.out.errors[ifOutErrors.2],5m)<{\$IF.ERRORS.WARN:"enp4s0"}*0.8   |         |      |          |             |           |                   |               |
| <input type="checkbox"/> | Average     | OK    | Network interfaces discovery: Interface enp4s0(): Link down  | Current state: {ITEM.LASTVALUE1}  | Problem: {\$IFCONTROL:"enp4s0"}=1 and <b>last</b> (/SNMP host/net.if.status[ifOperStatus.2])=2 and ( <b>last</b> (/SNMP host/net.if.status[ifOperStatus.2],#1)<< <b>last</b> (/SNMP host/net.if.status[ifOperStatus.2],#2))<br>Recovery: <b>last</b> (/SNMP host/net.if.status[ifOperStatus.2])<<2 or {\$IFCONTROL:"enp4s0"}=0   |         |      |          |             |           |                   |               |

## Graphs

All hosts / SNMP host

Enabled

SNMP

Items 81

Triggers 23

Graphs 14

Discovery rules 6

Web scenarios

| <input type="checkbox"/> | Name ▲  |
|--------------------------|---|
| <input type="checkbox"/> | Mounted filesystem discovery: /: Disk space usage                 |
| <input type="checkbox"/> | Linux SNMP: CPU jumps   |
| <input type="checkbox"/> | CPU discovery: CPU usage  |
| <input type="checkbox"/> | CPU discovery: CPU utilization                                    |
| <input type="checkbox"/> | Network interfaces discovery: Interface enp4s0(): Network traffic |

## 5 Discovery of JMX objects

Overview

It is possible to **discover** all JMX MBeans or MBean attributes or to specify a pattern for the discovery of these objects.

It is mandatory to understand the difference between an MBean and MBean attributes for discovery rule configuration. An MBean is an object which can represent a device, an application, or any resource that needs to be managed.

For example, there is an MBean which represents a web server. Its attributes are connection count, thread count, request timeout, http file cache, memory usage, etc. Expressing this thought in human comprehensive language we can define a coffee machine as an MBean which has the following attributes to be monitored: water amount per cup, average consumption of water for a certain period of time, number of coffee beans required per cup, coffee beans and water refill time, etc.

Item key

In **discovery rule** configuration, select **JMX agent** in the *Type* field.

Two item keys are supported for JMX object discovery - `jmx.discovery[]` and `jmx.get[]`:

| Item key   | Return value   | Parameters   | Comment  |
|--|--|--|--|
| <b>jmx.discovery</b> [<discovery mode>,<object name>,<unique short de-scrip-tion>] | This item returns a JSON array with LLD macros describing MBean objects or their attributes. | <b>discovery mode</b> - one of the following: <i>attributes</i> (retrieve JMX MBean attributes, default) or <i>beans</i> (retrieve JMX MBeans)<br><b>object name</b> - object name pattern (see <a href="#">documentation</a> ) identifying the MBean names to be retrieved (empty by default, retrieving all registered beans)<br><b>unique short description</b> - a unique description that allows multiple JMX items with the same discovery mode and object name on the host (optional) | Examples:<br>→ <code>jmx.discovery</code> - retrieve all JMX MBean attributes<br>→ <code>jmx.discovery[beans]</code> - retrieve all JMX MBeans<br>→<br><code>jmx.discovery[attributes,"*:type=GarbageCollector,name=*</code><br>- retrieve all garbage collector attributes<br>→<br><code>jmx.discovery[beans,"*:type=GarbageCollector,name=*</code><br>- retrieve all garbage collectors<br><br>There are some <b>limitations</b> to what MBean properties this item can return based on limited characters that are supported in macro name generation (supported characters can be described by the following regular expression: <code>A-Z0-9_\. \</code> ). So, for example, to discover MBean properties with a hyphenated word or non-ASCII characters, you need to use <code>jmx.get []</code> .<br><br>Supported since Zabbix Java gateway 3.4. |
| <b>jmx.get</b> [<discovery mode>,<object name>,<unique short de-scrip-tion>]       |  |  |  |



| Item key  |  |   |
|---|--|---|
| This item returns a JSON array with MBean objects or their attributes.  | <b>discovery mode</b> - one of the following: <i>attributes</i> (retrieve JMX MBean attributes, default) or <i>beans</i> (retrieve JMX MBeans)   | When using this item, it is needed to define custom low-level discovery macros, pointing to values extracted from the returned JSON using JSONPath. |
| Compared to <code>jmx.discovery[]</code> it does not define LLD macros. | <b>object name</b> - object name pattern (see <a href="#">documentation</a> ) identifying the MBean names to be retrieved (empty by default, retrieving all registered beans)<br><b>unique short description</b> - a unique description that allows multiple JMX items with the same discovery mode and object name on the host (optional) | Supported since Zabbix Java gateway 4.4.  |

#### Attention:

If no parameters are passed, all MBean attributes from JMX are requested. Not specifying parameters for JMX discovery or trying to receive all attributes for a wide range like `*:type=*,name=*` may lead to potential performance problems.

Using `jmx.discovery`

This item returns a JSON object with low-level discovery macros describing MBean objects or attributes. For example, in the discovery of MBean attributes (reformatted for clarity):

```
[
  {
    "{#JMXVALUE}": "0",
    "{#JMXTYPE}": "java.lang.Long",
    "{#JMXOBJ}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXDESC}": "java.lang:type=GarbageCollector,name=PS Scavenge,CollectionCount",
    "{#JMXATTR}": "CollectionCount"
  },
  {
    "{#JMXVALUE}": "0",
    "{#JMXTYPE}": "java.lang.Long",
    "{#JMXOBJ}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXDESC}": "java.lang:type=GarbageCollector,name=PS Scavenge,CollectionTime",
    "{#JMXATTR}": "CollectionTime"
  },
  {
    "{#JMXVALUE}": "true",
    "{#JMXTYPE}": "java.lang.Boolean",
    "{#JMXOBJ}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXDESC}": "java.lang:type=GarbageCollector,name=PS Scavenge,Valid",
    "{#JMXATTR}": "Valid"
  },
  {
    "{#JMXVALUE}": "PS Scavenge",
    "{#JMXTYPE}": "java.lang.String",
    "{#JMXOBJ}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXDESC}": "java.lang:type=GarbageCollector,name=PS Scavenge,Name",
    "{#JMXATTR}": "Name"
  },
  {
    "{#JMXVALUE}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXTYPE}": "javax.management.ObjectName",
    "{#JMXOBJ}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "{#JMXDESC}": "java.lang:type=GarbageCollector,name=PS Scavenge,ObjectName",
    "{#JMXATTR}": "ObjectName"
  }
]
```

```
]
```

In the discovery of MBeans (reformatted for clarity):

```
[
  {
    "#{JMXDOMAIN}": "java.lang",
    "#{JMXTYPE}": "GarbageCollector",
    "#{JMXOBJ}": "java.lang:type=GarbageCollector,name=PS Scavenge",
    "#{JMXNAME}": "PS Scavenge"
  }
]
```

Supported macros

The following macros are supported for use in the discovery rule **filter** and prototypes of items, triggers and graphs:

| Macro                         | Description  |
|-------------------------------|--|
| Discovery of MBean attributes |  |
| {#JMXVALUE}                   | Attribute value.   |
| {#JMXTYPE}                    | Attribute type.  |
| {#JMXOBJ}                     | Object name.   |
| {#JMXDESC}                    | Object name including attribute name.  |
| {#JMXATTR}                    | Attribute name.  |
| Discovery of MBeans           |  |
| {#JMXDOMAIN}                  | MBean domain. ( <i>Zabbix reserved name</i> )                                  |
| {#JMXOBJ}                     | Object name. ( <i>Zabbix reserved name</i> )                                   |
| {#JMX<key property>}          | MBean properties (like {#JMXTYPE}, {#JMXNAME}) (see <b>Limitations</b> below). |

Limitations

There are some limitations associated with the algorithm of creating LLD macro names from MBean property names:

- attribute names are changed to uppercase
- attribute names are ignored (no LLD macros are generated) if they consist of unsupported characters for LLD macro names. Supported characters can be described by the following regular expression: A-Z0-9\_\..
- if an attribute is called "obj" or "domain" they will be ignored because of the overlap with the values of the reserved Zabbix properties {#JMXOBJ} and {#JMXDOMAIN} (supported since Zabbix 3.4.3.)

Please consider this jmx.discovery (with "beans" mode) example. MBean has the following properties defined (some of which will be ignored; see below):

```
name=test
=Type
attributes []=1,2,3
Name=NameOfTheTest
domAin=some
```

As a result of JMX discovery, the following LLD macros will be generated:

- {#JMXDOMAIN} - Zabbix internal, describing the domain of MBean
- {#JMXOBJ} - Zabbix internal, describing MBean object
- {#JMXNAME} - created from "name" property

Ignored properties are:

- тип : its name contains unsupported characters (non-ASCII)
- attributes[] : its name contains unsupported characters (square brackets are not supported)
- Name : it's already defined (name=test)
- domAin : it's a Zabbix reserved name

Examples

Let's review two more practical examples of an LLD rule creation with the use of MBean. To understand the difference between an LLD rule collecting MBeans and an LLD rule collecting MBean attributes better please take a look at following table:

| MBean1           | MBean2           | MBean3           |
|------------------|------------------|------------------|
| MBean1Attribute1 | MBean2Attribute1 | MBean3Attribute1 |

|                  |                  |                  |
|------------------|------------------|------------------|
| MBean1Attribute2 | MBean2Attribute2 | MBean3Attribute2 |
| MBean1Attribute3 | MBean2Attribute3 | MBean3Attribute3 |

Example 1: Discovering MBeans

This rule will return 3 objects: the top row of the column: MBean1, MBean2, MBean3.

For more information about objects please refer to [supported macros](#) table, *Discovery of MBeans* section.

Discovery rule configuration collecting MBeans (without the attributes) looks like the following:

Discovery rule

Preprocessing

LLD macros

Filters

Overrides

\* Name

JMX garbage collectors

Type

JMX agent

\* Key

jmx.discovery[beans,"\*:type=GarbageCollector,name=\*"]

\* Host interface

127.0.0.1 : 12345

The key used here:

```
jmx.discovery[beans,"*:type=GarbageCollector,name=*"]
```

All the garbage collectors without attributes will be discovered. As Garbage collectors have the same attribute set, we can use desired attributes in item prototypes the following way:

## Item prototypes

All hosts / JMX

Enabled

JMX

Discovery list / JMX garbage collectors

Item prototypes

Trigger p

| <input type="checkbox"/> Name ▲                        | Key                            |
|--|--------------------------------|
| <input type="checkbox"/> GC {#JMXNAME} CollectionCount | jmx[{#JMXOBJ},CollectionCount] |
| <input type="checkbox"/> GC {#JMXNAME} CollectionTime  | jmx[{#JMXOBJ},CollectionTime]  |
| <input type="checkbox"/> GC {#JMXNAME} Valid           | jmx[{#JMXOBJ},Valid]           |

The keys used here:

```
jmx[{#JMXOBJ},CollectionCount]
jmx[{#JMXOBJ},CollectionTime]
jmx[{#JMXOBJ},Valid]
```

LLD discovery rule will result in something close to this (items are discovered for two Garbage collectors):

|                          |   |          | Filter ▼   |
|--------------------------|---|----------|--|
| <input type="checkbox"/> | Name ▲  | Triggers | Key  |
| <input type="checkbox"/> | ... JMX garbage collectors: GC PS MarkSweep CollectionCount |          | jmx["java.lang:type=GarbageCollector,name=PS MarkSweep",CollectionCount] |
| <input type="checkbox"/> | ... JMX garbage collectors: GC PS MarkSweep CollectionTime  |          | jmx["java.lang:type=GarbageCollector,name=PS MarkSweep",CollectionTime]  |
| <input type="checkbox"/> | ... JMX garbage collectors: GC PS MarkSweep Valid           |          | jmx["java.lang:type=GarbageCollector,name=PS MarkSweep",Valid]           |
| <input type="checkbox"/> | ... JMX garbage collectors: GC PS Scavenge CollectionCount  |          | jmx["java.lang:type=GarbageCollector,name=PS Scavenge",CollectionCount]  |
| <input type="checkbox"/> | ... JMX garbage collectors: GC PS Scavenge CollectionTime   |          | jmx["java.lang:type=GarbageCollector,name=PS Scavenge",CollectionTime]   |
| <input type="checkbox"/> | ... JMX garbage collectors: GC PS Scavenge Valid            |          | jmx["java.lang:type=GarbageCollector,name=PS Scavenge",Valid]            |

## Example 2: Discovering MBean attributes

This rule will return 9 objects with the following fields: MBean1Attribute1, MBean2Attribute1, MBean3Attribute1, MBean1Attribute2, MBean2Attribute2, MBean3Attribute2, MBean1Attribute3, MBean2Attribute3, MBean3Attribute3.

For more information about objects please refer to [supported macros](#) table, *Discovery of MBean attributes* section.

Discovery rule configuration collecting MBean attributes looks like the following:

Discovery rule
Preprocessing
LLD macros
Filters
Overrides

\* Name

JMX garbage collectors

Type

JMX agent

\* Key

jmx.discovery[attributes,"\*:type=GarbageCollector,name=\*"]

\* Host interface

127.0.0.1 : 12345

The key used here:

```
jmx.discovery[attributes,"*:type=GarbageCollector,name=*"]
```

All the garbage collectors with a single item attribute will be discovered.

## Item prototypes

All hosts / JMX
Enabled
JMX
Discovery list / JMX garbage collectors
Item prototypes
Trigger

| <input type="checkbox"/> | Name ▲               | Key                       |
|--------------------------|----------------------|---------------------------|
| <input type="checkbox"/> | {#JMXOBJ} {#JMXATTR} | jmx[{#JMXOBJ},{#JMXATTR}] |

In this particular case an item will be created from prototype for every MBean attribute. The main drawback of this configuration is that trigger creation from trigger prototypes is impossible as there is only one item prototype for all attributes. So this setup can be used for data collection, but is not recommended for automatic monitoring.

Using `jmx.get`

`jmx.get []` is similar to the `jmx.discovery []` item, but it does not turn Java object properties into low-level discovery macro names and therefore can return values without [limitations](#) that are associated with LLD macro name generation such as hyphens or non-ASCII characters.

When using `jmx.get []` for discovery, low-level discovery macros can be defined separately in the custom [LLD macro](#) tab of the discovery rule configuration, using JSONPath to point to the required values.

Discovering MBeans

Discovery item: `jmx.get[beans,"com.example:type=*,*"]`

Response:

```
[
  {
    "object": "com.example:type=Hello,data-src=data-base, = ",
    "domain": "com.example",
    "properties": {
      "data-src": "data-base",
      " ": " ",
      "type": "Hello"
    }
  },
  {
    "object": "com.example:type=Atomic",
    "domain": "com.example",
    "properties": {
      "type": "Atomic"
    }
  }
]
```

Discovering MBean attributes

Discovery item: `jmx.get[attributes,"com.example:type=*,*"]`

Response:

```
[
  {
    "object": "com.example:type=*",
    "domain": "com.example",
    "properties": {
      "type": "Simple"
    }
  },
  {
    "object": "com.zabbix:type=yes,domain=zabbix.com,data-source=/dev/rand, = ,obj=true",
    "domain": "com.zabbix",
    "properties": {
      "type": "Hello",
      "domain": "com.example",
      "data-source": "/dev/rand",
      " ": " ",
      "obj": true
    }
  }
]
```

## 6 Discovery of IPMI sensors

Overview

It is possible to automatically discover IPMI sensors.

To do that, you may use a combination of:

- the `ipmi.get` IPMI item (supported since Zabbix **5.0.0**) as the master item
- dependent low-level discovery rule and item prototypes

Configuration

Master item

Create an IPMI item using the following key:

`ipmi.get`

| Item                | Tags            | Preprocessing |
|---------------------|-----------------|---------------|
| * Name              | IPMI get item   |               |
| Type                | IPMI agent      |               |
| * Key               | ipmi.get        |               |
| * Host interface    | 127.0.0.1 : 623 |               |
| IPMI sensor         |                 |               |
| Type of information | Text            |               |

Set the type of information to "Text" for possibly big JSON data.

Dependent LLD rule

Create a low-level discovery rule as "Dependent item" type:

| Discovery rule | Preprocessing                  | LLD macros | Filters | Overrides |
|----------------|--------------------------------|------------|---------|-----------|
| * Name         | Discovery rule for ipmi.get    |            |         |           |
| Type           | Dependent item                 |            |         |           |
| * Key          | ipmi.sensor.discovery          |            |         |           |
| * Master item  | Zabbix server: IPMI get item X |            |         |           |

As master item select the `ipmi.get` item we created.

In the "LLD macros" tab define a custom macro with the corresponding JSONPath:

| Discovery rule | Preprocessing | LLD macros 1 | Filters | Overrides |
|----------------|---------------|--------------|---------|-----------|
| LLD macros     |               |              |         |           |
| LLD macro      |               | JSONPath     |         |           |
| {#SENSOR_ID}   |               | \$.id        |         |           |
| Add            |               |              |         |           |

Dependent item prototype

Create an item prototype with "Dependent item" type in this LLD rule. As master item for this prototype select the `ipmi.get` item we created.

Item prototype

Tags

Preprocessing

\* Name

IPMI value for sensor {#SENSOR\_ID}

Type

Dependent item

\* Key

ipmi\_sensor[{#SENSOR\_ID}]

\* Master item

Zabbix server: IPMI get item

Type of information

Numeric (unsigned)

Note the use of the `{#SENSOR ID}` macro in the item prototype name and key:

- *Name*: IPMI value for sensor {#SENSOR\_ID}
- *Key*: ipmi sensor[{#SENSOR ID}]

As type of information, *Numeric (unsigned)*.

In the item prototype "Preprocessing" tab select JSONPath and use the following JSONPath expression as parameter:

```
$.['?(@.id=='{#SENSOR ID}')'].value.first()
```

Item prototype

Tags

Preprocessing 1

| Preprocessing steps                 | Name                | Parameters   |
|-------------------------------------|---------------------|--|
| <div><div></div><div>1:</div></div> | <div>JSONPath</div> | <div><code>\$.[?(@.id=='#SENSOR_ID')].value.first()</code></div> |

Add

When discovery starts, one item per each IPMI sensor will be created. This item will return the integer value of the given sensor.

## 7 Discovery of systemd services

## Overview

It is possible to **discover** systemd units (services, by default) with Zabbix.

Item key

The item to use in the **discovery rule** is the

systemd.unit.discovery

**Attention:**

This **item** key is only supported in Zabbix agent 2.

This item returns a JSON with information about systemd units, for example:

```
[{
  "{#UNIT.NAME}": "mysqld.service",
  "{#UNIT.DESRIPTION}": "MySQL Server",
  "{#UNIT.LOADSTATE}": "loaded",
  "{#UNIT.ACTIVESTATE}": "active",
  "{#UNIT.SUBSTATE}": "running",
  "{#UNIT.FOLLOWED}": "",
  "{#UNIT.PATH}": "/org/freedesktop/systemd1/unit/mysqld_2eservice",
```

```

    "{#UNIT.JOBID}": 0,
    "{#UNIT.JOBTYP}": "",
    "{#UNIT.JOBPATH}": "/",
    "{#UNIT.UNITFILESTATE}": "enabled"
  }, {
    "{#UNIT.NAME}": "systemd-journald.socket",
    "{#UNIT.DESCRPTION}": "Journal Socket",
    "{#UNIT.LOADSTATE}": "loaded",
    "{#UNIT.ACTIVESTATE}": "active",
    "{#UNIT.SUBSTATE}": "running",
    "{#UNIT.FOLLOWED}": "",
    "{#UNIT.PATH}": "/org/freedesktop/systemd1/unit/systemd_2djournald_2socket",
    "{#UNIT.JOBID}": 0,
    "{#UNIT.JOBTYP}": "",
    "{#UNIT.JOBPATH}": "/",
    "{#UNIT.UNITFILESTATE}": "enabled"
  }
}]

```

Discovery of disabled systemd units

Since Zabbix 6.0.1 it is also possible to discover **disabled** systemd units. In this case three macros are returned in the resulting JSON:

- {#UNIT.PATH}
- {#UNIT.ACTIVESTATE}
- {#UNIT.UNITFILESTATE}.

#### Attention:

To have items and triggers created from prototypes for disabled systemd units, make sure to adjust (or remove) prohibiting LLD filters for {#UNIT.ACTIVESTATE} and {#UNIT.UNITFILESTATE}.

Supported macros

The following macros are supported for use in the discovery rule **filter** and prototypes of items, triggers and graphs:

| Macro                 | Description  |
|-----------------------|--|
| {#UNIT.NAME}          | Primary unit name.   |
| {#UNIT.DESCRPTION}    | Human readable description.  |
| {#UNIT.LOADSTATE}     | Load state (i.e. whether the unit file has been loaded successfully)   |
| {#UNIT.ACTIVESTATE}   | Active state (i.e. whether the unit is currently started or not)   |
| {#UNIT.SUBSTATE}      | Sub state (a more fine-grained version of the active state that is specific to the unit type, which the active state is not) |
| {#UNIT.FOLLOWED}      | Unit that is being followed in its state by this unit, if there is any; otherwise an empty string.                           |
| {#UNIT.PATH}          | Unit object path.  |
| {#UNIT.JOBID}         | Numeric job ID if there is a job queued for the job unit; 0 otherwise.   |
| {#UNIT.JOBTYP}        | Job type.  |
| {#UNIT.JOBPATH}       | Job object path.   |
| {#UNIT.UNITFILESTATE} | The install state of the unit file.  |

Item prototypes

Item prototypes that can be created based on systemd service discovery include, for example:

- Item name: {#UNIT.DESCRPTION} active state info; item key: systemd.unit.info["{#UNIT.NAME}"]
- Item name: {#UNIT.DESCRPTION} load state info; item key: systemd.unit.info["{#UNIT.NAME}",LoadState]

systemd.unit.info **agent items** are supported since Zabbix 4.4.

## 8 Discovery of Windows services

Overview

In a similar way as **file systems** are discovered, it is possible to also discover Windows services.



Item key

The item to use in the **discovery rule** is

`service.discovery`

This item is supported since Zabbix Windows agent 3.0.

Supported macros

The following macros are supported for use in the discovery rule **filter** and prototypes of items, triggers and graphs:

| Macro                                  | Description   |
|--|---|
| <code>{#SERVICE.NAME}</code>           | Service name.   |
| <code>{#SERVICE.DISPLAYNAME}</code>    | Displayed service name.   |
| <code>{#SERVICE.DESRIPTION}</code>     | Service description.  |
| <code>{#SERVICE.STATE}</code>          | Numerical value of the service state.<br>See the <b>service.info</b> item for details.  |
| <code>{#SERVICE.STATENAME}</code>      | Name of the service state.<br>See the <b>service.info</b> item for details.   |
| <code>{#SERVICE.PATH}</code>           | Service path.   |
| <code>{#SERVICE.USER}</code>           | Service user.   |
| <code>{#SERVICE.STARTUP}</code>        | Numerical value of the service startup type.<br>See the <b>service.info</b> item for details.   |
| <code>{#SERVICE.STARTUPNAME}</code>    | Name of the service startup type.<br>See the <b>service.info</b> item for details.  |
| <code>{#SERVICE.STARTUPTRIGGER}</code> | Numerical value to indicate if the service startup type has:<br>0 - no startup triggers<br>1 - has startup triggers<br>This macro is supported since Zabbix 3.4.4. It is useful to discover such service startup types as <i>Automatic (trigger start)</i> , <i>Automatic delayed (trigger start)</i> and <i>Manual (trigger start)</i> . |

Based on Windows service discovery you may create an **item** prototype like

```
service.info[{#SERVICE.NAME},<param>]
```

where `param` accepts the following values: *state*, *displayname*, *path*, *user*, *startup* or *description*.

For example, to acquire the display name of a service you may use a "service.info[{#SERVICE.NAME},displayname]" item. If `param` value is not specified ("service.info[{#SERVICE.NAME}]"), the default *state* parameter is used.

## 9 Discovery of Windows performance counter instances

Overview

It is possible to discover object instances of Windows performance counters. This is useful for multi-instance performance counters.

Item key

To configure the **discovery rule**, use the following item:

- `perf_instance.discovery[object]`

Note that the object name may be localized. For example:

```
perf_instance.discovery[Processor] # The object name is in English.  
perf_instance.discovery[Processador] # The object name is in Portuguese.
```

Alternatively, to ensure that the object name is provided in English, independent of OS localization, use the following item:

- `perf_instance_en.discovery[object]`

For example:

```
perf_instance_en.discovery[Processor]  
perf_instance_en.discovery[Memory]
```

These items are supported since Zabbix Windows agent 5.0.1.

Supported macros

The discovery process will return all instances of the specified object in the `{#INSTANCE}` macro:

```
[
  {"{#INSTANCE}": "0"},
  {"{#INSTANCE}": "1"},
  {"{#INSTANCE}": "_Total"}
]
```

This macro may be used in the prototypes of `perf_counter[]` and `perf_counter_en[]` items.

For example, if the item key used in the discovery rule is `perf_instance.discovery[Processor]`, you may create the following item prototype:

```
perf_counter["\\Processor({#INSTANCE})\\% Processor Time"]
```

Note:

- If the specified object is not found or does not support variable instances, the discovery item will become NOTSUPPORTED.
- If the specified object supports variable instances but currently does not have any instances, an empty JSON array will be returned.
- Duplicate instances will be skipped.

## 10 Discovery using WMI queries

Overview

[WMI](#) is a powerful interface in Windows that can be used for retrieving various information about Windows components, services, state and software installed.

It can be used for physical disk discovery and their performance data collection, network interface discovery, Hyper-V guest discovery, monitoring Windows services and many other things in Windows OS.

This type of low-level **discovery** is done using WQL queries whose results get automatically transformed into a JSON object suitable for low-level discovery.

Item key

The item to use in the **discovery rule** is

```
wmi.getall[<namespace>,<query>]
```

This **item** transforms the query result into a JSON array. For example:

```
select * from Win32_DiskDrive where Name like '%PHYSICALDRIVE%'
```

may return something like this:

```
[
  {
    "DeviceID" : "\\.\PHYSICALDRIVE0",
    "BytesPerSector" : 512,
    "Capabilities" : [
      3,
      4
    ],
    "CapabilityDescriptions" : [
      "Random Access",
      "Supports Writing"
    ],
    "Caption" : "VBOX HARDDISK ATA Device",
    "ConfigManagerErrorCode" : "0",
    "ConfigManagerUserConfig" : "false",
    "CreationClassName" : "Win32_DiskDrive",
    "Description" : "Disk drive",
    "FirmwareRevision" : "1.0",
    "Index" : 0,
    "InterfaceType" : "IDE"
  }
]
```

```

},
{
  "DeviceID" : "\\.\PHYSICALDRIVE1",
  "BytesPerSector" : 512,
  "Capabilities" : [
    3,
    4
  ],
  "CapabilityDescriptions" : [
    "Random Access",
    "Supports Writing"
  ],
  "Caption" : "VBOX HARDDISK ATA Device",
  "ConfigManagerErrorCode" : "0",
  "ConfigManagerUserConfig" : "false",
  "CreationClassName" : "Win32_DiskDrive",
  "Description" : "Disk drive",
  "FirmwareRevision" : "1.0",
  "Index" : 1,
  "InterfaceType" : "IDE"
}
]

```

This item is supported since Zabbix Windows agent 4.4.

Low-level discovery macros

Even though no low-level discovery macros are created in the returned JSON, these macros can be defined by the user as an additional step, using the [custom LLD macro](#) functionality with JSONPath pointing to the discovered values in the returned JSON.

The macros then can be used to create item, trigger, etc prototypes.

## 11 Discovery using ODBC SQL queries

Overview

This type of low-level [discovery](#) is done using SQL queries, whose results get automatically transformed into a JSON object suitable for low-level discovery.

Item key

SQL queries are performed using a "Database monitor" item type. Therefore, most of the instructions on [ODBC monitoring](#) page apply in order to get a working "Database monitor" discovery rule.

Two item keys may be used in "Database monitor" discovery rules:

- **db.odbc.discovery**[<unique short description>,<dsn>,<connection string>] - this item transforms the SQL query result into a JSON array, turning the column names from the query result into low-level discovery macro names paired with the discovered field values. These macros can be used in creating item, trigger, etc prototypes. See also: [Using db.odbc.discovery](#).
- **db.odbc.get**[<unique short description>,<dsn>,<connection string>] - this item transforms the SQL query result into a JSON array, keeping the original column names from the query result as a field name in JSON paired with the discovered values. Compared to `db.odbc.discovery[]`, this item does not create low-level discovery macros in the returned JSON, therefore there is no need to check if the column names can be valid macro names. The low-level discovery macros can be defined as an additional step as required, using the [custom LLD macro](#) functionality with JSONPath pointing to the discovered values in the returned JSON. See also: [Using db.odbc.get](#).

Using db.odbc.discovery

As a practical example to illustrate how the SQL query is transformed into JSON, let us consider low-level discovery of Zabbix proxies by performing an ODBC query on Zabbix database. This is useful for automatic creation of "zabbix[proxy,<name>,lastaccess]" [internal items](#) to monitor which proxies are alive.

Let us start with discovery rule configuration:

| Discovery rule    | Preprocessing   | LLD macros | Filters | Overrides |
|-------------------|---|------------|---------|-----------|
| * Name            | Proxy discovery   |            |         |           |
| Type              | Database monitor  |            |         |           |
| * Key             | db.odbc.discovery[proxies,{SDSN}]   |            |         |           |
| User name         |   |            |         |           |
| Password          |   |            |         |           |
| * SQL query       | SELECT h1.host, COUNT(h2.host) AS count FROM hosts h1 LEFT JOIN hosts h2 ON h1.hostid = h2.proxy_hostid WHERE h1.status IN (5, 6) GROUP BY h1.host; |            |         |           |
| * Update interval | 30s   |            |         |           |

All mandatory input fields are marked with a red asterisk.

Here, the following direct query on Zabbix database is used to select all Zabbix proxies, together with the number of hosts they are monitoring. The number of hosts can be used, for instance, to filter out empty proxies:

```
mysql> SELECT h1.host, COUNT(h2.host) AS count FROM hosts h1 LEFT JOIN hosts h2 ON h1.hostid = h2.proxy_hostid
```

```
+-----+-----+
| host   | count |
+-----+-----+
| Japan 1 |    5 |
| Japan 2 |   12 |
| Latvia  |    3 |
+-----+-----+
```

```
3 rows in set (0.01 sec)
```

By the internal workings of "db.odbc.discovery[,{\$DSN}]" item, the result of this query gets automatically transformed into the following JSON:

```
[
  {
    "{#HOST}": "Japan 1",
    "{#COUNT}": "5"
  },
  {
    "{#HOST}": "Japan 2",
    "{#COUNT}": "12"
  },
  {
    "{#HOST}": "Latvia",
    "{#COUNT}": "3"
  }
]
```

It can be seen that column names become macro names and selected rows become the values of these macros.

#### Note:

If it is not obvious how a column name would be transformed into a macro name, it is suggested to use column aliases like "COUNT(h2.host) AS count" in the example above.

In case a column name cannot be converted into a valid macro name, the discovery rule becomes not supported, with the error message detailing the offending column number. If additional help is desired, the obtained column names are provided under DebugLevel=4 in Zabbix server log file:

```
$ grep db.odbc.discovery /tmp/zabbix_server.log
```

```
...
```

```
23876:20150114:153410.856 In db_odbc_discovery() query:'SELECT h1.host, COUNT(h2.host) FROM hosts h1 I
```

```
23876:20150114:153410.860 db_odbc_discovery() column[1]:'host'
```

```
23876:20150114:153410.860 db_odbc_discovery() column[2]:'COUNT(h2.host)'
```

```
23876:20150114:153410.860 End of db_odbc_discovery():NOTSUPPORTED
```

```
23876:20150114:153410.860 Item [Zabbix server:db.odbc.discovery[proxies,{ $DSN}]] error: Cannot convert
```

Now that we understand how a SQL query is transformed into a JSON object, we can use {#HOST} macro in item prototypes:

| Item prototype           | Tags                              | Preprocessing |
|--------------------------|-----------------------------------|---------------|
| <b>* Name</b>            | Last access time of proxy {#HOST} |               |
| Type                     | Zabbix internal                   |               |
| <b>* Key</b>             | zabbix[proxy,{#HOST},lastaccess]  |               |
| Type of information      | Numeric (unsigned)                |               |
| Units                    | unixtime                          |               |
| <b>* Update interval</b> | 60s                               |               |

Once discovery is performed, an item will be created for each proxy:

| <input type="checkbox"/> | Name   | Triggers | Key ▲                          |
|--------------------------|--|----------|--------------------------------|
| <input type="checkbox"/> | ... <b>Proxy discovery:</b> Last access time of proxy Japan1 |          | zabbix[proxy,Japan1,lastacce   |
| <input type="checkbox"/> | ... <b>Proxy discovery:</b> Last access time of proxy Japan2 |          | zabbix[proxy,Japan2,lastacce   |
| <input type="checkbox"/> | ... <b>Proxy discovery:</b> Last access time of proxy Latvia |          | zabbix[proxy,Latvia,lastaccess |

Using db.odbc.get

Using db.odbc.get[,{\$DSN}] and the following SQL example:

```
mysql> SELECT h1.host, COUNT(h2.host) AS count FROM hosts h1 LEFT JOIN hosts h2 ON h1.hostid = h2.proxy_ho
```

```
+-----+-----+
```

```
| host      | count |
```

```
+-----+-----+
```

```
| Japan 1 |      5 |
```

```
| Japan 2 |     12 |
```

```
| Latvia  |      3 |
```

```
+-----+-----+
```

```
3 rows in set (0.01 sec)
```

this JSON will be returned:

```
[  
  {
```

```

    "host": "Japan 1",
    "count": "5"
  },
  {
    "host": "Japan 2",
    "count": "12"
  },
  {
    "host": "Latvia",
    "count": "3"
  }
]

```

As you can see, there are no low-level discovery macros there. However, custom low-level discovery macros can be created in the **LLD macros** tab of a discovery rule using JSONPath, for example:

{#HOST} → \$.host

Now this {#HOST} macro may be used in item prototypes:

| Item prototype      | Tags                              | Preprocessing |
|---------------------|-----------------------------------|---------------|
| * Name              | Last access time of proxy {#HOST} |               |
| Type                | Zabbix internal                   |               |
| * Key               | zabbix[proxy,{#HOST},lastaccess]  |               |
| Type of information | Numeric (unsigned)                |               |
| Units               | unixtime                          |               |
| * Update interval   | 60s                               |               |

## 12 Discovery using Prometheus data

### Overview

Data provided in Prometheus line format can be used for low-level discovery.

See **Prometheus checks** for details how Prometheus data querying is implemented in Zabbix.

### Configuration

The low-level discovery rule should be created as a **dependent item** to the HTTP master item that collects Prometheus data.

### Prometheus to JSON

In the discovery rule, go to the Preprocessing tab and select the *Prometheus to JSON* preprocessing option. Data in JSON format are needed for discovery and the *Prometheus to JSON* preprocessing option will return exactly that, with the following attributes:

- metric name
- metric value
- help (if present)
- type (if present)
- labels (if present)
- raw line

For example, querying `wmi_logical_disk_free_bytes`:

Discovery rule
Preprocessing 1
LLD macros
Filters
Overrides

| Preprocessing steps | Name               | Parameters   |
|---------------------|--------------------|--|
| 1:                  | Prometheus to JSON | wmi_logical_disk_free_bytes{volume=~".*"}<br><a href="#">Add</a> |

from these Prometheus lines:

```
# HELP wmi_logical_disk_free_bytes Free space in bytes (LogicalDisk.PercentFreeSpace)
# TYPE wmi_logical_disk_free_bytes gauge
wmi_logical_disk_free_bytes{volume="C:"} 3.5180249088e+11
wmi_logical_disk_free_bytes{volume="D:"} 2.627731456e+09
wmi_logical_disk_free_bytes{volume="HarddiskVolume4"} 4.59276288e+08
```

will return:

```
[
  {
    "name": "wmi_logical_disk_free_bytes",
    "help": "Free space in bytes (LogicalDisk.PercentFreeSpace)",
    "type": "gauge",
    "labels": {
      "volume": "C:"
    },
    "value": "3.5180249088e+11",
    "line_raw": "wmi_logical_disk_free_bytes{volume=\"C:\"} 3.5180249088e+11"
  },
  {
    "name": "wmi_logical_disk_free_bytes",
    "help": "Free space in bytes (LogicalDisk.PercentFreeSpace)",
    "type": "gauge",
    "labels": {
      "volume": "D:"
    },
    "value": "2.627731456e+09",
    "line_raw": "wmi_logical_disk_free_bytes{volume=\"D:\"} 2.627731456e+09"
  },
  {
    "name": "wmi_logical_disk_free_bytes",
    "help": "Free space in bytes (LogicalDisk.PercentFreeSpace)",
    "type": "gauge",
    "labels": {
      "volume": "HarddiskVolume4"
    },
    "value": "4.59276288e+08",
    "line_raw": "wmi_logical_disk_free_bytes{volume=\"HarddiskVolume4\"} 4.59276288e+08"
  }
]
```

#### Mapping LLD macros

Next you have to go to the LLD macros tab and make the following mappings:

```
{#VOLUME}=${labels['volume']}
{#METRIC}=${['name']}
{#HELP}=${['help']}
```

#### Item prototype

You may want to create an item prototype like this:

Item prototype
Tags
Preprocessing

\* Name
Free bytes on {#VOLUME}

Type
Dependent item

\* Key
wmi[{#METRIC},{#VOLUME}]
Select

\* Master item
My host: HTTP master item
Select

Type of information
Numeric (float)

Units
B

\* History storage period
Do not keep history
Storage period
90d

\* Trend storage period
Do not keep trends
Storage period
365d

Value mapping
type here to search
Select

Description
{#HELP}

Create enabled
☒

Discover
☒

Add
Test
Cancel

with preprocessing options:

Item prototype
Tags
Preprocessing 1

Preprocessing steps
Name
Parameters

1:
Prometheus pattern
{#METRIC}{volume="{#VOLUME}"}

Add

### 13 Discovery of block devices

In a similar way as **file systems** are discovered, it is possible to also discover block devices and their type.

Item key

The item key to use in the **discovery rule** is

`vfs.dev.discovery`

This item is supported on Linux platforms only, since Zabbix agent 4.4.

You may create discovery rules using this discovery item and:



- filter: **{#DEVNAME}** matches `sd[\D]$` - to discover devices named "sd0", "sd1", "sd2", ...
- filter: **{#DEVTYPE}** matches `disk` AND **{#DEVNAME}** does not match `^loop.*` - to discover disk type devices whose name does not start with "loop"

Supported macros

This discovery key returns two macros - `{#DEVNAME}` and `{#DEVTYPE}` identifying the block device name and type respectively, e.g.:

```
[
  {
    "{#DEVNAME}": "loop1",
    "{#DEVTYPE}": "disk"
  },
  {
    "{#DEVNAME}": "dm-0",
    "{#DEVTYPE}": "disk"
  },
  {
    "{#DEVNAME}": "sda",
    "{#DEVTYPE}": "disk"
  },
  {
    "{#DEVNAME}": "sda1",
    "{#DEVTYPE}": "partition"
  }
]
```

Block device discovery allows to use `vfs.dev.read[]` and `vfs.dev.write[]` items to create item prototypes using the `{#DEVNAME}` macro, for example:

- `"vfs.dev.read[{#DEVNAME},sps]"`
- `"vfs.dev.write[{#DEVNAME},sps]"`

`{#DEVTYPE}` is intended for device filtering.

## 14 Discovery of host interfaces in Zabbix

### Overview

It is possible to **discover** all interfaces configured in Zabbix frontend for a host.

### Item key

The item to use in the **discovery rule** is the

`zabbix[host,discovery,interfaces]`

internal item. This item is supported since Zabbix server 3.4.

This item returns a JSON with the description of interfaces, including:

- IP address/DNS hostname (depending on the "Connect to" host setting)
- Port number
- Interface type (Zabbix agent, SNMP, JMX, IPMI)
- If it is the default interface or not
- If the bulk request feature is enabled - for SNMP interfaces only.

For example:

```
[{"{#IF.CONN}": "192.168.3.1", "{#IF.IP}": "192.168.3.1", "{#IF.DNS}": "", "{#IF.PORT}": "10050", "{#IF.TYPE}": "AG"}
```

With multiple interfaces their records in JSON are ordered by:

- Interface type,
- Default - the default interface is put before non-default interfaces,
- Interface ID (in ascending order).

### Supported macros

The following macros are supported for use in the discovery rule **filter** and prototypes of items, triggers and graphs:

| Macro           | Description   |
|-----------------|---|
| {#IF.CONNN}     | Interface IP address or DNS host name.  |
| {#IF.IP}        | Interface IP address.   |
| {#IF.DNS}       | Interface DNS host name.  |
| {#IF.PORT}      | Interface port number.  |
| {#IF.TYPE}      | Interface type ("AGENT", "SNMP", "JMX", or "IPMI").   |
| {#IF.DEFAULT}   | Default status for the interface:<br>0 - not default interface<br>1 - default interface   |
| {#IF.SNMP.BULK} | SNMP bulk processing status for the interface:<br>0 - disabled<br>1 - enabled<br>This macro is returned only if interface type is "SNMP". |

## 6 Custom LLD rules

### Overview

It is also possible to create a completely custom LLD rule, discovering any type of entities - for example, databases on a database server.

To do so, a custom item should be created that returns JSON, specifying found objects and optionally - some properties of them. The amount of macros per entity is not limited - while the built-in discovery rules return either one or two macros (for example, two for filesystem discovery), it is possible to return more.

### Example

The required JSON format is best illustrated with an example. Suppose we are running an old Zabbix 1.8 agent (one that does not support "vfs.fs.discovery"), but we still need to discover file systems. Here is a simple Perl script for Linux that discovers mounted file systems and outputs JSON, which includes both file system name and type. One way to use it would be as a UserParameter with key "vfs.fs.discovery\_perl":

```
####!/usr/bin/perl

$first = 1;

print "[\n";

for (`cat /proc/mounts`)
{
    ($fsname, $fstype) = m/\S+ (\S+) (\S+)/;

    print "\t,\n" if not $first;
    $first = 0;

    print "\t{\n";
    print "\t\t\"{#FSNAME}\" : \"$fsname\", \n";
    print "\t\t\"{#FSTYPE}\" : \"$fstype\" \n";
    print "\t}\n";
}

print "]\n";
```

#### Attention:

Allowed symbols for LLD macro names are **0-9** , **A-Z** , **\_** , **.** . Lowercase letters are not supported in the names.

An example of its output (reformatted for clarity) is shown below. JSON for custom discovery checks has to follow the same format.

```
[
  { "{#FSNAME}": "/",           "{#FSTYPE}": "rootfs" },
  { "{#FSNAME}": "/sys",        "{#FSTYPE}": "sysfs"  },
  { "{#FSNAME}": "/proc",       "{#FSTYPE}": "proc"   },
  { "{#FSNAME}": "/dev",        "{#FSTYPE}": "devtmpfs"},
  { "{#FSNAME}": "/dev/pts",    "{#FSTYPE}": "devpts" },
```

```

{ "{#FSNAME}":"/lib/init/rw",           "{#FSTYPE}":"tmpfs"    },
{ "{#FSNAME}":"/dev/shm",             "{#FSTYPE}":"tmpfs"    },
{ "{#FSNAME}":"/home",                "{#FSTYPE}":"ext3"     },
{ "{#FSNAME}":"/tmp",                 "{#FSTYPE}":"ext3"     },
{ "{#FSNAME}":"/usr",                 "{#FSTYPE}":"ext3"     },
{ "{#FSNAME}":"/var",                 "{#FSTYPE}":"ext3"     },
{ "{#FSNAME}":"/sys/fs/fuse/connections", "{#FSTYPE}":"fusectl"  }
]

```

In the previous example it is required that the keys match the LLD macro names used in prototypes, the alternative is to extract LLD macro values using JSONPath `{#FSNAME} → $.fsname` and `{#FSTYPE} → $.fstype`, thus making such script possible:

```

####!/usr/bin/perl

$first = 1;

print "[\n";

for (`cat /proc/mounts`)
{
    ($fsname, $fstype) = m/\S+ (\S+) (\S+)/;

    print "\t,\n" if not $first;
    $first = 0;

    print "\t{\n";
    print "\t\t\"fsname\": \"$fsname\", \n";
    print "\t\t\"fstype\": \"$fstype\" \n";
    print "\t}\n";
}

print "]\n";

```

An example of its output (reformatted for clarity) is shown below. JSON for custom discovery checks has to follow the same format.

```

[
  { "fsname": "/",           "fstype": "rootfs"    },
  { "fsname": "/sys",       "fstype": "sysfs"     },
  { "fsname": "/proc",     "fstype": "proc"      },
  { "fsname": "/dev",      "fstype": "devtmpfs"   },
  { "fsname": "/dev/pts",  "fstype": "devpts"   },
  { "fsname": "/lib/init/rw", "fstype": "tmpfs"    },
  { "fsname": "/dev/shm",  "fstype": "tmpfs"    },
  { "fsname": "/home",    "fstype": "ext3"     },
  { "fsname": "/tmp",     "fstype": "ext3"     },
  { "fsname": "/usr",     "fstype": "ext3"     },
  { "fsname": "/var",     "fstype": "ext3"     },
  { "fsname": "/sys/fs/fuse/connections", "fstype": "fusectl"  }
]

```

Then, in the discovery rule's "Filter" field, we could specify "{#FSTYPE}" as a macro and "rootfs|ext3" as a regular expression.

#### Note:

You don't have to use macro names FSNAME/FSTYPE with custom LLD rules, you are free to use whatever names you like. In case JSONPath is used then LLD row will be an array element that can be an object, but it can be also another array or a value.

Note that, if using a user parameter, the return value is limited to 16MB. For more details, see [data limits for LLD return values](#).

## 16 Distributed monitoring

**Overview** Zabbix provides an effective and reliable way of monitoring a distributed IT infrastructure using Zabbix proxies.

Proxies can be used to collect data locally on behalf of a centralized Zabbix server and then report the data to the server.

Proxy features

When making a choice of using/not using a proxy, several considerations must be taken into account.

|                             | Proxy            |
|-----------------------------|------------------|
| Lightweight                 | Yes              |
| GUI                         | No               |
| Works independently         | Yes              |
| Easy maintenance            | Yes              |
| Automatic DB creation       | Yes <sup>1</sup> |
| Local administration        | No               |
| Ready for embedded hardware | Yes              |
| One way TCP connections     | Yes              |
| Centralized configuration   | Yes              |
| Generates notifications     | No               |

<sup>1</sup> Automatic DB creation feature works only with SQLite. Other databases require manual setup.

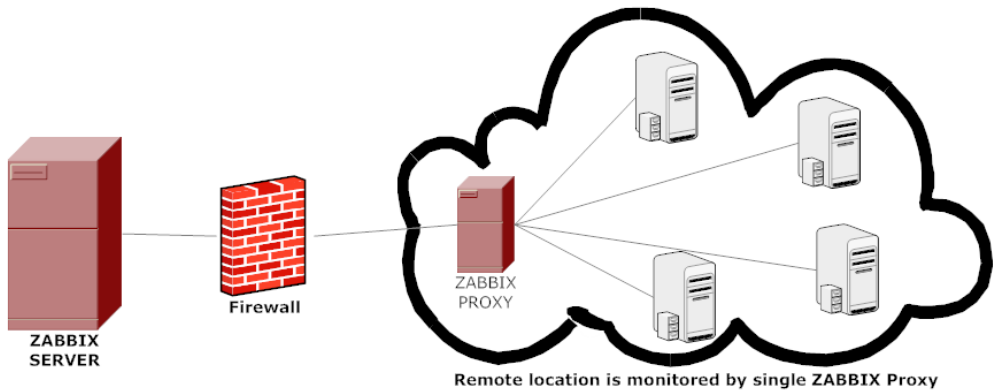
1 Proxies

**Overview** A Zabbix proxy can collect performance and availability data on behalf of the Zabbix server. This way, a proxy can take on itself some of the load of collecting data and offload the Zabbix server.

Also, using a proxy is the easiest way of implementing centralized and distributed monitoring, when all agents and proxies report to one Zabbix server and all data is collected centrally.

A Zabbix proxy can be used to:

- Monitor remote locations
- Monitor locations having unreliable communications
- Offload the Zabbix server when monitoring thousands of devices
- Simplify the maintenance of distributed monitoring



The proxy requires only one TCP connection to the Zabbix server. This way it is easier to get around a firewall as you only need to configure one firewall rule.

**Attention:**

Zabbix proxy must use a separate database. Pointing it to the Zabbix server database will break the configuration.

All data collected by the proxy is stored locally before transmitting it over to the server. This way no data is lost due to any temporary communication problems with the server. The *ProxyLocalBuffer* and *ProxyOfflineBuffer* parameters in the proxy configuration file control for how long the data are kept locally.

**Attention:**

It may happen that a proxy, which receives the latest configuration changes directly from Zabbix server database, has a more up-to-date configuration than Zabbix server whose configuration may not be updated as fast due to the value of **CacheUpdateFrequency**. As a result, proxy may start gathering data and send them to Zabbix server that ignores these data.

Zabbix proxy is a data collector. It does not calculate triggers, process events or send alerts. For an overview of what proxy functionality is, review the following table:

| Function                            | Supported by proxy      |
|-------------------------------------|-------------------------|
| Items                               |                         |
| <i>Zabbix agent checks</i>          | <b>Yes</b>              |
| <i>Zabbix agent checks (active)</i> | <b>Yes</b> <sup>1</sup> |
| <i>Simple checks</i>                | <b>Yes</b>              |
| <i>Trapper items</i>                | <b>Yes</b>              |
| <i>SNMP checks</i>                  | <b>Yes</b>              |
| <i>SNMP traps</i>                   | <b>Yes</b>              |
| <i>IPMI checks</i>                  | <b>Yes</b>              |
| <i>JMX checks</i>                   | <b>Yes</b>              |
| <i>Log file monitoring</i>          | <b>Yes</b>              |
| <i>Internal checks</i>              | <b>Yes</b>              |
| <i>SSH checks</i>                   | <b>Yes</b>              |
| <i>Telnet checks</i>                | <b>Yes</b>              |
| <i>External checks</i>              | <b>Yes</b>              |
| <i>Dependent items</i>              | <b>Yes</b>              |
| <i>Script items</i>                 | <b>Yes</b>              |
| Built-in web monitoring             | <b>Yes</b>              |
| Item value preprocessing            | <b>Yes</b>              |
| Network discovery                   | <b>Yes</b>              |
| Active agent autoregistration       | <b>Yes</b>              |
| Low-level discovery                 | <b>Yes</b> <sup>2</sup> |
| Remote commands                     | <b>Yes</b>              |
| Calculating triggers                | <i>No</i>               |
| Processing events                   | <i>No</i>               |
| Event correlation                   | <i>No</i>               |
| Sending alerts                      | <i>No</i>               |

**Note:**

[1] To make sure that an agent asks the proxy (and not the server) for active checks, the proxy must be listed in the **ServerActive** parameter in the agent configuration file.  
 [2] For LLD, Zabbix proxy only collects and preprocesses the data and then sends it to Zabbix server for further processing.

## Protection from overloading

If Zabbix server was down for some time, and proxies have collected a lot of data, and then the server starts, it may get overloaded (history cache usage stays at 95-100% for some time). This overload could result in a performance hit, where checks are processed slower than they should. Protection from this scenario was implemented to avoid problems that arise due to overloading history cache.

When Zabbix server history cache is full the history cache write access is being throttled, stalling server data gathering processes. The most common history cache overload case is after server downtime when proxies are uploading gathered data. To avoid this proxy throttling was added (currently it cannot be disabled).

Zabbix server will stop accepting data from proxies when history cache usage reaches 80%. Instead those proxies will be put on a throttling list. This will continue until the cache usage falls down to 60%. Now server will start accepting data from proxies one by one, defined by the throttling list. This means the first proxy that attempted to upload data during the throttling period will be served first and until it's done the server will not accept data from other proxies.

This throttling mode will continue until either cache usage hits 80% again or falls down to 20% or the throttling list is empty. In the first case the server will stop accepting proxy data again. In the other two cases the server will start working normally, accepting data from all proxies.

The above information can be illustrated in the following table:

| History write<br>cache usage | Zabbix server mode | Zabbix server action  |
|------------------------------|--------------------|---|
| Reaches 80%                  | Wait               | Stops accepting proxy data, but maintains a <i>throttling list</i> (prioritized list of proxies to be contacted later). |
| Drops to 60%                 | Throttled          | Starts processing throttling list, but still not accepting proxy data.  |
| Drops to 20%                 | Normal             | Drops the throttling list and starts accepting proxy data normally.   |

You may use the `zabbix[wcache,history,pused]` internal item to correlate this behavior of Zabbix server with a metric.

**Configuration** Once you have **installed** and **configured** a proxy, it is time to configure it in the Zabbix frontend.

Adding proxies

To configure a proxy in Zabbix frontend:

- Go to: *Administration* → *Proxies*
- Click on *Create proxy*

Proxy

Encryption

\* Proxy name

Remote proxy

Proxy mode

Active

Passive

Proxy address

127.0.0.1,192.168.1.0/24,::1,2001:db8::32,zabbix.example.com

Description

Add

Cancel

| Parameter            | Description   |
|----------------------|---|
| <i>Proxy name</i>    | Enter the proxy name. It must be the same name as in the <i>Hostname</i> parameter in the proxy configuration file.   |
| <i>Proxy mode</i>    | Select the proxy mode.<br><b>Active</b> - the proxy will connect to the Zabbix server and request configuration data<br><b>Passive</b> - Zabbix server connects to the proxy<br><i>Note</i> that without encrypted communications (sensitive) proxy configuration data may become available to parties having access to the Zabbix server trapper port when using an active proxy. This is possible because anyone may pretend to be an active proxy and request configuration data if authentication does not take place or proxy addresses are not limited in the <i>Proxy address</i> field. |
| <i>Proxy address</i> | If specified then active proxy requests are only accepted from this list of comma-delimited IP addresses, optionally in CIDR notation, or DNS names of active Zabbix proxy. This field is only available if an active proxy is selected in the <i>Proxy mode</i> field. Macros are not supported.   |
| <i>Interface</i>     | This option is supported since Zabbix 4.0.0.  |
|                      | Enter interface details for the passive proxy.  |
|                      | This field is only available if a passive proxy is selected in the <i>Proxy mode</i> field.   |
| <i>IP address</i>    | IP address of the passive proxy (optional).   |
| <i>DNS name</i>      | DNS name of the passive proxy (optional).   |
| <i>Connect to</i>    | Clicking the respective button will tell Zabbix server what to use to retrieve data from proxy:<br><b>IP</b> - Connect to the proxy IP address (recommended)<br><b>DNS</b> - Connect to the proxy DNS name  |

| Parameter          | Description  |
|--------------------|--|
| <i>Port</i>        | TCP port number of the passive proxy (10051 by default). |
| <i>Description</i> | Enter the proxy description.                             |

The **Encryption** tab allows you to require encrypted connections with the proxy.

| Parameter                     | Description  |
|-------------------------------|--|
| <i>Connections to proxy</i>   | How the server connects to the passive proxy: no encryption (default), using PSK (pre-shared key) or certificate.  |
| <i>Connections from proxy</i> | Select what type of connections are allowed from the active proxy. Several connection types can be selected at the same time (useful for testing and switching to other connection type). Default is "No encryption".  |
| <i>Issuer</i>                 | Allowed issuer of certificate. Certificate is first validated with CA (certificate authority). If it is valid, signed by the CA, then the <i>Issuer</i> field can be used to further restrict allowed CA. This field is optional, intended to use if your Zabbix installation uses certificates from multiple CAs. |
| <i>Subject</i>                | Allowed subject of certificate. Certificate is first validated with CA. If it is valid, signed by the CA, then the <i>Subject</i> field can be used to allow only one value of <i>Subject</i> string. If this field is empty then any valid certificate signed by the configured CA is accepted.                   |
| <i>PSK identity</i>           | Pre-shared key identity string.<br>Do not put sensitive information in the PSK identity, it is transmitted unencrypted over the network to inform a receiver which PSK to use.   |
| <i>PSK</i>                    | Pre-shared key (hex-string). Maximum length: 512 hex-digits (256-byte PSK) if Zabbix uses GnuTLS or OpenSSL library, 64 hex-digits (32-byte PSK) if Zabbix uses mbed TLS (PolarSSL) library. Example: 1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952   |

### Host configuration

You can specify that an individual host should be monitored by a proxy in the **host configuration** form, using the *Monitored by proxy* field.

Monitored by proxy

(no proxy) ▾

(no proxy)

Remote proxy

Enabled

Host **mass update** is another way of specifying that hosts should be monitored by a proxy.

## 17 Encryption

**Overview** Zabbix supports encrypted communications between Zabbix components using Transport Layer Security (TLS) protocol v.1.2 and 1.3 (depending on the crypto library). Certificate-based and pre-shared key-based encryption is supported.

Encryption can be configured for connections:

- Between Zabbix server, Zabbix proxy, Zabbix agent, Zabbix web service, zabbix\_sender and zabbix\_get utilities
- To Zabbix database **from Zabbix frontend and server/proxy**

Encryption is optional and configurable for individual components:

- Some proxies and agents can be configured to use certificate-based encryption with the server, while others can use pre-shared key-based encryption, and yet others continue with unencrypted communications (as before)
- Server (proxy) can use different encryption configurations for different hosts

Zabbix daemon programs use one listening port for encrypted and unencrypted incoming connections. Adding an encryption does not require opening new ports on firewalls.

## Limitations

- Private keys are stored in plain text in files readable by Zabbix components during startup
- Pre-shared keys are entered in Zabbix frontend and stored in Zabbix database in plain text
- Built-in encryption does not protect communications:
  - Between the web server running Zabbix frontend and user web browser
  - Between Zabbix frontend and Zabbix server
- Currently each encrypted connection opens with a full TLS handshake, no session caching and tickets are implemented
- Adding encryption increases the time for item checks and actions, depending on network latency:
  - For example, if packet delay is 100ms then opening a TCP connection and sending unencrypted request takes around 200ms. With encryption about 1000 ms are added for establishing the TLS connection;
  - Timeouts may need to be increased, otherwise some items and actions running remote scripts on agents may work with unencrypted connections, but fail with timeout with encrypted.
- Encryption is not supported by **network discovery**. Zabbix agent checks performed by network discovery will be unencrypted and if Zabbix agent is configured to reject unencrypted connections such checks will not succeed.

**Compiling Zabbix with encryption support** To support encryption Zabbix must be compiled and linked with one of the supported crypto libraries:

- GnuTLS - from version 3.1.18
- OpenSSL - versions 1.0.1, 1.0.2, 1.1.0, 1.1.1, 3.0.x. Note that 3.0.x is supported since Zabbix 6.0.4.
- LibreSSL - tested with versions 2.7.4, 2.8.2:
  - LibreSSL 2.6.x is not supported
  - LibreSSL is supported as a compatible replacement of OpenSSL; the new `tls_*`() LibreSSL-specific API functions are not used. Zabbix components compiled with LibreSSL will not be able to use PSK, only certificates can be used.

### Note:

You can find out more about setting up SSL for Zabbix frontend by referring to these **best practices**.

The library is selected by specifying the respective option to "configure" script:

- `--with-gnutls [=DIR]`
- `--with-openssl [=DIR]` (also used for LibreSSL)

For example, to configure the sources for server and agent with *OpenSSL* you may use something like:

```
./configure --enable-server --enable-agent --with-mysql --enable-ipv6 --with-net-snmp --with-libcurl --with-
```

Different Zabbix components may be compiled with different crypto libraries (e.g. a server with *OpenSSL*, an agent with *GnuTLS*).

### Attention:

If you plan to use pre-shared keys (PSK), consider using *GnuTLS* or *OpenSSL 1.1.0* (or newer) libraries in Zabbix components using PSKs. *GnuTLS* and *OpenSSL 1.1.0* libraries support PSK ciphersuites with **Perfect Forward Secrecy**. Older versions of the *OpenSSL* library (1.0.1, 1.0.2c) also support PSKs, but available PSK ciphersuites do not provide Perfect Forward Secrecy.

**Connection encryption management** Connections in Zabbix can use:

- no encryption (default)
- **RSA certificate-based encryption**
- **PSK-based encryption**

There are two important parameters used to specify encryption between Zabbix components:

- **TLSCConnect** - specifies what encryption to use for outgoing connections (unencrypted, PSK or certificate)
- **TLSCAccept** - specifies what types of connections are allowed for incoming connections (unencrypted, PSK or certificate). One or more values can be specified.

**TLSCConnect** is used in the configuration files for Zabbix proxy (in active mode, specifies only connections to server) and Zabbix agent (for active checks). In Zabbix frontend the **TLSCConnect** equivalent is the *Connections to host* field in *Configuration* → *Hosts* → *<some host>* → *Encryption* tab and the *Connections to proxy* field in *Administration* → *Proxies* → *<some proxy>* → *Encryption* tab. If the configured encryption type for connection fails, no other encryption types will be tried.

**TLSCAccept** is used in the configuration files for Zabbix proxy (in passive mode, specifies only connections from server) and Zabbix agent (for passive checks). In Zabbix frontend the **TLSCAccept** equivalent is the *Connections from host* field in *Configuration* → *Hosts* → *<some host>* → *Encryption* tab and the *Connections from proxy* field in *Administration* → *Proxies* → *<some proxy>* → *Encryption* tab.



Normally you configure only one type of encryption for incoming connections. But you may want to switch the encryption type, e.g. from unencrypted to certificate-based with minimum downtime and rollback possibility. To achieve this:

- Set `TLSAccept=unencrypted`, `cert` in the agent configuration file and restart Zabbix agent
- Test connection with `zabbix_get` to the agent using certificate. If it works, you can reconfigure encryption for that agent in Zabbix frontend in the *Configuration* → *Hosts* → *<some host>* → *Encryption* tab by setting *Connections to host* to "Certificate".
- When server configuration cache gets updated (and proxy configuration is updated if the host is monitored by proxy) then connections to that agent will be encrypted
- If everything works as expected you can set `TLSAccept=cert` in the agent configuration file and restart Zabbix agent. Now the agent will be accepting only encrypted certificate-based connections. Unencrypted and PSK-based connections will be rejected.

In a similar way it works on server and proxy. If in Zabbix frontend in host configuration *Connections from host* is set to "Certificate" then only certificate-based encrypted connections will be accepted from the agent (active checks) and `zabbix_sender` (trapper items).

Most likely you will configure incoming and outgoing connections to use the same encryption type or no encryption at all. But technically it is possible to configure it asymmetrically, e.g. certificate-based encryption for incoming and PSK-based for outgoing connections.

Encryption configuration for each host is displayed in the Zabbix frontend, in *Configuration* → *Hosts* in the *Agent encryption* column. For example:

| Example                                  | Connections to host          | Allowed connections from host                   | Rejected connections from host                 |
|--|------------------------------|---|--|
| <b>NONE</b>                              | Unencrypted                  | Unencrypted                                     | Encrypted, certificate and PSK-based encrypted |
| <b>CERT</b> <small>NONE PSK CERT</small> | Encrypted, certificate-based | Encrypted, certificate-based                    | Unencrypted and PSK-based encrypted            |
| <b>PSK</b> <small>NONE PSK CERT</small>  | Encrypted, PSK-based         | Encrypted, PSK-based                            | Unencrypted and certificate-based encrypted    |
| <b>PSK</b> <small>NONE PSK CERT</small>  | Encrypted, PSK-based         | Unencrypted and PSK-based encrypted             | Certificate-based encrypted                    |
| <b>CERT</b> <small>NONE PSK CERT</small> | Encrypted, certificate-based | Unencrypted, PSK or certificate-based encrypted | -  |

#### Attention:

Connections are unencrypted by default. Encryption must be configured for each host and proxy individually.

**zabbix\_get and zabbix\_sender with encryption** See `zabbix_get` and `zabbix_sender` manpages for using them with encryption.

**Ciphersuites** Ciphersuites by default are configured internally during Zabbix startup and, before Zabbix 4.0.19, 4.4.7, are not user-configurable.

Since Zabbix 4.0.19, 4.4.7 also user-configured ciphersuites are supported for GnuTLS and OpenSSL. Users may **configure** ciphersuites according to their security policies. Using this feature is optional (built-in default ciphersuites still work).

For crypto libraries compiled with default settings Zabbix built-in rules typically result in the following ciphersuites (in order from higher to lower priority):

| Library               | Certificate ciphersuites         | PSK ciphersuites                 |
|-----------------------|----------------------------------|----------------------------------|
| <i>GnuTLS 3.1.18</i>  | TLS_ECDHE_RSA_AES_128_GCM_SHA256 | TLS_ECDHE_PSK_AES_128_CBC_SHA256 |
|                       | TLS_ECDHE_RSA_AES_128_CBC_SHA256 | TLS_ECDHE_PSK_AES_128_CBC_SHA1   |
|                       | TLS_ECDHE_RSA_AES_128_CBC_SHA1   | TLS_PSK_AES_128_GCM_SHA256       |
|                       | TLS_RSA_AES_128_GCM_SHA256       | TLS_PSK_AES_128_CBC_SHA256       |
|                       | TLS_RSA_AES_128_CBC_SHA256       | TLS_PSK_AES_128_CBC_SHA1         |
|                       | TLS_RSA_AES_128_CBC_SHA1         |                                  |
| <i>OpenSSL 1.0.2c</i> | ECDHE-RSA-AES128-GCM-SHA256      | PSK-AES128-CBC-SHA               |
|                       | ECDHE-RSA-AES128-SHA256          |                                  |
|                       | ECDHE-RSA-AES128-SHA             |                                  |
|                       | AES128-GCM-SHA256                |                                  |
|                       | AES128-SHA256                    |                                  |
|                       | AES128-SHA                       |                                  |

| Library               | Certificate ciphersuites  | PSK ciphersuites   |
|-----------------------|---|--|
| <i>OpenSSL 1.1.0</i>  | ECDHE-RSA-AES128-GCM-SHA256<br>ECDHE-RSA-AES128-SHA256<br>ECDHE-RSA-AES128-SHA<br>AES128-GCM-SHA256<br>AES128-CCM8<br>AES128-CCM<br>AES128-SHA256<br>AES128-SHA   | ECDHE-PSK-AES128-CBC-SHA256<br>ECDHE-PSK-AES128-CBC-SHA<br>PSK-AES128-GCM-SHA256<br>PSK-AES128-CCM8<br>PSK-AES128-CCM<br>PSK-AES128-CBC-SHA256<br>PSK-AES128-CBC-SHA   |
| <i>OpenSSL 1.1.1d</i> | TLS_AES_256_GCM_SHA384<br>TLS_CHACHA20_POLY1305_SHA256<br>TLS_AES_128_GCM_SHA256<br>ECDHE-RSA-AES128-GCM-SHA256<br>ECDHE-RSA-AES128-SHA256<br>ECDHE-RSA-AES128-SHA<br>AES128-GCM-SHA256<br>AES128-CCM8<br>AES128-CCM<br>AES128-SHA256<br>AES128-SHA | TLS_CHACHA20_POLY1305_SHA256<br>TLS_AES_128_GCM_SHA256<br>ECDHE-PSK-AES128-CBC-SHA256<br>ECDHE-PSK-AES128-CBC-SHA<br>PSK-AES128-GCM-SHA256<br>PSK-AES128-CCM8<br>PSK-AES128-CCM<br>PSK-AES128-CBC-SHA256<br>PSK-AES128-CBC-SHA |

**User-configured ciphersuites** The built-in ciphersuite selection criteria can be overridden with user-configured ciphersuites.

**Attention:**

User-configured ciphersuites is a feature intended for advanced users who understand TLS ciphersuites, their security and consequences of mistakes, and who are comfortable with TLS troubleshooting.

The built-in ciphersuite selection criteria can be overridden using the following parameters:

| Override scope                                    | Parameter       | Value   | Description  |
|---|-----------------|---|--|
| Ciphersuite selection for certificates            | TLSCipherCert13 | Valid OpenSSL 1.1.1 <a href="#">cipher strings</a> for TLS 1.3 protocol (their values are passed to the OpenSSL function <code>SSL_CTX_set_ciphersuites()</code> ).   | Certificate-based ciphersuite selection criteria for TLS 1.3<br><br>Only OpenSSL 1.1.1 or newer. |
|   | TLSCipherCert   | Valid OpenSSL <a href="#">cipher strings</a> for TLS 1.2 or valid GnuTLS <a href="#">priority strings</a> . Their values are passed to the <code>SSL_CTX_set_cipher_list()</code> or <code>gnutls_priority_init()</code> functions, respectively. | Certificate-based ciphersuite selection criteria for TLS 1.2/1.3 (GnuTLS), TLS 1.2 (OpenSSL)     |
| Ciphersuite selection for PSK                     | TLSCipherPSK13  | Valid OpenSSL 1.1.1 <a href="#">cipher strings</a> for TLS 1.3 protocol (their values are passed to the OpenSSL function <code>SSL_CTX_set_ciphersuites()</code> ).   | PSK-based ciphersuite selection criteria for TLS 1.3<br><br>Only OpenSSL 1.1.1 or newer.         |
|   | TLSCipherPSK    | Valid OpenSSL <a href="#">cipher strings</a> for TLS 1.2 or valid GnuTLS <a href="#">priority strings</a> . Their values are passed to the <code>SSL_CTX_set_cipher_list()</code> or <code>gnutls_priority_init()</code> functions, respectively. | PSK-based ciphersuite selection criteria for TLS 1.2/1.3 (GnuTLS), TLS 1.2 (OpenSSL)             |
| Combined ciphersuite list for certificate and PSK | TLSCipherAll13  | Valid OpenSSL 1.1.1 <a href="#">cipher strings</a> for TLS 1.3 protocol (their values are passed to the OpenSSL function <code>SSL_CTX_set_ciphersuites()</code> ).   | Ciphersuite selection criteria for TLS 1.3<br><br>Only OpenSSL 1.1.1 or newer.                   |
|   |                 |   |  |

| Override scope | Parameter    | Value   | Description  |
|----------------|--------------|---|--|
|                | TLSCipherAll | Valid OpenSSL <a href="#">cipher strings</a> for TLS 1.2 or valid GnuTLS <a href="#">priority strings</a> . Their values are passed to the <code>SSL_CTX_set_cipher_list()</code> or <code>gnutls_priority_init()</code> functions, respectively. | Ciphersuite selection criteria for TLS 1.2/1.3 (GnuTLS), TLS 1.2 (OpenSSL) |

To override the ciphersuite selection in `zabbix_get` and `zabbix_sender` utilities - use the command-line parameters:

- `--tls-cipher13`
- `--tls-cipher`

The new parameters are optional. If a parameter is not specified, the internal default value is used. If a parameter is defined it cannot be empty.

If the setting of a `TLSCipher*` value in the crypto library fails then the server, proxy or agent will not start and an error is logged.

It is important to understand when each parameter is applicable.

Outgoing connections

The simplest case is outgoing connections:

- For outgoing connections with certificate - use `TLSCipherCert13` or `TLSCipherCert`
- For outgoing connections with PSK - use `TLSCipherPSK13` or `TLSCipherPSK`
- In case of `zabbix_get` and `zabbix_sender` utilities the command-line parameters `--tls-cipher13` or `--tls-cipher` can be used (encryption is unambiguously specified with a `--tls-connect` parameter)

Incoming connections

It is a bit more complicated with incoming connections because rules are specific for components and configuration.

For Zabbix **agent**:

| Agent connection setup          | Cipher configuration                                      |
|---------------------------------|---|
| <code>TLSCConnect=cert</code>   | <code>TLSCipherCert</code> , <code>TLSCipherCert13</code> |
| <code>TLSCConnect=psk</code>    | <code>TLSCipherPSK</code> , <code>TLSCipherPSK13</code>   |
| <code>TLSAccept=cert</code>     | <code>TLSCipherCert</code> , <code>TLSCipherCert13</code> |
| <code>TLSAccept=psk</code>      | <code>TLSCipherPSK</code> , <code>TLSCipherPSK13</code>   |
| <code>TLSAccept=cert,psk</code> | <code>TLSCipherAll</code> , <code>TLSCipherAll13</code>   |

For Zabbix **server** and **proxy**:

| Connection setup  | Cipher configuration                                    |
|---|---|
| Outgoing connections using PSK                              | <code>TLSCipherPSK</code> , <code>TLSCipherPSK13</code> |
| Incoming connections using certificates                     | <code>TLSCipherAll</code> , <code>TLSCipherAll13</code> |
| Incoming connections using PSK if server has no certificate | <code>TLSCipherPSK</code> , <code>TLSCipherPSK13</code> |
| Incoming connections using PSK if server has certificate    | <code>TLSCipherAll</code> , <code>TLSCipherAll13</code> |

Some pattern can be seen in the two tables above:

- `TLSCipherAll` and `TLSCipherAll13` can be specified only if a combined list of certificate- **and** PSK-based ciphersuites is used. There are two cases when it takes place: server (proxy) with a configured certificate (PSK ciphersuites are always configured on server, proxy if crypto library supports PSK), agent configured to accept both certificate- and PSK-based incoming connections
- in other cases `TLSCipherCert*` and/or `TLSCipherPSK*` are sufficient

The following tables show the `TLSCipher*` built-in default values. They could be a good starting point for your own custom values.

| Parameter     | GnuTLS 3.6.12  |
|---------------|--|
| TLSCipherCert | NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL:+CTYPE-X.509                 |
| TLSCipherPSK  | NONE:+VERS-TLS1.2:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL                              |
| TLSCipherAll  | NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL:+CTYPE-X.509 |

| Parameter       | OpenSSL 1.1.1d <sup>1</sup>                                    |
|-----------------|--|
| TLSCipherCert13 |  |
| TLSCipherCert   | EECDH+aRSA+AES128:RSA+aRSA+AES128                              |
| TLSCipherPSK13  | TLS_CHACHA20_POLY1305_SHA256:TLS_AES_128_GCM_SHA256            |
| TLSCipherPSK    | kECDHEPSK+AES128:kPSK+AES128                                   |
| TLSCipherAll13  |  |
| TLSCipherAll    | EECDH+aRSA+AES128:RSA+aRSA+AES128:kECDHEPSK+AES128:kPSK+AES128 |

<sup>1</sup> Default values are different for older OpenSSL versions (1.0.1, 1.0.2, 1.1.0), for LibreSSL and if OpenSSL is compiled without PSK support.

### Examples of user-configured ciphersuites

See below the following examples of user-configured ciphersuites:

- [Testing cipher strings and allowing only PFS ciphersuites](#)
- [Switching from AES128 to AES256](#)

Testing cipher strings and allowing only PFS ciphersuites

To see which ciphersuites have been selected you need to set 'DebugLevel=4' in the configuration file, or use the `-vv` option for `zabbix_sender`.

Some experimenting with `TLSCipher*` parameters might be necessary before you get the desired ciphersuites. It is inconvenient to restart Zabbix server, proxy or agent multiple times just to tweak `TLSCipher*` parameters. More convenient options are using `zabbix_sender` or the `openssl` command. Let's show both.

#### 1. Using `zabbix_sender`.

Let's make a test configuration file, for example, `/home/zabbix/test.conf`, with the syntax of a `zabbix_agentd.conf` file:

```

Hostname=nonexisting
ServerActive=nonexisting

TLSConnect=cert
TLSCAFile=/home/zabbix/ca.crt
TLSCertFile=/home/zabbix/agent.crt
TLSKeyFile=/home/zabbix/agent.key
TLSPSKIdentity=nonexisting
TLSPSKFile=/home/zabbix/agent.psk

```

You need valid CA and agent certificates and PSK for this example. Adjust certificate and PSK file paths and names for your environment.

If you are not using certificates, but only PSK, you can make a simpler test file:

```

Hostname=nonexisting
ServerActive=nonexisting

TLSConnect=psk
TLSPSKIdentity=nonexisting
TLSPSKFile=/home/zabbix/agentd.psk

```

The selected ciphersuites can be seen by running `zabbix_sender` (example compiled with OpenSSL 1.1.d):

```

$ zabbix_sender -vv -c /home/zabbix/test.conf -k nonexistent_item -o 1 2>&1 | grep ciphersuites
zabbix_sender [41271]: DEBUG: zbx_tls_init_child() certificate ciphersuites: TLS_AES_256_GCM_SHA384 TLS_
zabbix_sender [41271]: DEBUG: zbx_tls_init_child() PSK ciphersuites: TLS_CHACHA20_POLY1305_SHA256 TLS_AE
zabbix_sender [41271]: DEBUG: zbx_tls_init_child() certificate and PSK ciphersuites: TLS_AES_256_GCM_SHA

```

Here you see the ciphersuites selected by default. These default values are chosen to ensure interoperability with Zabbix agents running on systems with older OpenSSL versions (from 1.0.1).

With newer systems you can choose to tighten security by allowing only a few ciphersuites, e.g. only ciphersuites with PFS (Perfect Forward Secrecy). Let's try to allow only ciphersuites with PFS using `TLSCipher*` parameters.

**Attention:**

The result will not be interoperable with systems using OpenSSL 1.0.1 and 1.0.2, if PSK is used. Certificate-based encryption should work.

Add two lines to the `test.conf` configuration file:

```
TLSCipherCert=EECDH+aRSA+AES128
TLSCipherPSK=kECDHEPSK+AES128
```

and test again:

```
$ zabbix_sender -vv -c /home/zabbix/test.conf -k nonexistent_item -o 1 2>&1 | grep ciphersuites
zabbix_sender [42892]: DEBUG: zbx_tls_init_child() certificate ciphersuites: TLS_AES_256_GCM_SHA384 TLS_AES_128_GCM_SHA256
zabbix_sender [42892]: DEBUG: zbx_tls_init_child() PSK ciphersuites: TLS_CHACHA20_POLY1305_SHA256 TLS_AES_128_GCM_SHA256
zabbix_sender [42892]: DEBUG: zbx_tls_init_child() certificate and PSK ciphersuites: TLS_AES_256_GCM_SHA384 TLS_AES_128_GCM_SHA256
```

The "certificate ciphersuites" and "PSK ciphersuites" lists have changed - they are shorter than before, only containing TLS 1.3 ciphersuites and TLS 1.2 ECDHE-\* ciphersuites as expected.

2. `TLSCipherAll` and `TLSCipherAll13` cannot be tested with `zabbix_sender`; they do not affect "certificate and PSK ciphersuites" value shown in the example above. To tweak `TLSCipherAll` and `TLSCipherAll13` you need to experiment with the agent, proxy or server.

So, to allow only PFS ciphersuites you may need to add up to three parameters

```
TLSCipherCert=EECDH+aRSA+AES128
TLSCipherPSK=kECDHEPSK+AES128
TLSCipherAll=EECDH+aRSA+AES128:kECDHEPSK+AES128
```

to `zabbix_agentd.conf`, `zabbix_proxy.conf` and `zabbix_server.conf` if each of them has a configured certificate and agent has also PSK.

If your Zabbix environment uses only PSK-based encryption and no certificates, then only one:

```
TLSCipherPSK=kECDHEPSK+AES128
```

Now that you understand how it works you can test the ciphersuite selection even outside of Zabbix, with the `openssl` command. Let's test all three `TLSCipher*` parameter values:

```
$ openssl ciphers EECDH+aRSA+AES128 | sed 's:/ /g'
TLS_AES_256_GCM_SHA384 TLS_CHACHA20_POLY1305_SHA256 TLS_AES_128_GCM_SHA256 ECDHE-RSA-AES128-GCM-SHA256 ECDHE-PSK-AES128-CBC-SHA256
$ openssl ciphers kECDHEPSK+AES128 | sed 's:/ /g'
TLS_AES_256_GCM_SHA384 TLS_CHACHA20_POLY1305_SHA256 TLS_AES_128_GCM_SHA256 ECDHE-PSK-AES128-CBC-SHA256 ECDHE-RSA-AES128-GCM-SHA256
$ openssl ciphers EECDH+aRSA+AES128:kECDHEPSK+AES128 | sed 's:/ /g'
TLS_AES_256_GCM_SHA384 TLS_CHACHA20_POLY1305_SHA256 TLS_AES_128_GCM_SHA256 ECDHE-RSA-AES128-GCM-SHA256 ECDHE-PSK-AES128-CBC-SHA256
```

You may prefer `openssl ciphers` with option `-V` for a more verbose output:

```
$ openssl ciphers -V EECDH+aRSA+AES128:kECDHEPSK+AES128
0x13,0x02 - TLS_AES_256_GCM_SHA384 TLSv1.3 Kx=any Au=any Enc=AESGCM(256) Mac=AEAD
0x13,0x03 - TLS_CHACHA20_POLY1305_SHA256 TLSv1.3 Kx=any Au=any Enc=CHACHA20/POLY1305(256) Mac=AEAD
0x13,0x01 - TLS_AES_128_GCM_SHA256 TLSv1.3 Kx=any Au=any Enc=AESGCM(128) Mac=AEAD
0xC0,0x2F - ECDHE-RSA-AES128-GCM-SHA256 TLSv1.2 Kx=ECDH Au=RSA Enc=AESGCM(128) Mac=AEAD
0xC0,0x27 - ECDHE-RSA-AES128-SHA256 TLSv1.2 Kx=ECDH Au=RSA Enc=AES(128) Mac=SHA256
0xC0,0x13 - ECDHE-RSA-AES128-SHA TLSv1 Kx=ECDH Au=RSA Enc=AES(128) Mac=SHA1
0xC0,0x37 - ECDHE-PSK-AES128-CBC-SHA256 TLSv1 Kx=ECDHEPSK Au=PSK Enc=AES(128) Mac=SHA256
0xC0,0x35 - ECDHE-PSK-AES128-CBC-SHA TLSv1 Kx=ECDHEPSK Au=PSK Enc=AES(128) Mac=SHA1
```

Similarly, you can test the priority strings for GnuTLS:

```
$ gnutls-cli -l --priority=NONE:+VERS-TLS1.2:+ECDHE-RSA:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+CURVE-ALL:+COMP-ALL
Cipher suites for NONE:+VERS-TLS1.2:+ECDHE-RSA:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+CURVE-ALL:+COMP-ALL
TLS_ECDHE_RSA_AES_128_GCM_SHA256 0xc0, 0x2f TLS1.2
TLS_ECDHE_RSA_AES_128_CBC_SHA256 0xc0, 0x27 TLS1.2
```

```

Protocols: VERS-TLS1.2
Ciphers: AES-128-GCM, AES-128-CBC
MACs: AEAD, SHA256
Key Exchange Algorithms: ECDHE-RSA
Groups: GROUP-SECP256R1, GROUP-SECP384R1, GROUP-SECP521R1, GROUP-X25519, GROUP-X448, GROUP-FFDHE2048, GROUP-FFDHE3072
PK-signatures: SIGN-RSA-SHA256, SIGN-RSA-PSS-SHA256, SIGN-RSA-PSS-RSAE-SHA256, SIGN-ECDSA-SHA256, SIGN-ECDSA-SHA384, SIGN-ECDSA-SHA512

```

Switching from AES128 to AES256

Zabbix uses AES128 as the built-in default for data. Let’s assume you are using certificates and want to switch to AES256, on OpenSSL 1.1.1.

This can be achieved by adding the respective parameters in `zabbix_server.conf`:

```

TLSCAFile=/home/zabbix/ca.crt
TLSCertFile=/home/zabbix/server.crt
TLSKeyFile=/home/zabbix/server.key
TLSCipherCert13=TLS_AES_256_GCM_SHA384
TLSCipherCert=EECDH+aRSA+AES256:-SHA1:-SHA384
TLSCipherPSK13=TLS_CHACHA20_POLY1305_SHA256
TLSCipherPSK=kECDHEPSK+AES256:-SHA1
TLSCipherAll13=TLS_AES_256_GCM_SHA384
TLSCipherAll=EECDH+aRSA+AES256:-SHA1:-SHA384

```

**Attention:**

Although only certificate-related ciphersuites will be used, `TLSCipherPSK*` parameters are defined as well to avoid their default values which include less secure ciphers for wider interoperability. PSK ciphersuites cannot be completely disabled on server/proxy.

And in `zabbix_agentd.conf`:

```

TLSConnect=cert
TLSAccept=cert
TLSCAFile=/home/zabbix/ca.crt
TLSCertFile=/home/zabbix/agent.crt
TLSKeyFile=/home/zabbix/agent.key
TLSCipherCert13=TLS_AES_256_GCM_SHA384
TLSCipherCert=EECDH+aRSA+AES256:-SHA1:-SHA384

```

1 Using certificates

Overview

Zabbix can use RSA certificates in PEM format, signed by a public or an in-house certificate authority (CA).

Certificate verification is performed against a pre-configured CA certificate. Optionally, [Certificate Revocation Lists \(CRL\)](#) can be used.

Each Zabbix component can have only one certificate configured.

For more information on setting up and operating an internal CA, generating and signing certificate requests, and revoking certificates, refer to tutorials such as the [OpenSSL PKI Tutorial v2.0](#).

Carefully consider and test your certificate extensions. For more details, see [Limitations on using X.509 v3 certificate extensions](#).

Certificate configuration parameters

The following configuration parameters are supported for setting up certificates on Zabbix components.

| Parameter        | Mandatory | Description  |
|------------------|-----------|--|
| <i>TLSCAFile</i> | yes       | Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification.<br><br>If using a certificate chain with multiple members, order the certificates with lower level CA(s) certificates first, followed by higher level CA(s) certificates.<br><br>Certificates from multiple CAs can be included in a single file. |

| Parameter                   | Mandatory | Description   |
|-----------------------------|-----------|---|
| <i>TLSCRLFile</i>           | no        | Full pathname of a file containing <b>Certificate Revocation Lists (CRL)</b> .  |
| <i>TLSCertFile</i>          | yes       | Full pathname of a file containing the certificate.<br>If using a certificate chain with multiple members, order the certificates with the server, proxy, or agent certificate first, followed by lower level CA(s) certificates, and concluded by higher level CA(s) certificates. |
| <i>TLSKeyFile</i>           | yes       | Full pathname of a file containing the private key.<br>Ensure that this file is readable only by the <b>Zabbix user</b> by setting appropriate access rights.   |
| <i>TLSServerCertIssuer</i>  | no        | Allowed server certificate issuer.  |
| <i>TLSServerCertSubject</i> | no        | Allowed server certificate subject.   |

## Configuration examples

After setting up the necessary certificates, configure Zabbix components to use certificate-based encryption.

Below are detailed steps for configuring:

- **Zabbix server**
- **Zabbix proxy**
- **Zabbix agent**

### Zabbix server

#### 1. Prepare the CA certificate file.

In order to verify peer certificates, Zabbix server must have access to the file containing the top-level, self-signed root CA certificates. For example, if certificates from two independent root CAs are needed, place them into a file at `/home/zabbix/zabbix_ca_file.crt`.

Certificate:

```
Data:
  Version: 3 (0x2)
  Serial Number: 1 (0x1)
Signature Algorithm: sha1WithRSAEncryption
Issuer: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Root1 CA
...
Subject: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Root1 CA
Subject Public Key Info:
  Public Key Algorithm: rsaEncryption
  Public-Key: (2048 bit)
...
X509v3 extensions:
  X509v3 Key Usage: critical
    Certificate Sign, CRL Sign
  X509v3 Basic Constraints: critical
    CA:TRUE
...
```

-----BEGIN CERTIFICATE-----

```
MIID2jCCAsKgAwIBAgIBATANBgkqhkiG9w0BAQUFADB+MRMwEQYKCZImiZPyLGGQ
```

....

```
9wEzdN8uTrqoyU78gi12npLj08LegRKjb5hFTVm0
```

-----END CERTIFICATE-----

Certificate:

```
Data:
  Version: 3 (0x2)
  Serial Number: 1 (0x1)
Signature Algorithm: sha1WithRSAEncryption
Issuer: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Root2 CA
...
Subject: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Root2 CA
Subject Public Key Info:
  Public Key Algorithm: rsaEncryption
  Public-Key: (2048 bit)
....
X509v3 extensions:
```

```

        X509v3 Key Usage: critical
            Certificate Sign, CRL Sign
        X509v3 Basic Constraints: critical
            CA:TRUE
        ....
-----BEGIN CERTIFICATE-----
MIID3DCCAsSgAwIBAgIBATANBgkqhkiG9w0BAQUFADB/MRMwEQYKCZImiZPyLGGQ
...
vdGNYoSfvu41GQAR5Vj5FnRJRzv5XQOZ3B6894GY1zY=
-----END CERTIFICATE-----

```

2. Place the Zabbix server certificate/certificate chain into a file, for example, at `/home/zabbix/zabbix_server.crt`. The first certificate is the Zabbix server certificate, followed by the intermediate CA certificate:

```

Certificate:
  Data:
    Version: 3 (0x2)
    Serial Number: 1 (0x1)
  Signature Algorithm: sha1WithRSAEncryption
    Issuer: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Signing CA
    ...
    Subject: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Zabbix server
  Subject Public Key Info:
    Public Key Algorithm: rsaEncryption
    Public-Key: (2048 bit)
    ...
  X509v3 extensions:
    X509v3 Key Usage: critical
      Digital Signature, Key Encipherment
    X509v3 Basic Constraints:
      CA:FALSE
    ...
-----BEGIN CERTIFICATE-----
MIIECDCCAvCgAwIBAgIBATANBgkqhkiG9w0BAQUFADCBgTETMBEGCgmSJomT8ixk
...
h02u1GHIy46GI+xfR3LsPwFKlkTaaLaL/6aaoQ==
-----END CERTIFICATE-----
Certificate:
  Data:
    Version: 3 (0x2)
    Serial Number: 2 (0x2)
  Signature Algorithm: sha1WithRSAEncryption
    Issuer: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Root1 CA
    ...
    Subject: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Signing CA
  Subject Public Key Info:
    Public Key Algorithm: rsaEncryption
    Public-Key: (2048 bit)
    ...
  X509v3 extensions:
    X509v3 Key Usage: critical
      Certificate Sign, CRL Sign
    X509v3 Basic Constraints: critical
      CA:TRUE, pathlen:0
    ...
-----BEGIN CERTIFICATE-----
MIID4TCCAsmgAwIBAgIBAjANBgkqhkiG9w0BAQUFADB+MRMwEQYKCZImiZPyLGGQ
...
dyCeWnvL7u5sd6ffo8iRny0QzbHKmQt/wUtcVIvWXdMIFJMOHw==
-----END CERTIFICATE-----

```



**Note:**

Use only the attributes mentioned above for both client and server certificates to avoid affecting the certificate verification process. For example, OpenSSL might fail to establish an encrypted connection if *X509v3 Subject Alternative Name* or *Netscape Cert Type* extensions are used. For more information, see [Limitations on using X.509 v3 certificate extensions](#).

3. Place the Zabbix server private key into a file, for example, at `/home/zabbix/zabbix_server.key`:

```
-----BEGIN PRIVATE KEY-----
MIIEwAIBADANBgkqhkiG9w0BAQEFAASCBAKowggSmAgEAAoIBAQC9tIXIJ0VnNXDl
...
IJLkhbybBYEf47MLhffWa7XvZTY=
-----END PRIVATE KEY-----
```

4. Edit the TLS configuration parameters in the **Zabbix server configuration file**:

```
TLSCAFile=/home/zabbix/zabbix_ca_file
TLSCertFile=/home/zabbix/zabbix_server.crt
TLSKeyFile=/home/zabbix/zabbix_server.key
```

### Zabbix proxy

1. Prepare files with the top-level CA certificates, the Zabbix proxy certificate/certificate chain, and the private key as described in the **Zabbix server** section. Then, edit the `TLSCAFile`, `TLSCertFile`, and `TLSKeyFile` parameters in the **Zabbix proxy configuration file** accordingly.

2. Edit additional TLS parameters in the **Zabbix proxy configuration file**:

- For active proxy: `TLSConnect=cert`
- For passive proxy: `TLSAccept=cert`

**Note:**

To improve proxy security, you can also set the `TLSServerCertIssuer` and `TLSServerCertSubject` parameters. For more information, see [Restricting allowed certificate issuer and subject](#).

TLS parameters in the final proxy configuration file may look as follows:

```
TLSConnect=cert
TLSAccept=cert
TLSCAFile=/home/zabbix/zabbix_ca_file
TLSServerCertIssuer=CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
TLSServerCertSubject=CN=Zabbix server,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
TLSCertFile=/home/zabbix/zabbix_proxy.crt
TLSKeyFile=/home/zabbix/zabbix_proxy.key
```

3. Configure encryption for this proxy in Zabbix frontend:

- Go to: *Administration* → *Proxies*.
- Select the proxy and click the *Encryption* tab.

In the examples below, the *Issuer* and *Subject* fields are filled in. For more information on why and how to use these fields, see [Restricting allowed certificate issuer and subject](#).

For active proxy:

Proxy
Encryption

Connections to proxy
No encryption
PSK
Certificate

Connections from proxy
☐ No encryption
☐ PSK
☒ Certificate

Issuer
CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com

Subject
CN=Zabbix proxy,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com

Update
Clone
Delete
Cancel

For passive proxy:

Proxy
Encryption

Connections to proxy
No encryption
PSK
Certificate

Connections from proxy
☒ No encryption
☐ PSK
☐ Certificate

Issuer
CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com

Subject
CN=Zabbix proxy,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com

Update
Clone
Delete
Cancel

## Zabbix agent

1. Prepare files with the top-level CA certificates, the Zabbix agent certificate/certificate chain, and the private key as described in the [Zabbix server](#) section. Then, edit the `TLSCAFile`, `TLSCertFile`, and `TLSKeyFile` parameters in the [Zabbix agent configuration file](#) accordingly.
2. Edit additional TLS parameters in the [Zabbix agent configuration file](#):
  - For active agent: `TLSConnect=cert`
  - For passive agent: `TLSAccept=cert`

### Note:

To improve agent security, you can set the `TLSServerCertIssuer` and `TLSServerCertSubject` parameters. For more information, see [Restricting allowed certificate issuer and subject](#).

The TLS parameters in the final agent configuration file may look as follows. Note that the example assumes that the host is monitored by a proxy, hence it is specified as the certificate Subject:

```

TLSConnect=cert
TLSAccept=cert
TLSCAFile=/home/zabbix/zabbix_ca_file
TLSServerCertIssuer=CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
TLSServerCertSubject=CN=Zabbix proxy,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
TLSCertFile=/home/zabbix/zabbix_agentd.crt
TLSKeyFile=/home/zabbix/zabbix_agentd.key

```

3. Configure encryption in Zabbix frontend for the host monitored by this agent.

- Go to: *Configuration* → *Hosts*.

- Select the host and click the *Encryption* tab.

In the example below, the *Issuer* and *Subject* fields are filled in. For more information on why and how to use these fields, see [Restricting allowed certificate issuer and subject](#).

#### Zabbix web service

1. Prepare files with the top-level CA certificates, the Zabbix web service certificate/certificate chain, and the private key as described in the [Zabbix server](#) section. Then, edit the `TLSCAFile`, `TLSCertFile`, and `TLSKeyFile` parameters in the [Zabbix web service configuration file](#) accordingly.
2. Edit an additional TLS parameter in the [Zabbix web service configuration file](#): `TLSAccept=cert`

TLS parameters in the final web service configuration file may look as follows:

```

TLSAccept=cert
TLSCAFile=/home/zabbix/zabbix_ca_file
TLSCertFile=/home/zabbix/zabbix_web_service.crt
TLSKeyFile=/home/zabbix/zabbix_web_service.key

```

3. Configure Zabbix server to connect to the TLS-configured Zabbix web service by editing the `WebServiceURL` parameter in the [Zabbix server configuration file](#):

```

WebServiceURL=https://example.com

```

#### Restricting allowed certificate issuer and subject

When two Zabbix components (for example, server and agent) establish a TLS connection, they validate each other's certificates. If a peer certificate is signed by a trusted CA (with a pre-configured top-level certificate in `TLSCAFile`), is valid, has not expired, and passes other checks, then the communication between components can proceed. In this simplest case, the certificate issuer and subject are not verified.

However, this presents a risk: anyone with a valid certificate can impersonate anyone else (for example, a host certificate could be used to impersonate a server). While this may be acceptable in small environments where certificates are signed by a dedicated in-house CA and the risk of impersonation is low, it may not be sufficient in larger or more security-sensitive environments.

If your top-level CA issues certificates that should not be accepted by Zabbix or if you want to reduce the risk of impersonation, you can restrict allowed certificates by specifying their issuer and subject.

For example, in the Zabbix proxy configuration file, you could specify:

```

TLSServerCertIssuer=CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
TLSServerCertSubject=CN=Zabbix server,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com

```

With these settings, an active proxy will not communicate with a Zabbix server whose certificate has a different issuer or subject. Similarly, a passive proxy will not accept requests from such a server.

#### Rules for matching Issuer and Subject strings

The rules for matching Issuer and Subject strings are as follows:

- Issuer and Subject strings are checked independently. Both are optional.
- An unspecified string means that any string is accepted.
- Strings are compared as *is* and must match exactly.

- UTF-8 characters are supported. However, wildcards (\*) or regular expressions are not supported.
- The following [RFC 4514](#) requirements are implemented - characters that require escaping (with a '\' backslash, U+005C):
  - anywhere in the string: '"' (U+0022), '+' (U+002B), ',' (U+002C), ';' (U+003B), '<' (U+003C), '>' (U+003E), '\\' (U+005C);
  - at the beginning of the string: space (' ', U+0020) or number sign ('#', U+0023);
  - at the end of the string: space (' ', U+0020).
- Null characters (U+0000) are not supported. If a null character is encountered, the matching will fail.
- [RFC 4517](#) and [RFC 4518](#) standards are not supported.

For example, if Issuer and Subject organization (O) strings contain trailing spaces and the Subject organizational unit (OU) string contains double quotes, these characters must be escaped:

```
TLSServerCertIssuer=CN=Signing CA,OU=Development head,O=\ Example SIA\ ,DC=example,DC=com
TLSServerCertSubject=CN=Zabbix server,OU=Development group \"5\",O=\ Example SIA\ ,DC=example,DC=com
```

#### Field order and formatting

Zabbix follows the recommendations of [RFC 4514](#), which specifies a “reverse” order for these fields, starting with the lowest-level fields (CN), proceeding to the mid-level fields (OU, O), and concluding with the highest-level fields (DC).

```
TLSServerCertIssuer=CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
TLSServerCertSubject=CN=Zabbix proxy,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
```

In contrast, OpenSSL by default displays the Issuer and Subject strings in top-level to low-level order. In the following example, Issuer and Subject fields start with the top-level (DC) and end with the low-level (CN) field. The formatting with spaces and field separators also varies based on the options used, and thus will not match the format required by Zabbix.

```
$ openssl x509 -noout -in /home/zabbix/zabbix_proxy.crt -issuer -subject
issuer= /DC=com/DC=zabbix/O=Zabbix SIA/OU=Development group/CN=Signing CA
subject= /DC=com/DC=zabbix/O=Zabbix SIA/OU=Development group/CN=Zabbix proxy

$ openssl x509 -noout -text -in /home/zabbix/zabbix_proxy.crt
Certificate:
    ...
    Issuer: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Signing CA
    ...
    Subject: DC=com, DC=zabbix, O=Zabbix SIA, OU=Development group, CN=Zabbix proxy
```

To format *Issuer* and *Subject* strings correctly for Zabbix, invoke OpenSSL with the following options:

```
$ openssl x509 -noout -issuer -subject \
  -nameopt esc_2253,esc_ctrl,utf8,dump_nostr,dump_unknown,dump_der,sep_comma_plus,dn_rev,sname\
  -in /home/zabbix/zabbix_proxy.crt
```

The output will then be in reverse order, comma-separated, and usable in Zabbix configuration files and frontend:

```
issuer= CN=Signing CA,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
subject= CN=Zabbix proxy,OU=Development group,O=Zabbix SIA,DC=zabbix,DC=com
```

#### Limitations on using X.509 v3 certificate extensions

When implementing X.509 v3 certificates within Zabbix, certain extensions may not be fully supported or could result in inconsistent behavior.

#### Subject Alternative Name extension

Zabbix does not support the *Subject Alternative Name* extension, which is used to specify alternative DNS names such as IP addresses or email addresses. Zabbix can only validate the value in the *Subject* field of the certificate (see [Restricting Allowed Certificate Issuer and Subject](#)). If certificates include the *subjectAltName* field, the outcome of certificate validation may vary depending on the specific crypto toolkits used to compile Zabbix components. As a result, Zabbix may either accept or reject certificates based on these combinations.

#### Extended Key Usage extension

Zabbix supports the *Extended Key Usage* extension. However, if used, it is generally required that both *clientAuth* (for TLS WWW client authentication) and *serverAuth* (for TLS WWW server authentication) attributes are specified. For example:

- In passive checks, where Zabbix agent operates as a TLS server, the *serverAuth* attribute must be included in the agent's certificate.
- For active checks, where the agent operates as a TLS client, the *clientAuth* attribute must be included in the agent's certificate.

While GnuTLS may issue a warning for key usage violations, it typically allows communication to proceed despite these warnings.

**Name Constraints extension**

Support for the *Name Constraints* extension varies among crypto toolkits. Ensure that your chosen toolkit supports this extension. This extension may restrict Zabbix from loading CA certificates if this section is marked as critical, depending on the specific toolkit in use.

Certificate Revocation Lists (CRL)

If a certificate is compromised, the Certificate Authority (CA) can revoke it by including the certificate in a Certificate Revocation List (CRL). CRLs are managed through configuration files and can be specified using the `TLSCRLFile` parameter in server, proxy, and agent configuration files. For example:

```
TLSCRLFile=/home/zabbix/zabbix_crl_file.crt
```

In this case, `zabbix_crl_file.crt` may contain CRLs from multiple CAs, and could look like this:

```
-----BEGIN X509 CRL-----
MIIB/DCB5QIBATANBgqhkiG9w0BAQUFADCBgTETMBEGCgmSJomT8ixkARkWA2Nv
...
treZeUPjb7LSmZ3K2hpbZN7So0ZcAoHQ3Gwd9npuctg=
-----END X509 CRL-----
-----BEGIN X509 CRL-----
MIIB+TCB4gIBATANBgqhkiG9w0BAQUFADB/MRMwEQYKCZImiZPyLQGGBGRYDY29t
...
CAEebS2CND3ShBedZ8YSil5906JvaDP611R5lNs=
-----END X509 CRL-----
```

The CRL file is loaded only when Zabbix starts. To update the CRL, restart Zabbix.

**Attention:**  
If Zabbix components are compiled with OpenSSL and CRLs are used, ensure that each top-level and intermediate CA in the certificate chains has a corresponding CRL (even if it is empty) included in the `TLSCRLFile`.

**2 Using pre-shared keys**

Overview

Each pre-shared key (PSK) in Zabbix actually is a pair of:

- non-secret PSK identity string,
- secret PSK string value.

PSK identity string is a non-empty UTF-8 string. For example, "PSK ID 001 Zabbix agentd". It is a unique name by which this specific PSK is referred to by Zabbix components. Do not put sensitive information in PSK identity string - it is transmitted over the network unencrypted.

PSK value is a hard to guess string of hexadecimal digits, for example, "e560cb0d918d26d31b4f642181f5f570ad89a390931102e5391d08327b".

Size limits

There are size limits for PSK identity and value in Zabbix, in some cases a crypto library can have lower limit:

| Component                   | PSK identity max size                    | PSK value min size                                      | PSK value max size   |
|-----------------------------|--|---|--|
| <i>Zabbix</i>               | 128 UTF-8 characters                     | 128-bit (16-byte PSK, entered as 32 hexadecimal digits) | 2048-bit (256-byte PSK, entered as 512 hexadecimal digits) |
| <i>GnuTLS</i>               | 128 bytes (may include UTF-8 characters) | -   | 2048-bit (256-byte PSK, entered as 512 hexadecimal digits) |
| <i>OpenSSL 1.0.x, 1.1.0</i> | 127 bytes (may include UTF-8 characters) | -   | 2048-bit (256-byte PSK, entered as 512 hexadecimal digits) |
| <i>OpenSSL 1.1.1</i>        | 127 bytes (may include UTF-8 characters) | -   | 512-bit (64-byte PSK, entered as 128 hexadecimal digits)   |

| Component                       | PSK identity max size                    | PSK value min size | PSK value max size   |
|---------------------------------|--|--------------------|--|
| <i>OpenSSL 1.1.1a and later</i> | 127 bytes (may include UTF-8 characters) | -                  | 2048-bit (256-byte PSK, entered as 512 hexadecimal digits) |

#### Attention:

Zabbix frontend allows configuring up to 128-character long PSK identity string and 2048-bit long PSK regardless of crypto libraries used.

If some Zabbix components support lower limits, it is the user's responsibility to configure PSK identity and value with allowed length for these components.

Exceeding length limits results in communication failures between Zabbix components.

Before Zabbix server connects to agent using PSK, the server looks up the PSK identity and PSK value configured for that agent in database (actually in configuration cache). Upon receiving a connection the agent uses PSK identity and PSK value from its configuration file. If both parties have the same PSK identity string and PSK value the connection may succeed.

#### Attention:

Each PSK identity must be paired with only one value. It is the user's responsibility to ensure that there are no two PSKs with the same identity string but different values. Failing to do so may lead to unpredictable errors or disruptions of communication between Zabbix components using PSKs with this PSK identity string.

### Generating PSK

For example, a 256-bit (32 bytes) PSK can be generated using the following commands:

- with *OpenSSL*:

```
$ openssl rand -hex 32
af8ced32dfe8714e548694e2d29e1a14ba6fa13f216cb35c19d0feb1084b0429
```

- with *GnuTLS*:

```
$ psktool -u psk_identity -p database.psk -s 32
Generating a random key for user 'psk_identity'
Key stored to database.psk
```

```
$ cat database.psk
psk_identity:9b8eafedfaae00cece62e85d5f4792c7d9c9bcc851b23216a1d300311cc4f7cb
```

Note that "psktool" above generates a database file with a PSK identity and its associated PSK. Zabbix expects just a PSK in the PSK file, so the identity string and colon (':') should be removed from the file.

### Configuring PSK for server-agent communication (example)

On the agent host, write the PSK value into a file, for example, `/home/zabbix/zabbix_agentd.psk`. The file must contain PSK in the first text string, for example:

```
1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952
```

Set access rights to PSK file - it must be readable only by Zabbix user.

Edit TLS parameters in agent configuration file `zabbix_agentd.conf`, for example, set:

```
TLSConnect=psk
TLSAccept=psk
TLSPSKFile=/home/zabbix/zabbix_agentd.psk
TLSPSKIdentity=PSK 001
```

The agent will connect to server (active checks) and accept from server and `zabbix_get` only connections using PSK. PSK identity will be "PSK 001".

Restart the agent. Now you can test the connection using `zabbix_get`, for example:

```
zabbix_get -s 127.0.0.1 -k "system.cpu.load[all,avg1]" --tls-connect=psk --tls-psk-identity="PSK 001" --tl
```

(To minimize downtime see how to change connection type in [Connection encryption management](#)).

Configure PSK encryption for this agent in Zabbix frontend:

- Go to: *Configuration → Hosts*

- Select host and click on **Encryption** tab

Example:

The screenshot shows the Zabbix web interface for configuring encryption. The 'Encryption' tab is active. The 'Connections to host' section has three buttons: 'No encryption', 'PSK' (which is highlighted), and 'Certificate'. The 'Connections from host' section has three checkboxes: 'No encryption' (unchecked), 'PSK' (checked), and 'Certificate' (unchecked). Below these, there are two mandatory fields marked with a red asterisk: '\* PSK identity' with the value 'PSK 001' and '\* PSK' with a long hexadecimal string. At the bottom, there are five buttons: 'Update' (in blue), 'Clone', 'Full clone', 'Delete', and 'Cancel'.

All mandatory input fields are marked with a red asterisk.

When configuration cache is synchronized with database the new connections will use PSK. Check server and agent logfiles for error messages.

Configuring PSK for server - active proxy communication (example)

On the proxy, write the PSK value into a file, for example, `/home/zabbix/zabbix_proxy.psk`. The file must contain PSK in the first text string, for example:

```
e560cb0d918d26d31b4f642181f5f570ad89a390931102e5391d08327ba434e9
```

Set access rights to PSK file - it must be readable only by Zabbix user.

Edit TLS parameters in proxy configuration file `zabbix_proxy.conf`, for example, set:

```
TLSCConnect=psk
TLSPSKFile=/home/zabbix/zabbix_proxy.psk
TLSPSKIdentity=PSK 002
```

The proxy will connect to server using PSK. PSK identity will be "PSK 002".

(To minimize downtime see how to change connection type in [Connection encryption management](#)).

Configure PSK for this proxy in Zabbix frontend. Go to *Administration*→*Proxies*, select the proxy, go to "Encryption" tab. In "Connections from proxy" mark PSK. Paste into "PSK identity" field "PSK 002" and "e560cb0d918d26d31b4f642181f5f570ad89a390931102e5391d08327ba434e9" into "PSK" field. Click "Update".

Restart proxy. It will start using PSK-based encrypted connections to server. Check server and proxy logfiles for error messages.

For a passive proxy the procedure is very similar. The only difference - set `TLSAccept=psk` in proxy configuration file and set "Connections to proxy" in Zabbix frontend to PSK.

### 3 Troubleshooting

#### General recommendations

- Start with understanding which component acts as a TLS client and which one acts as a TLS server in problem case. Zabbix server, proxies and agents, depending on interaction between them, all can work as TLS servers and clients. For example, Zabbix server connecting to agent for a passive check, acts as a TLS client. The agent is in role of TLS server. Zabbix agent, requesting a list of active checks from proxy, acts as a TLS client. The proxy is in role of TLS server. `zabbix_get` and `zabbix_sender` utilities always act as TLS clients.
- Zabbix uses mutual authentication. Each side verifies its peer and may refuse connection.

For example, Zabbix server connecting to agent can close connection immediately if agent's certificate is invalid. And vice versa - Zabbix agent accepting a connection from server can close connection if server is not trusted by agent.

- Examine logfiles in both sides - in TLS client and TLS server.

The side which refuses connection may log a precise reason why it was refused. Other side often reports rather general error (e.g. "Connection closed by peer", "connection was non-properly terminated").

- Sometimes misconfigured encryption results in confusing error messages in no way pointing to real cause.

In subsections below we try to provide a (far from exhaustive) collection of messages and possible causes which could help in troubleshooting.

Please note that different crypto toolkits (OpenSSL, GnuTLS) often produce different error messages in same problem situations.

Sometimes error messages depend even on particular combination of crypto toolkits on both sides.

## 1 Connection type or permission problems

Server is configured to connect with PSK to agent but agent accepts only unencrypted connections

In server or proxy log (with *GnuTLS* 3.3.16)

```
Get value from agent failed: zbx_tls_connect(): gnutls_handshake() failed: \
-110 The TLS connection was non-properly terminated.
```

In server or proxy log (with *OpenSSL* 1.0.2c)

```
Get value from agent failed: TCP connection successful, cannot establish TLS to [[127.0.0.1]:10050]: \
Connection closed by peer. Check allowed connection types and access rights
```

One side connects with certificate but other side accepts only PSK or vice versa

In any log (with *GnuTLS*):

```
failed to accept an incoming connection: from 127.0.0.1: zbx_tls_accept(): gnutls_handshake() failed:\
-21 Could not negotiate a supported cipher suite.
```

In any log (with *OpenSSL* 1.0.2c):

```
failed to accept an incoming connection: from 127.0.0.1: TLS handshake returned error code 1:\
file .\ssl\s3_srvr.c line 1411: error:1408A0C1:SSL routines:ssl3_get_client_hello:no shared cipher:\
TLS write fatal alert "handshake failure"
```

Attempting to use Zabbix sender compiled with TLS support to send data to Zabbix server/proxy compiled without TLS

In connecting-side log:

Linux:

```
...In zbx_tls_init_child()
...OpenSSL library (version OpenSSL 1.1.1 11 Sep 2018) initialized
...
...In zbx_tls_connect(): psk_identity:"PSK test sender"
...End of zbx_tls_connect():FAIL error:'connection closed by peer'
...send value error: TCP successful, cannot establish TLS to [[localhost]:10051]: connection closed by peer
```

Windows:

```
...OpenSSL library (version OpenSSL 1.1.1a 20 Nov 2018) initialized
...
...In zbx_tls_connect(): psk_identity:"PSK test sender"
...zbx_psk_client_cb() requested PSK identity "PSK test sender"
...End of zbx_tls_connect():FAIL error:'SSL_connect() I/O error: [0x00000000] The operation completed successfully'
...send value error: TCP successful, cannot establish TLS to [[192.168.1.2]:10051]: SSL_connect() I/O error: [0] Success
```

In accepting-side log:

```
...failed to accept an incoming connection: from 127.0.0.1: support for TLS was not compiled in
```

One side connects with PSK but other side uses LibreSSL or has been compiled without encryption support

LibreSSL does not support PSK.

In connecting-side log:

```
...TCP successful, cannot establish TLS to [[192.168.1.2]:10050]: SSL_connect() I/O error: [0] Success
```



In accepting-side log:

```
...failed to accept an incoming connection: from 192.168.1.2: support for PSK was not compiled in
```

In Zabbix frontend:

```
Get value from agent failed: TCP successful, cannot establish TLS to [[192.168.1.2]:10050]: SSL_connect()
```

One side connects with PSK but other side uses OpenSSL with PSK support disabled

In connecting-side log:

```
...TCP successful, cannot establish TLS to [[192.168.1.2]:10050]: SSL_connect() set result code to SSL_ERROR_SSL
```

In accepting-side log:

```
...failed to accept an incoming connection: from 192.168.1.2: TLS handshake set result code to 1: file ssl
```

## 2 Certificate problems

OpenSSL used with CRLs and for some CA in the certificate chain its CRL is not included in TLSCRLFile

In TLS server log in case of *OpenSSL* peer:

```
failed to accept an incoming connection: from 127.0.0.1: TLS handshake with 127.0.0.1 returned error code
file s3_srvr.c line 3251: error:14089086: SSL routines:ssl3_get_client_certificate:certificate verify
TLS write fatal alert "unknown CA"
```

In TLS server log in case of *GnuTLS* peer:

```
failed to accept an incoming connection: from 127.0.0.1: TLS handshake with 127.0.0.1 returned error code
file rsa_pk1.c line 103: error:0407006A: rsa routines:RSA_padding_check_PKCS1_type_1:\
block type is not 01 file rsa_eay.c line 705: error:04067072: rsa routines:RSA_EAY_PUBLIC_DECRYPT:padding
```

CRL expired or expires during server operation

*OpenSSL*, in server log:

- before expiration:

```
cannot connect to proxy "proxy-openssl-1.0.1e": TCP successful, cannot establish TLS to [[127.0.0.1]:20004]
SSL_connect() returned SSL_ERROR_SSL: file s3_clnt.c line 1253: error:14090086:\
SSL routines:ssl3_get_server_certificate:certificate verify failed:\
TLS write fatal alert "certificate revoked"
```

- after expiration:

```
cannot connect to proxy "proxy-openssl-1.0.1e": TCP successful, cannot establish TLS to [[127.0.0.1]:20004]
SSL_connect() returned SSL_ERROR_SSL: file s3_clnt.c line 1253: error:14090086:\
SSL routines:ssl3_get_server_certificate:certificate verify failed:\
TLS write fatal alert "certificate expired"
```

The point here is that with valid CRL a revoked certificate is reported as "certificate revoked". When CRL expires the error message changes to "certificate expired" which is quite misleading.

*GnuTLS*, in server log:

- before and after expiration the same:

```
cannot connect to proxy "proxy-openssl-1.0.1e": TCP successful, cannot establish TLS to [[127.0.0.1]:20004]
invalid peer certificate: The certificate is NOT trusted. The certificate chain is revoked.
```

Self-signed certificate, unknown CA

*OpenSSL*, in log:

```
error:'self signed certificate: SSL_connect() set result code to SSL_ERROR_SSL: file ../ssl/statem/statem_
line 1924: error:1416F086:SSL routines:tls_process_server_certificate:certificate verify failed:\
TLS write fatal alert "unknown CA"'
```

This was observed when server certificate by mistake had the same Issuer and Subject string, although it was signed by CA. Issuer and Subject are equal in top-level CA certificate, but they cannot be equal in server certificate. (The same applies to proxy and agent certificates.)

### 3 PSK problems

PSK contains an odd number of hex-digits

Proxy or agent does not start, message in the proxy or agent log:

```
invalid PSK in file "/home/zabbix/zabbix_proxy.psk"
```

PSK identity string longer than 128 bytes is passed to GnuTLS

In TLS client side log:

```
gnutls_handshake() failed: -110 The TLS connection was non-properly terminated.
```

In TLS server side log.

```
gnutls_handshake() failed: -90 The SRP username supplied is illegal.
```

Too long PSK value used with OpenSSL 1.1.1

In connecting-side log:

```
...OpenSSL library (version OpenSSL 1.1.1 11 Sep 2018) initialized
```

```
...
```

```
...In zbx_tls_connect(): psk_identity:"PSK 1"
```

```
...zbx_psk_client_cb() requested PSK identity "PSK 1"
```

```
...End of zbx_tls_connect():FAIL error:'SSL_connect() set result code to SSL_ERROR_SSL: file ssl\statem\ex
```

In accepting-side log:

```
...Message from 123.123.123.123 is missing header. Message ignored.
```

This problem typically arises when upgrading OpenSSL from 1.0.x or 1.1.0 to 1.1.1 and if the PSK value is longer than 512-bit (64-byte PSK, entered as 128 hexadecimal digits).

See also: [Value size limits](#)

## 18 Web interface

**Overview** For an easy access to Zabbix from anywhere and from any platform, the web-based interface is provided.

### Note:

If using more than one frontend instance make sure that the locales and libraries (LDAP, SAML etc.) are installed and configured identically for all frontends.

### 1 Menu

Overview

A vertical menu in a sidebar provides access to various Zabbix frontend sections.

The menu is dark blue in the default theme.

**ZABBIX** << [icon]

Global view

All dashboards / Global view

Page 1 ... Page 2 Stop slideshow

**System information**

| Parameter                          | Value | Details         |
|------------------------------------|-------|-----------------|
| Zabbix server is running           | Yes   | localhost:10051 |
| Number of hosts (enabled/disabled) | 5     | 4 / 1           |
| Number of templates                | 140   |                 |

**Problems**

| Time                | Info     | Host | Problem        |
|---------------------|----------|------|----------------|
| 2021-12-06 15:08:12 | New host |      | Nodata trigger |
| 2021-12-06 14:13:11 | New host |      | Nodata trigger |
| 2021-12-06 14:07:45 | New      |      | Abs trigger    |

Working with the menu

A **global search** box is located below the Zabbix logo.

The menu can be collapsed or hidden completely:

- To collapse, click on [icon] next to Zabbix logo
- To hide, click on [icon] next to Zabbix logo

**Global view**

All dashboards / Global view

**System information**

| Parameter                          | Value | Details         |
|------------------------------------|-------|-----------------|
| Zabbix server is running           | Yes   | localhost:10051 |
| Number of hosts (enabled/disabled) | 5     | 4 / 1           |
| Number of templates                | 140   |                 |

**Problems**

| Time                | Info     | Host | Problem        |
|---------------------|----------|------|----------------|
| 2021-12-06 15:08:12 | New host |      | Nodata trigger |
| 2021-12-06 14:13:11 | New host |      | Nodata trigger |
| 2021-12-06 14:07:45 | New      |      | Abs trigger    |

Collapsed menu with only the icons visible.

Hidden menu.

Collapsed menu

When the menu is collapsed to icons only, a full menu reappears as soon as the mouse cursor is placed upon it. Note that it reappears over page content; to move page content to the right you have to click on the expand button. If the mouse cursor again is placed outside the full menu, the menu will collapse again after two seconds.

You can also make a collapsed menu reappear fully by hitting the Tab key. Hitting the Tab key repeatedly will allow to focus on the next menu element.

## Hidden menu

Even when the menu is hidden completely, a full menu is just one mouse click away, by clicking on the burger icon. Note that it reappears over page content; to move page content to the right you have to unhide the menu by clicking on the show sidebar button.

## 2 Frontend sections

Please use the sidebar to access content in the Frontend sections section.

### 1 Monitoring

#### Overview

The Monitoring menu is all about displaying data. Whatever information Zabbix is configured to gather, visualize and act upon, it will be displayed in the various sections of the Monitoring menu.

#### View mode buttons

The following buttons located in the top right corner are common for every section:



Display page in kiosk mode. In this mode only page content is displayed.



To exit kiosk mode, move the mouse cursor until the exit button appears and click on it. You will be taken back to normal mode.

### 1 Dashboard

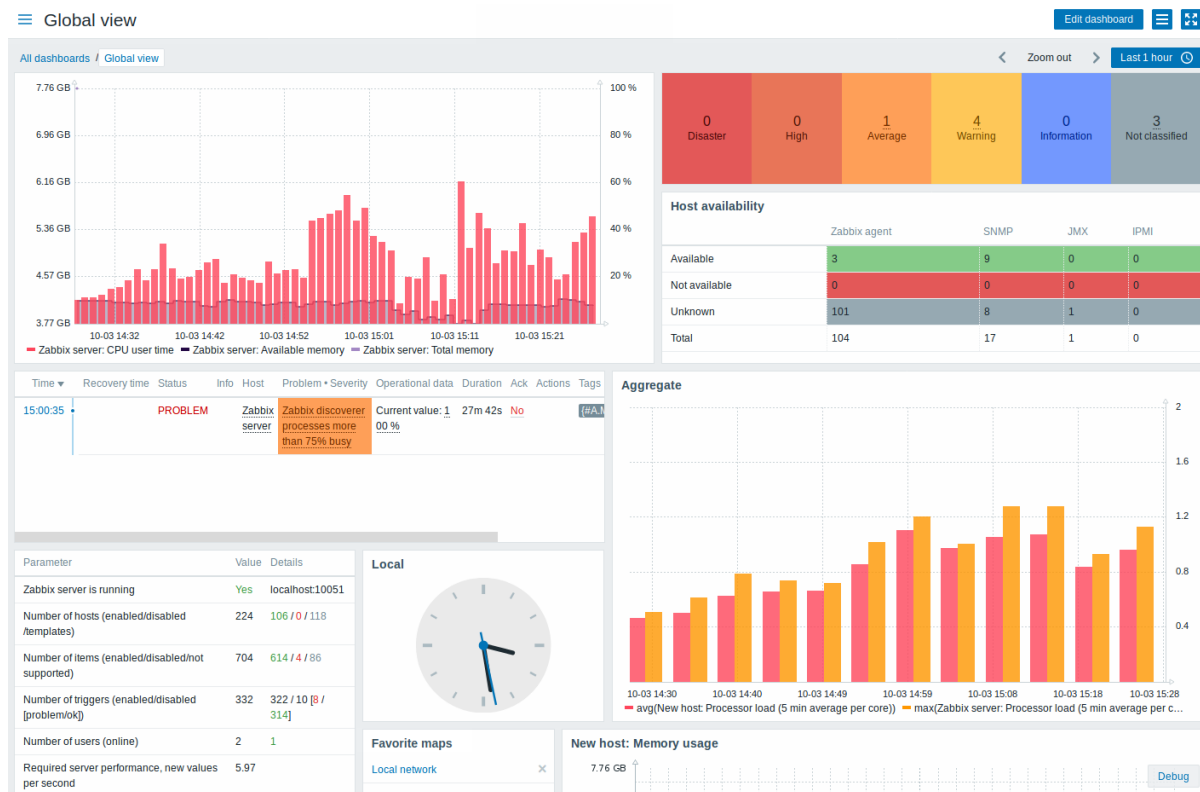
#### Overview

The *Monitoring* → *Dashboard* section is designed to display summaries of all the important information in a **dashboard**.

While only one dashboard can be displayed at one time, it is possible to configure several dashboards. Each dashboard may contain one or several pages that can be rotated in a slideshow.

A dashboard page consists of widgets and each widget is designed to display information of a certain kind and source, which can be a summary, a map, a graph, the clock, etc.

Access to hosts in the widgets depends on host **permissions**.



Pages and widgets are added to the dashboard and edited in the dashboard editing mode. Pages can be viewed and rotated in the dashboard viewing mode.

The time period that is displayed in graph widgets is controlled by the **time period selector** located above the widgets. The time period selector label, located to the right, displays the currently selected time period. Clicking the tab label allows expanding and collapsing the time period selector.

Note that when the dashboard is displayed in kiosk mode and widgets only are displayed, it is possible to zoom out the graph period by double-clicking in the graph.

### Dashboard size

The minimum width of a dashboard is 1200 pixels. The dashboard will not shrink below this width; instead a horizontal scrollbar is displayed if the browser window is smaller than that.

The maximum width of a dashboard is the browser window width. Dashboard widgets stretch horizontally to fit the window. At the same time, a dashboard widget cannot be stretched horizontally beyond the window limits.

Technically the dashboard consists of 12 horizontal columns of always equal width that stretch/shrink dynamically (but not to less than 1200 pixels total).

Vertically the dashboard may contain a maximum of 64 rows. Each row has a fixed height of 70 pixels. A widget may be up to 32 rows high.

### Viewing dashboards

To view all configured dashboards, click on *All dashboards* just below the section title.



Filter

| <input type="checkbox"/> Name ▲                 |                                     |
|---|-------------------------------------|
| <input type="checkbox"/> Apache info            | <span>My</span> <span>Shared</span> |
| <input type="checkbox"/> Global view            | <span>My</span> <span>Shared</span> |
| <input type="checkbox"/> HyperV (John's custom) | <span>My</span>                     |
| <input type="checkbox"/> Problems (quick view)  | <span>My</span>                     |
| <input type="checkbox"/> Zabbix server          | <span>My</span> <span>Shared</span> |
| <input type="checkbox"/> Zabbix server health   | <span>My</span> <span>Shared</span> |

Dashboards are displayed with a sharing tag:

- *My* - indicates a private dashboard
- *Shared* - indicates a public dashboard or a private dashboard shared with any user or user group

The filter located to the right above the list allows to filter dashboards by name and by those created by the current user.

To delete one or several dashboards, mark the checkboxes of the respective dashboards and click on *Delete* below the list.

Viewing and editing a dashboard

To view a single dashboard, click on its name in the list of dashboards.

When **viewing** a dashboard, the following options are available:

Edit dashboard

Switch to the dashboard **editing** mode.

The editing mode is also opened when a new dashboard is being created and when you click on the edit button of a widget.

Open the action menu (see action descriptions below).



| ACTIONS              |
|----------------------|
| Sharing              |
| Create new           |
| Clone                |
| Delete               |
| Create new report    |
| View related reports |

*Sharing* - edit sharing preferences for the dashboard. Dashboards can be made public or private. Public dashboards are visible to all users. Private dashboards are visible only to their owner.

Private dashboards can be shared by the owner with other users and user groups. For details on configuring sharing, see the map [configuration](#) section.

*Create new* - [create](#) a new dashboard.

*Clone* - create a new dashboard by copying properties of the existing one. First you are prompted to enter dashboard parameters. Then, the new dashboard opens in editing mode with all the widgets of the original dashboard.

*Delete* - delete the dashboard.

*Create new report* - open a pop-up window with report [configuration form](#). Disabled if the user does not have permission to manage scheduled reports.

*View related reports* - open a pop-up window with a list of existing reports based on the current dashboard. Disabled if there are no related reports or the user does not have permission to view scheduled reports.



Display only page content (**kiosk mode**).

Kiosk mode can also be accessed with the following URL parameters:

`/zabbix.php?action=dashboard.view&kiosk=1`.

To exit to normal mode: `/zabbix.php?action=dashboard.view&kiosk=0`

When **editing** a dashboard, the following options are available:



|              |
|--------------|
| Add widget   |
| Add page     |
| Paste widget |
| Paste page   |

Edit general dashboard **parameters**.

Add a new widget.

Clicking on the arrow button will open the action menu (see action descriptions below).

*Add widget* - add a new widget

*Add page* - add a new page

*Paste widget* - paste a copied widget. This option is grayed out if no widget has been copied. Only one entity (widget or page) can be copied at one time.

*Paste page* - paste a copied page. This option is grayed out if no page has been copied.

Save dashboard changes.

Cancel dashboard changes.

## Creating a dashboard

It is possible to create a new dashboard in two ways:

- Click on *Create dashboard*, when viewing all dashboards
- Select *Create new* from the action menu, when viewing a single dashboard

You will be first asked to enter general dashboard parameters:

### Dashboard properties

\* Owner

Admin (Zabbix Administrator) X

Select

\* Name

New dashboard

Default page display period

30 seconds

▼

Start slideshow automatically

☒

Apply

Cancel

| Parameter                     | Description   |
|-------------------------------|---|
| Owner                         | Select system user that will be the dashboard owner.  |
| Name                          | Enter dashboard name.   |
| Default page display period   | Select period for how long a dashboard page is displayed before rotating to the next page in a <b>slideshow</b> . |
| Start slideshow automatically | Mark this checkbox to run a slideshow automatically one more than one dashboard page exists.                      |

When you click on *Apply*, an empty dashboard is opened:



Add a new widget

To populate the dashboard, you can add widgets and pages.

Click on the *Save changes* button to save the dashboard. If you click on *Cancel*, the dashboard will not be created.

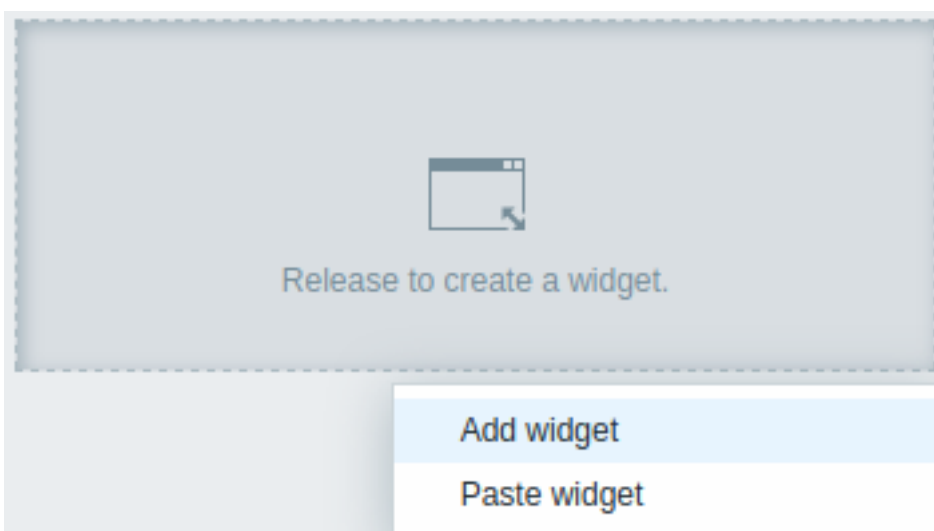
### Adding widgets

To add a widget to a dashboard:

- Click on the + Add ▼ button or the *Add widget* option in the action menu that can be opened by clicking on the arrow. Fill the widget configuration form. The widget will be created in its default size and placed after the existing widgets (if any);

Or

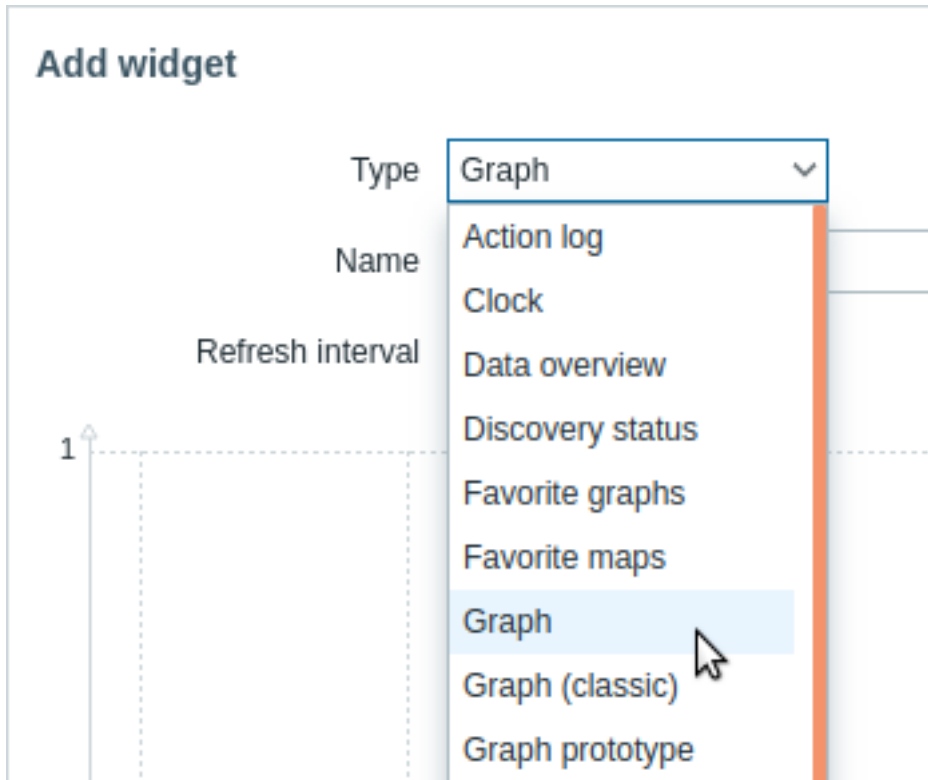
- Move your mouse to the desired empty spot for the new widget. Notice how a placeholder appears, on mouseover, on any empty slot on the dashboard. Then click to open the widget configuration form. After filling the form the widget will be created in its default size or, if its default size is bigger than is available, take up the available space. Alternatively, you may click and drag the placeholder to the desired widget size, then release, and then fill the widget configuration form. (Note that when there is a widget copied onto the clipboard, you will be first prompted to select between *Add widget* and *Paste widget* options to create a widget.)



In the widget configuration form:



- Select the *Type* of widget
- Enter widget parameters
- Click on *Add*



#### Widgets

A wide variety of **widgets** (e.g. **Clock**, **Host availability** or **Trigger overview**) can be added to a dashboard: these can be resized and moved around the dashboard in dashboard editing mode by clicking on the widget title bar and dragging it to a new location. Also, you can click on the following buttons in the top-right corner of the widget to:

- - edit a widget;
- - access the **widget menu**

Click on *Save changes* for the dashboard to make any changes to the widgets permanent.

#### Copying/pasting widgets

Dashboard widgets can be copied and pasted, allowing to create a new widget with the properties of an existing one. They can be copy-pasted within the same dashboard, or between dashboards opened in different tabs.

A widget can be copied using the **widget menu**. To paste the widget:

- click on the arrow next to the *Add* button and selecting the *Paste widget* option, when editing the dashboard
- use the *Paste widget* option when adding a new widget by selecting some area in the dashboard (a widget must be copied first for the paste option to become available)

A copied widget can be used to paste over an existing widget using the *Paste* option in the **widget menu**.

#### Creating a slideshow

A slideshow will run automatically if the dashboard contains two or more pages (see **Adding pages**) and if one of the following is true:




- The *Start slideshow automatically* option is marked in dashboard properties
- The dashboard URL contains a `slideshow=1` parameter

The pages rotate according to the intervals given in the properties of the dashboard and individual pages. Click on:

- *Stop slideshow* - to stop the slideshow
- *Start slideshow* - to start the slideshow



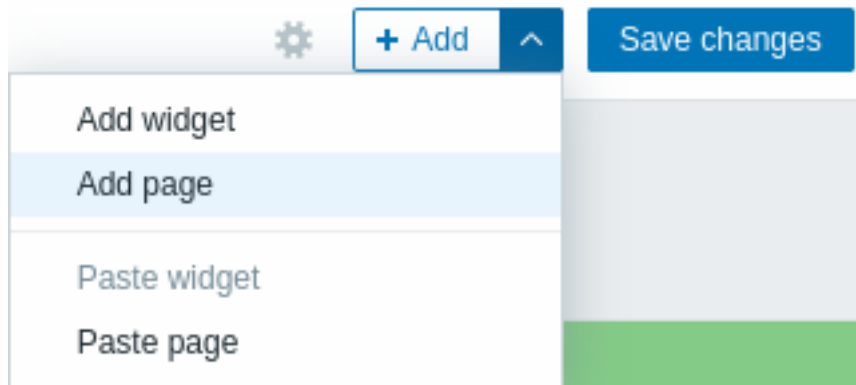
Slideshow-related controls are also available in **kiosk mode** (where only the page content is shown):

-  - stop slideshow
-  - start slideshow
-  - go back one page
-  - go to the next page

#### Adding pages

To add a new page to a dashboard:

- Make sure the dashboard is in the **editing mode**
- Click on the arrow next to the *Add* button and select the *Add page* option



- Fill the general page parameters and click on *Apply*. If you leave the name empty, the page will be added with a Page N name where 'N' is the incremental number of the page. The page display period allows to customize how long a page is displayed in a slideshow.

Dashboard page properties

Name

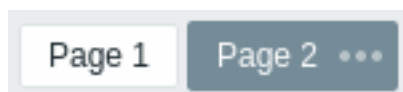
Page display period

Default (30 seconds) ▾

Apply

Cancel

A new page will be added, indicated by a new tab (*Page 2*).



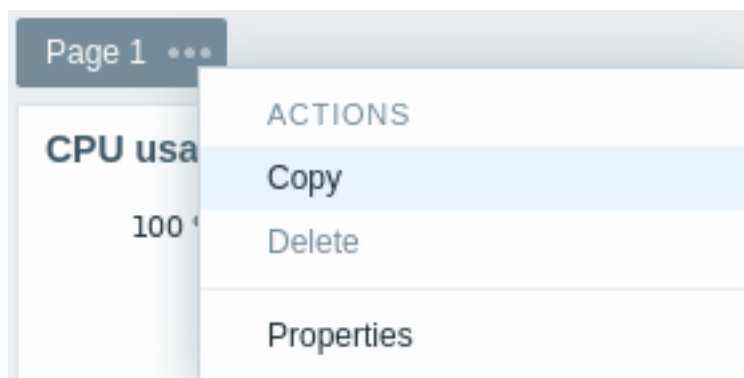
The pages can be reordered by dragging-and-dropping the page tabs. Reordering maintains the original page naming. It is always possible to go to each page by clicking on its tab.

When a new page is added, it is empty. You can add widgets to it as described above.

#### Copying/pasting pages

Dashboard pages can be copied and pasted, allowing to create a new page with the properties of an existing one. They can be pasted from the same dashboard or a different dashboard.


To paste an existing page to the dashboard, first copy it, using the **page menu**:

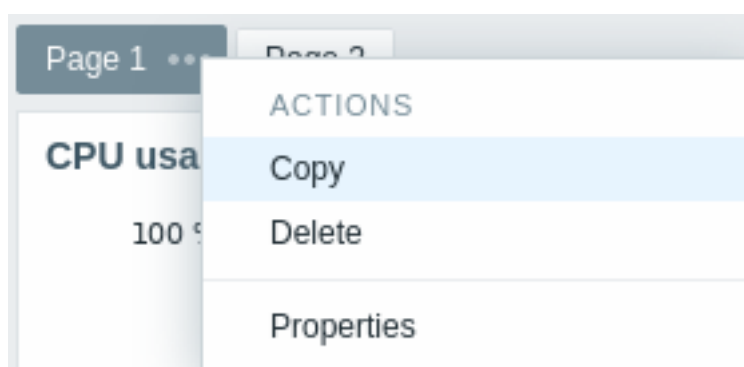


To paste the copied page:

- Make sure the dashboard is in the **editing mode**
- Click on the arrow next to the *Add* button and select the *Paste page* option

Page menu

The page menu can be opened by clicking on the three dots  next to the page name:

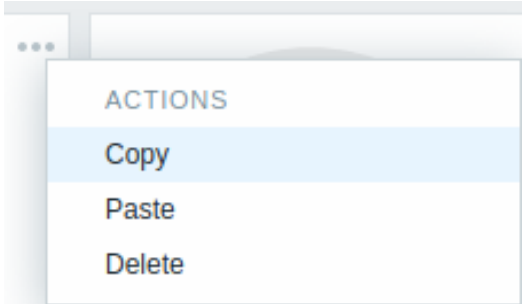


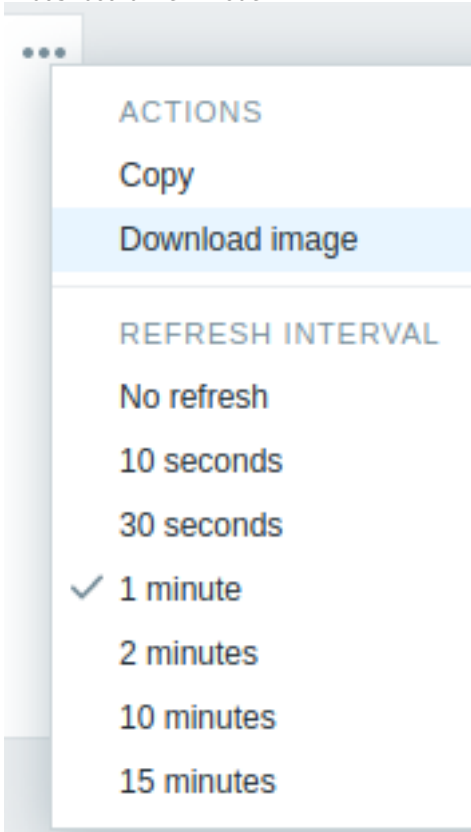
It contains the following options:

- *Copy* - copy the page
- *Delete* - delete the page (pages can only be deleted in the dashboard editing mode)
- *Properties* - customize the page parameters (the name and the page display period in a slideshow)

Widget menu

The widget menu contains different options based on whether the dashboard is in the edit or view mode:

| Widget menu  | Options  |
|--|--|
| <p>In dashboard edit mode:</p>  | <p><i>Copy</i> - copy the widget</p> <p><i>Paste</i> - paste a copied widget over this widget<br/>This option is grayed out if no widget has been copied.</p> <p><i>Delete</i> - delete the widget</p> |

| Widget menu   | Options  |
|---|--|
| <p>In dashboard view mode:</p>  | <p><i>Copy</i> - copy the widget</p> <p><i>Download image</i> - download the widget as a PNG image (only available for <b>graph/classic graph</b> widgets)</p> <p><i>Refresh interval</i> - select the frequency of refreshing the widget contents</p> |

## Dynamic widgets

When **configuring** some of the widgets:

- Classic graph
- Graph prototype
- Item value
- Plain text
- URL

there is an extra option called *Dynamic item*. You can check this box to make the widget dynamic - i.e. capable of displaying different content based on the selected host.

Now, when saving the dashboard, you will notice that a new host selection field has appeared atop the dashboard for selecting the host (while the *Select* button allows selecting the host group in a popup):



Thus you have a widget, which can display content that is based on the data from the host that is selected. The benefit of this is that you do not need to create extra widgets just because, for example, you want to see the same graphs containing data from various hosts.

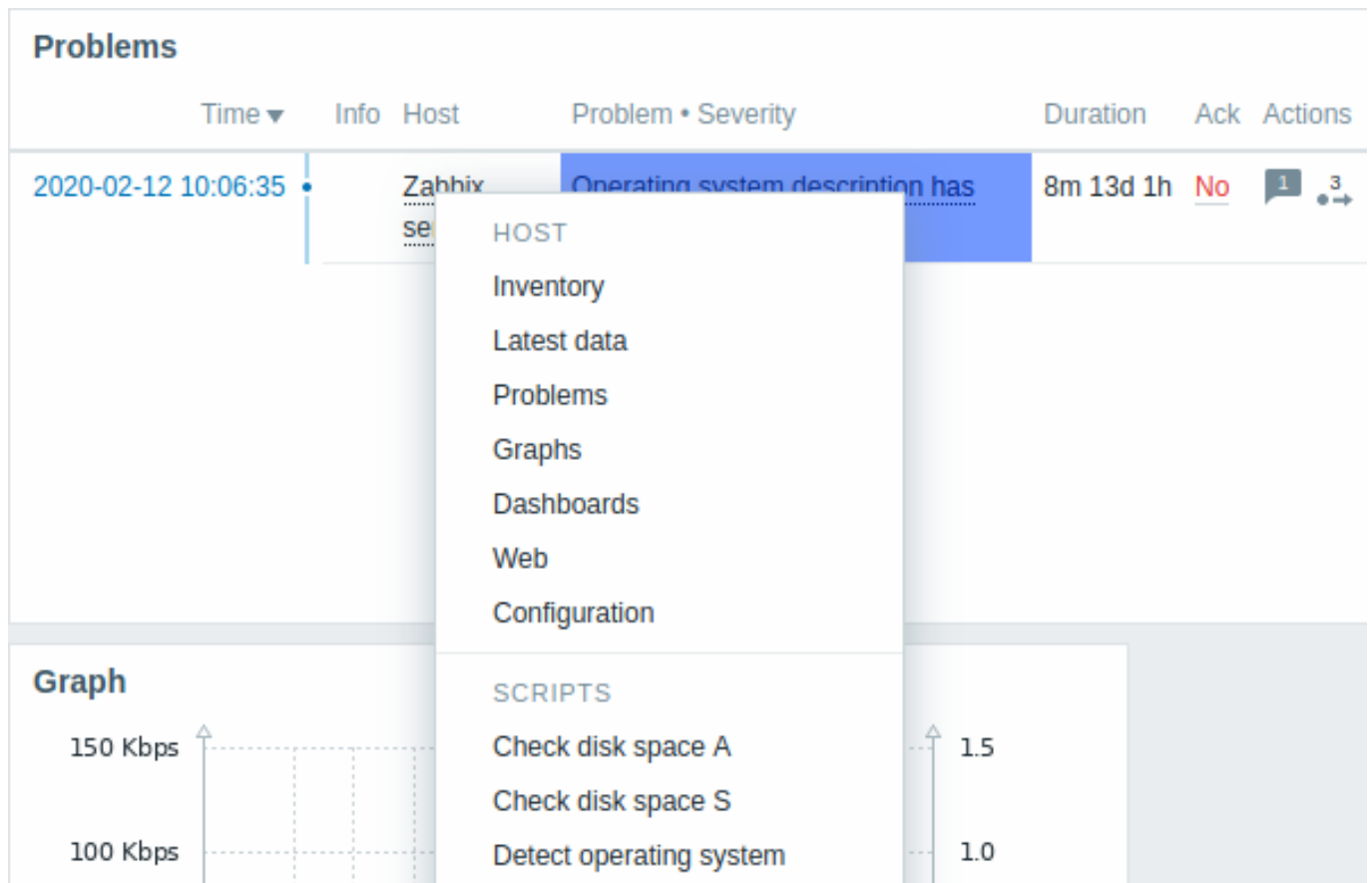
## Permissions to dashboards

Permissions to dashboards for regular users and users of 'Admin' type are limited in the following way:

- They can see and clone a dashboard if they have at least READ rights to it;
- They can edit and delete dashboard only if they have READ/WRITE rights to it;
- They cannot change the dashboard owner.

## Host menu

Clicking on a host in the *Problems* widget brings up the host menu. It includes links to host inventory, latest data, problems, graphs, dashboards, web scenarios and configuration. Note that host configuration is available for Admin and Superadmin users only.



Global scripts can also be run from the host menu. These scripts need to have their scope defined as 'Manual host action' to be available in the host menu.

The host menu is accessible by clicking on a host in several other frontend sections:

- Monitoring → Problems
- Monitoring → Problems → Event details
- Monitoring → Hosts
- Monitoring → Hosts → Web Monitoring
- Monitoring → Latest data
- Monitoring → Maps
- Reports → Triggers top 100

#### Problem event popup

The problem event popup includes the list of problem events for this trigger and, if defined, the trigger description and a clickable URL.

| Problems               | Time                   | Info     | Host      | Problem • Severity                          | Duration   |
|------------------------|------------------------|----------|-----------|---|------------|
| 05/07/2020 11:27:12 AM |                        |          | Server3   | /: Disk space is critically low (>90% used) | 10m 22d 23 |
| 04/17/2020 01:07:52 PM | 04/20/2020 02:14:12 PM | RESOLVED | 3d 1h 0m  | Yes   |            |
| 04/17/2020 01:05:16 PM | 04/20/2020 02:14:12 PM | RESOLVED | 3d 1h 8m  | Yes   |            |
| 04/17/2020 01:02:34 PM | 04/20/2020 02:14:12 PM | RESOLVED | 3d 1h 11m | Yes   |            |
| 04/17/2020 12:47:56 PM | 04/20/2020 02:14:12 PM | RESOLVED | 3d 1h 26m | Yes   |            |
| 04/17/2020 12:45:48 PM | 04/20/2020 02:14:12 PM | RESOLVED | 3d 1h 28m | Yes   |            |

To bring up the problem event popup:

- roll a mouse over the problem duration in the *Duration* column of the *Problems* widget. The popup disappears once you remove the mouse from the duration.
- click on the duration in the *Duration* column of the *Problems* widget. The popup disappears only if you click on the duration again.

#### 1 Dashboard widgets

#### Overview


This section provides the details of parameters that are common for dashboard widgets.

## Common parameters

The following parameters are common for every single widget:

|                         |   |
|-------------------------|---|
| <i>Name</i>             | Enter a widget name.  |
| <i>Refresh interval</i> | Configure default refresh interval. Default refresh intervals for widgets range from <i>No refresh</i> to <i>15 minutes</i> depending on the type of widget. For example: <i>No refresh</i> for URL widget, <i>1 minute</i> for action log widget, <i>15 minutes</i> for clock widget.        |
| <i>Show header</i>      | Mark the checkbox to show the header permanently.<br>When unchecked the header is hidden to save space and only slides up and becomes visible again when the mouse is positioned over the widget, both in view and edit modes. It is also semi-visible when dragging a widget to a new place. |

Refresh intervals for a widget can be set to a default value for all the corresponding users and also each user can set his own refresh interval value:

- To set a default value for all the corresponding users switch to editing mode (click the *Edit dashboard* button, find the right widget, click the *Edit* button opening the editing form of a widget), and choose the required refresh interval from the dropdown list.
- Setting a unique refresh interval for each user separately is possible in view mode by clicking the  button for a certain widget.

Unique refresh interval set by a user has priority over the widget setting and once it's set it's always preserved when the widget's setting is modified.

To see **specific parameters** for each widget, go to individual widget pages for:

- Action log
- Clock
- Data overview
- Discovery status
- Favorite graphs
- Favorite maps
- Geomap
- Graph
- Graph (classic)
- Graph prototype
- Host availability
- Item value
- Map
- Map navigation tree
- Plain text
- Problem hosts
- Problems
- SLA report
- System information
- Problems by severity
- Top hosts
- Trigger overview
- URL
- Web monitoring

Deprecated widgets:

- Data overview

### Attention:

Deprecated widgets will be removed in the upcoming major release.

## 1 Action log

## Overview

In the action log widget, you can display details of action operations (notifications, remote commands). It replicates information from *Reports* → *Action log*.

Configuration

To configure, select *Action log* as type:

Add widget

Type

Action log

Show header

☒

Name

Action log

Refresh interval

Default (1 minute)

Sort entries by

Time (descending)

\* Show lines

25

Add

Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                 |  |
|-----------------|--|
| Sort entries by | Sort entries by:<br><b>Time</b> (descending or ascending)<br><b>Type</b> (descending or ascending)<br><b>Status</b> (descending or ascending)<br><b>Recipient</b> (descending or ascending). |
| Show lines      | Set how many action log lines will be displayed in the widget.   |

2 Clock

Overview

In the clock widget, you may display local, server, or specified host time.

Configuration

To configure, select *Clock* as type:

Add widget

Type

Clock

Show header

☒

Name

Local time

Refresh interval

Default (15 minutes)

Time type

Local time

Add

Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                  |   |
|------------------|---|
| <i>Time type</i> | Select local, server, or specified host time.<br>Server time will be identical to the time zone set globally or for the Zabbix user.  |
| <i>Item</i>      | Select the item for displaying time. To display host time, use the <code>system.localtime[local] item</code> . This item must exist on the host.<br>This field is available only when <i>Host time</i> is selected. |

### 3 Data overview

#### Attention:

This widget is deprecated and will be removed in the upcoming major release. Consider using the *Top hosts* widget instead.

#### Overview

In the data overview widget, you can display the latest data for a group of hosts.

The color of problem items is based on the problem severity color, which can be adjusted in the *problem update* screen.

By default, only values that fall within the last 24 hours are displayed. This limit has been introduced with the aim of improving initial loading times for large pages of latest data. This limit is configurable in *Administration* → *General* → *GUI*, using the *Max history display period* option.

Clicking on a piece of data offers links to some predefined graphs or latest values.

Note that 50 records are displayed by default (configurable in *Administration* → *General* → *GUI*, using the *Max number of columns and rows in overview tables* option). If more records exist than are configured to display, a message is displayed at the bottom of the table, asking to provide more specific filtering criteria. There is no pagination. Note that this limit is applied first, before any further filtering of data, for example, by tags.

#### Configuration

To configure, select *Data overview* as type:

×

Add widget

Type

Data overview

Show header

☒

Name

default

Refresh interval

Default (1 minute)

Host groups

type here to search

Select

Hosts

type here to search

Select

Tags

And/Or

Or

tag

Contains

value

Remove

Add

Show suppressed problems

☐

Hosts location

Left

Top

Add

Cancel



In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                          |  |
|--------------------------|--|
| Host groups              | Select host groups. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups. Scroll down to select. Click on 'x' to remove the selected.  |
| Hosts                    | Select hosts. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts. Scroll down to select. Click on 'x' to remove the selected.  |
| Tags                     | <p>Specify tags to limit the number of item data displayed in the widget. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.</p> <p>There are several operators available for each condition:</p> <p><b>Exists</b> - include the specified tag names</p> <p><b>Equals</b> - include the specified tag names and values (case-sensitive)</p> <p><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p><b>Does not exist</b> - exclude the specified tag names</p> <p><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)</p> <p><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p>There are two calculation types for conditions:</p> <p><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition</p> <p><b>Or</b> - enough if one condition is met</p> |
| Show suppressed problems | Mark the checkbox to display problems that would otherwise be suppressed (not shown) because of host maintenance.  |
| Hosts location           | Select host location - left or top.  |

4 Discovery status

Overview

This widget displays a status summary of the active network discovery rules.

Add widget

Type

Discovery status

Name

Discovery status

Refresh interval

Default (1 minute)

Show header

☒

Add

Cancel

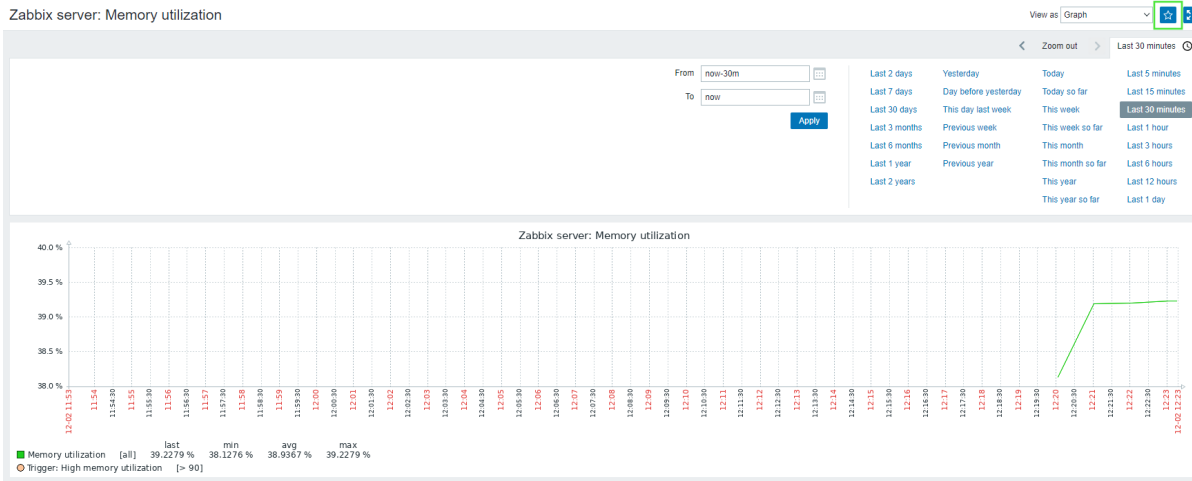
All configuration parameters are **common** for all widgets.

5 Favorite graphs

Overview

This widget contains shortcuts to the most needed graphs, sorted alphabetically.

The list of shortcuts is populated when you view a graph in Monitoring -> Latest data -> Graphs, and then click on its  **Add to favorites** button.



All configuration parameters are **common** for all widgets.

## 6 Favorite maps

### Overview

This widget contains shortcuts to the most needed maps, sorted alphabetically.

The list of shortcuts is populated when you **view** a map and then click on its  **Add to favorites** button.

All configuration parameters are **common** for all widgets.

## 7 Geomap

### Overview

Geomap widget displays hosts as markers on a geographical map using open-source JavaScript interactive maps library Leaflet.

#### Note:

Zabbix offers multiple predefined map tile service providers and an option to add a custom tile service provider or even host tiles themselves (configurable in the *Administration* → *General* → *Geographical maps* **menu section**).

By default, the widget displays all enabled hosts with valid geographical coordinates defined in the host configuration. It is possible to configure host filtering in the widget parameters.

The valid host coordinates are:

- Latitude: from -90 to 90 (can be integer or float number)
- Longitude: from -180 to 180 (can be integer or float number)

### Configuration

To add the widget, select *Geomap* as type.

Add widget
✕

Type

Geomap

Show header
☒

Name

default

Refresh interval

Default (1 minute)

Host groups

type here to search

Select

Hosts

type here to search

Select

Tags

And/Or

Or

tag

Contains

value

Remove

Add

Initial view

40.6892494,-74.0466891

Add

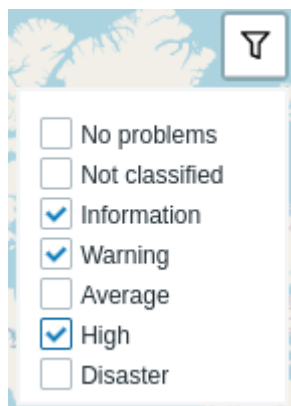
Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                     |  |
|---------------------|--|
| <i>Host groups</i>  | <p>Select host groups to be displayed on the map. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups. Scroll down to select. Click on 'x' to remove selected groups.</p> <p>If nothing is selected in both <i>Host groups</i> and <i>Hosts</i> fields, all hosts with valid coordinates will be displayed.</p>   |
| <i>Hosts</i>        | <p>Select hosts to be displayed all the map. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts. Scroll down to select. Click on 'x' to remove selected hosts.</p> <p>If nothing is selected in both <i>Host groups</i> and <i>Hosts</i> fields, all hosts with valid coordinates will be displayed.</p>   |
| <i>Tags</i>         | <p>Specify tags to limit the number of hosts displayed in the widget. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.</p> <p>There are several operators available for each condition:</p> <p><b>Exists</b> - include the specified tag names</p> <p><b>Equals</b> - include the specified tag names and values (case-sensitive)</p> <p><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p><b>Does not exist</b> - exclude the specified tag names</p> <p><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)</p> <p><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p>There are two calculation types for conditions:</p> <p><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition</p> <p><b>Or</b> - enough if one condition is met</p> |
| <i>Initial view</i> | <p>Comma-separated center coordinates and an optional zoom level to display when the widget is initially loaded in the format &lt;latitude&gt;,&lt;longitude&gt;,&lt;zoom&gt;</p> <p>If initial zoom is specified, the Geomap widget is loaded at the given zoom level. Otherwise, initial zoom is calculated as half of the <b>max zoom</b> for the particular tile provider.</p> <p>The initial view is ignored if the default view is set (see below).</p> <p>Examples:</p> <p>=&gt; 40.6892494,-74.0466891,14</p> <p>=&gt; 40.6892494,-122.0466891</p>   |

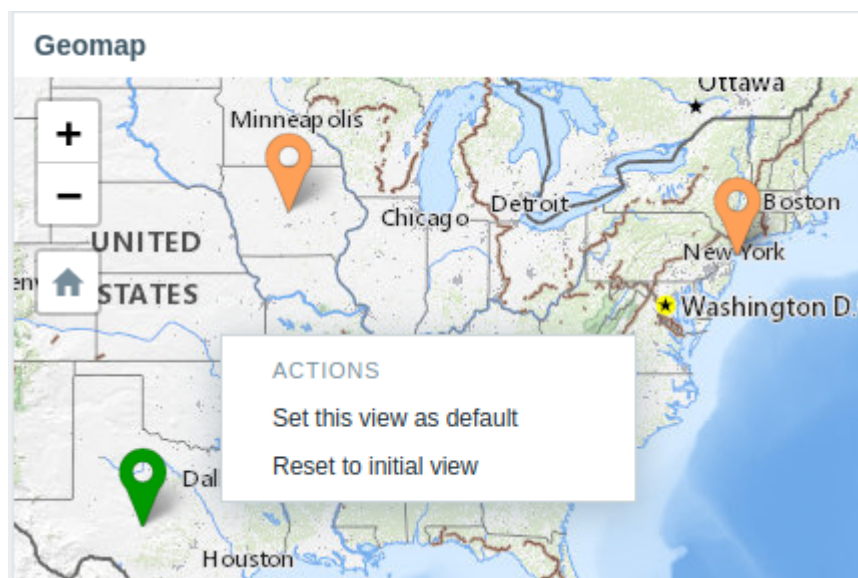
Host markers displayed on the map have the color of the host's most serious problem and green color if a host has no problems. Clicking on a host marker allows viewing the host's visible name and the number of unresolved problems grouped by severity. Clicking on the visible name will open [host menu](#).

Hosts displayed on the map can be filtered by problem severity. Press on the filter icon in the widget's upper right corner and mark the required severities.



It is possible to zoom in and out the map by using the plus and minus buttons in the widget's upper left corner or by using the mouse scroll wheel or touchpad. To set the current view as default, right-click anywhere on the map and select *Set this view as default*. This setting will override *Initial view* widget parameter for the current user. To undo this action, right-click anywhere on the map again and select *Reset the initial view*.

When *Initial view* or *Default view* is set, you can return to this view at any time by pressing on the home icon on the left.



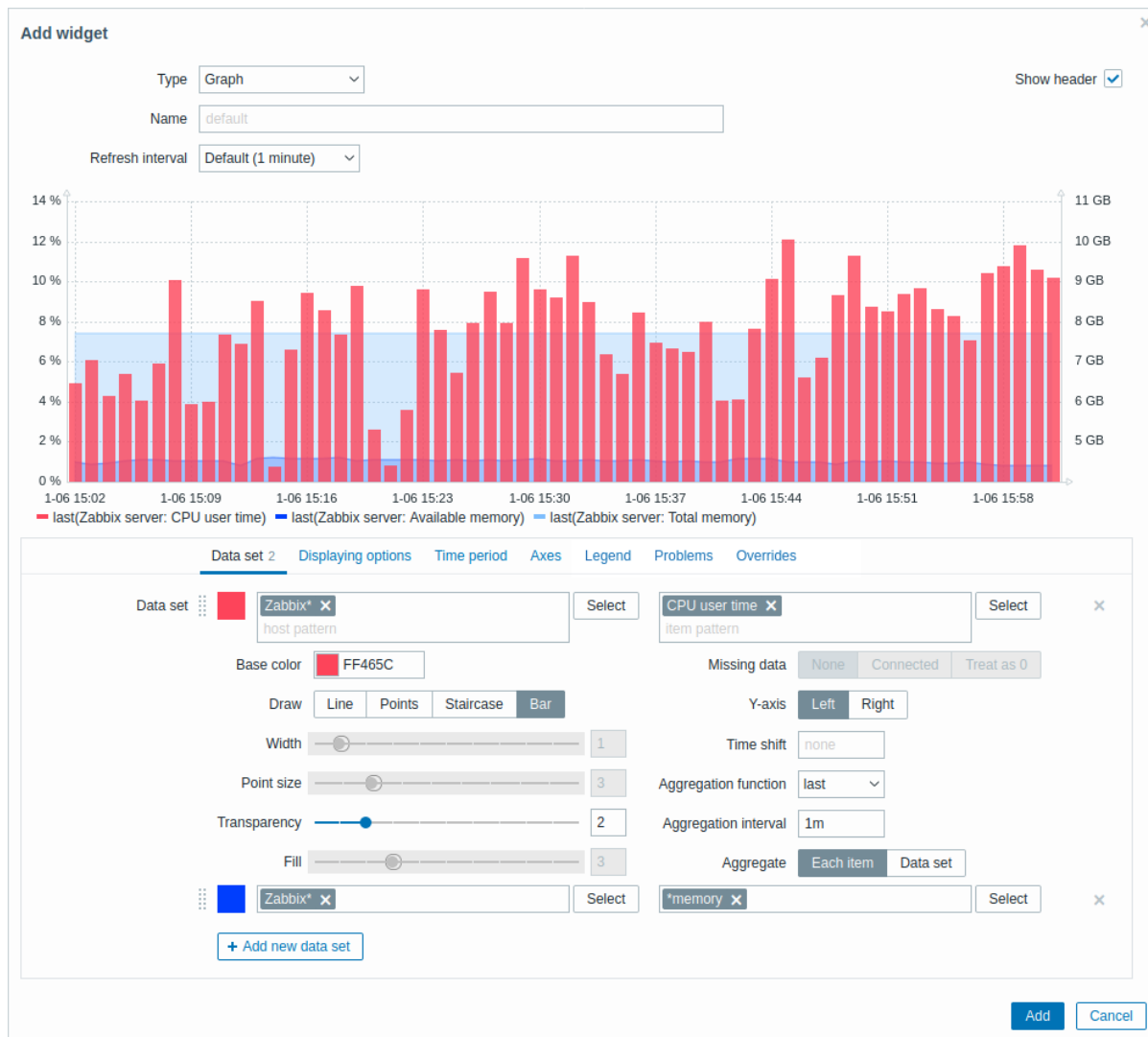
## 8 Graph

### Overview

The graph widget provides a modern and versatile way of visualizing data collected by Zabbix using a vector image drawing technique. This graph widget is supported since Zabbix 4.0. Note that the graph widget supported before Zabbix 4.0 can still be used as [Graph \(classic\)](#).

### Configuration

To configure, select *Graph* as type:



The **Data set** tab allows to add data sets and define their visual representation:

#### Data set

Select hosts and items to display on the graph. Alternatively, you may enter host and item patterns. Wildcard patterns may be used (for example, \* will return results that match zero or more characters). To specify a wildcard pattern, just enter the string manually and press *Enter*. While you are typing, note how all matching hosts are displayed in the dropdown. Up to 50 items may be displayed in the graph.

Host pattern and item pattern fields are mandatory.

The wildcard symbol is always interpreted, therefore it is not possible to add, for example, an item named "item\*" individually, if there are other matching items (e.g. item2, item3).

#### Base color

Adjust base color, either from the color picker or manually. The base color is used to calculate different colors for each item of the data set. Base color input field is mandatory.

#### Draw

Choose the draw type of the metric. Possible draw types are *Line* (set by default), *Points*, *Staircase* and *Bar*.

Note that if there's only one data point in the line/staircase graph it is drawn as a point regardless of the draw type. The point size is calculated from the line width, but it cannot be smaller than 3 pixels, even if the line width is less.

#### Width

Set the line width. This option is available when *Line* or *Staircase* draw type is selected.

#### Point size

Set the point size. This option is available when *Points* draw type is selected.

#### Transparency

Set the transparency level.

#### Fill

Set the fill level. This option is available when *Line* or *Staircase* draw type is selected.

#### Missing data

Select the option for displaying missing data:

**None** - the gap is left empty

**Connected** - two border values are connected

**Treat as 0** - the missing data is displayed as 0 values




Not applicable for the *Points* and *Bar* draw type.

#### Y-axis

Select the side of the graph where the Y-axis will be displayed.

|                             |  |
|-----------------------------|--|
| <i>Time shift</i>           | Specify time shift if required. You may use <b>time suffixes</b> in this field. Negative values are allowed.   |
| <i>Aggregation function</i> | Specify which aggregation function to use:<br><b>min</b> - display the smallest value<br><b>max</b> - display the largest value<br><b>avg</b> - display the average value<br><b>sum</b> - display the sum of values<br><b>count</b> - display the count of values<br><b>first</b> - display the first value<br><b>last</b> - display the last value<br><b>none</b> - display all values (no aggregation)<br>Aggregation allows to display an aggregated value for the chosen interval (5 minutes, an hour, a day), instead of all values. See also: <b>Aggregation in graphs</b> .<br>This option is supported since Zabbix 4.4. |
| <i>Aggregation interval</i> | Specify the interval for aggregating values. You may use <b>time suffixes</b> in this field. A numeric value without a suffix will be regarded as seconds.<br>This option is supported since Zabbix 4.4.   |
| <i>Aggregate</i>            | Specify whether to aggregate:<br><b>Each item</b> - each item in the dataset will be aggregated and displayed separately.<br><b>Data set</b> - all dataset items will be aggregated and displayed as one value.<br>This option is supported since Zabbix 4.4.  |

Existing data sets are displayed in a list. You may:

-  - click on this button to add a new data set
-  - click on the color icon to expand/collapse data set details
-  - click on the move icon and drag a data set to a new place in the list

The **Displaying options** tab allows to define history data selection:

Data set 2
Displaying options
Time period
Axes
Legend
Problems
Overrides

History data selection
Auto
History
Trends

|                               |   |
|-------------------------------|---|
| <i>History data selection</i> | Set the source of graph data:<br><b>Auto</b> - data are sourced according to the classic graph <b>algorithm</b> (default)<br><b>History</b> - data from history<br><b>Trends</b> - data from trends |
|-------------------------------|---|

The **Time period** tab allows to set a custom time period:

Data set 2
Displaying options
Time period
Axes
Legend
Problems
Overrides

Set custom time period ☒

From
now-1h

To
now

|                               |   |
|-------------------------------|---|
| <i>Set custom time period</i> | Mark this checkbox to set the custom time period for the graph (unmarked by default). |
| <i>From</i>                   | Set the start time of the custom time period for the graph.                           |

|    |   |
|----|---|
| To | Set the end time of the custom time period for the graph. |
|----|---|

The **Axes** tab allows to customize how axes are displayed:

Data set 2
Displaying options
Time period
**Axes**
Legend
Problems
Overrides

Left Y
☒ Show

Min

Max

Units
Auto

Right Y
☒ Show

Min

Max

Units
Auto

X-Axis
☒ Show

|         |   |
|---------|---|
| Left Y  | Mark this checkbox to make left Y-axis visible. The checkbox may be disabled if unselected either in <i>Data set</i> or in <i>Overrides</i> tab.  |
| Right Y | Mark this checkbox to make right Y-axis visible. The checkbox may be disabled if unselected either in <i>Data set</i> or in <i>Overrides</i> tab.   |
| X-Axis  | Unmark this checkbox to hide X-axis (marked by default).  |
| Min     | Set the minimum value of the corresponding axis. Visible range minimum value of Y-axis is specified.  |
| Max     | Set the maximum value of the corresponding axis. Visible range maximum value of Y-axis is specified.  |
| Units   | Choose the unit for the graph axis values from the dropdown. If the <i>Auto</i> option is chosen axis values are displayed using units of the first item of the corresponding axis. <i>Static</i> option allows you to assign the corresponding axis' custom name. If the <i>Static</i> option is chosen and the <i>value</i> input field left blank the corresponding axis' name will only consist of a numeric value. |

The **Legend** tab allows to customize the graph legend:

Data set 2
Displaying options
Time period
**Axes**
**Legend**
Problems
Overrides

Show legend
☒

Number of rows

|                |   |
|----------------|---|
| Show legend    | Unmark this checkbox to hide the legend on the graph (marked by default). |
| Number of rows | Set the number of rows to be displayed on the graph.                      |

The **Problems** tab allows to customize the problem display:

Data set 2
Displaying options
Time period
Axes
Legend
Problems ●
Overrides

Show problems ☒

Selected items only ☒

Problem hosts

Severity
☐ Not classified
☐ Warning
☒ High
☐ Information
☐ Average
☒ Disaster

Problem

Tags

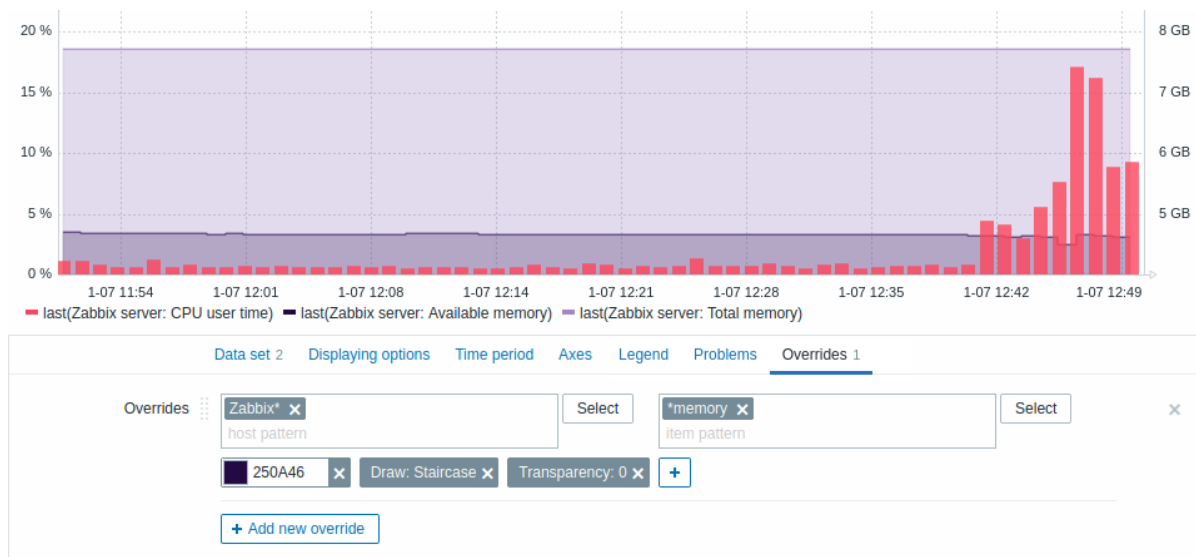
And/Or
Or

Add

|                     |  |
|---------------------|--|
| Show problems       | Mark this checkbox to enable problem displaying on the graph (unmarked, i.e. disabled by default).   |
| Selected items only | Mark this checkbox to include problems for the selected items only to be displayed on the graph.   |
| Problem hosts       | Select the problem hosts to be displayed on the graph. Wildcard patterns may be used (for example, * will return results that match zero or more characters). To specify a wildcard pattern, just enter the string manually and press <i>Enter</i> . While you are typing, note how all matching hosts are displayed in the dropdown.  |
| Severity            | Mark problem severities to filter problems to be displayed on the graph.<br>If no severities are marked, all problems will be displayed.   |
| Problem             | Specify the problem's name to be displayed on the graph.   |
| Tags                | Specify problem tags to limit the number of problems displayed in the widget. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.<br>There are several operators available for each condition:<br><b>Exists</b> - include the specified tag names<br><b>Equals</b> - include the specified tag names and values (case-sensitive)<br><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br><b>Does not exist</b> - exclude the specified tag names<br><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)<br><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br>There are two calculation types for conditions:<br><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition<br><b>Or</b> - enough if one condition is met |

The **Overrides** tab allows to add custom overrides for data sets:



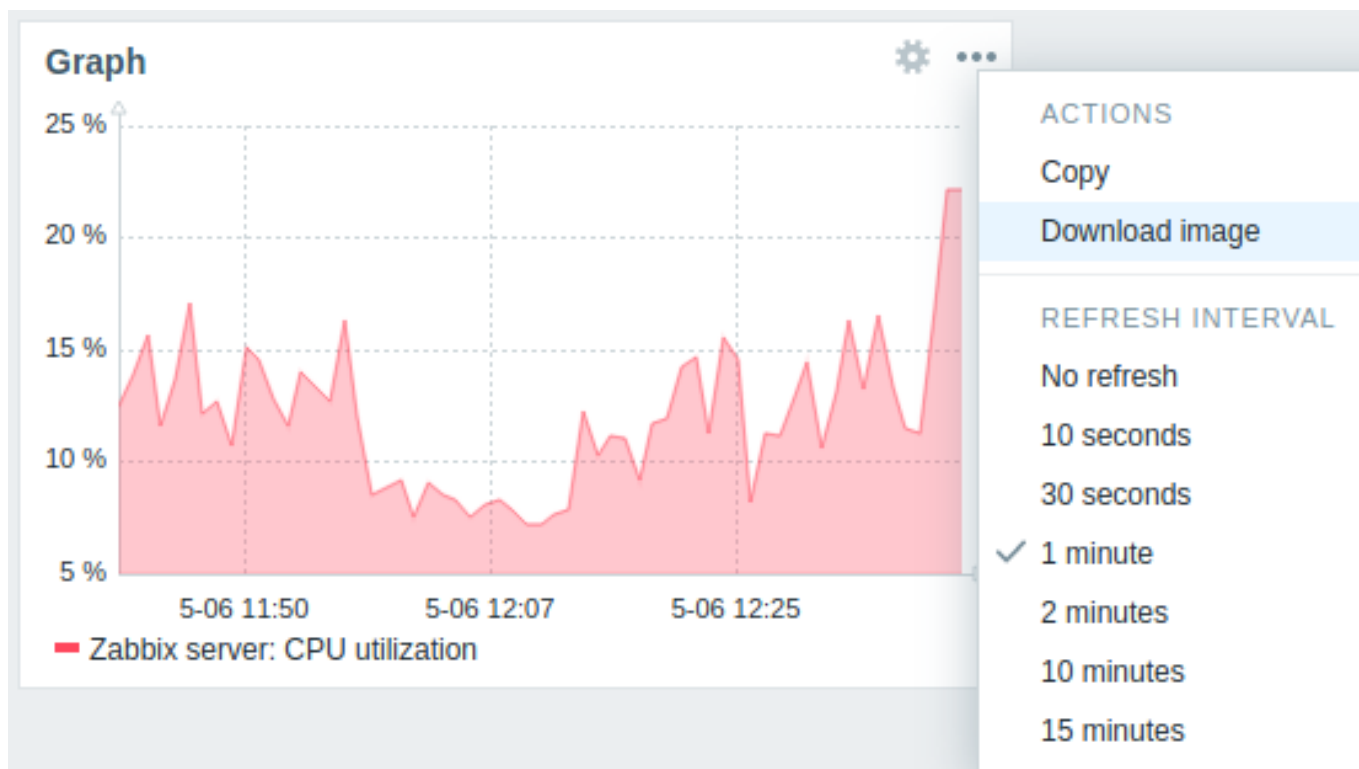


Overrides are useful when several items are selected for a data set using the \* wildcard and you want to change how the items are displayed by default (e.g. default base color or any other property).

Existing overrides (if any) are displayed in a list. To add a new override:

- Click on the **+ Add new override** button
- Select hosts and items for the override. Alternatively, you may enter host and item patterns. Wildcard patterns may be used (for example, \* will return results that match zero or more characters). To specify a wildcard pattern, just enter the string manually and press *Enter*. While you are typing, note how all matching hosts are displayed in the dropdown. The wildcard symbol is always interpreted, therefore it is not possible to add, for example, an item named "item\*" individually if there are other matching items (e.g. item2, item3). Host pattern and item pattern fields are mandatory.
- Click on **+**, to select override parameters. At least one override parameter should be selected. For parameter descriptions, see the *Data set* tab above.

Information displayed by the graph widget can be downloaded as a .png image using the **widget menu**:



A screenshot of the widget will be saved to the Downloads folder.

9 Graph (classic)

Overview

In the classic graph widget, you can display a single custom graph or simple graph.

Configuration

To configure, select *Graph (classic)* as type:

Add widget

Type

Graph (classic)

Show header

☒

Name

System load

Refresh interval

Default (1 minute)

Source

Graph

Simple graph

\* Graph

Zabbix server: System load

Select

Show legend

☒

Dynamic item

☐

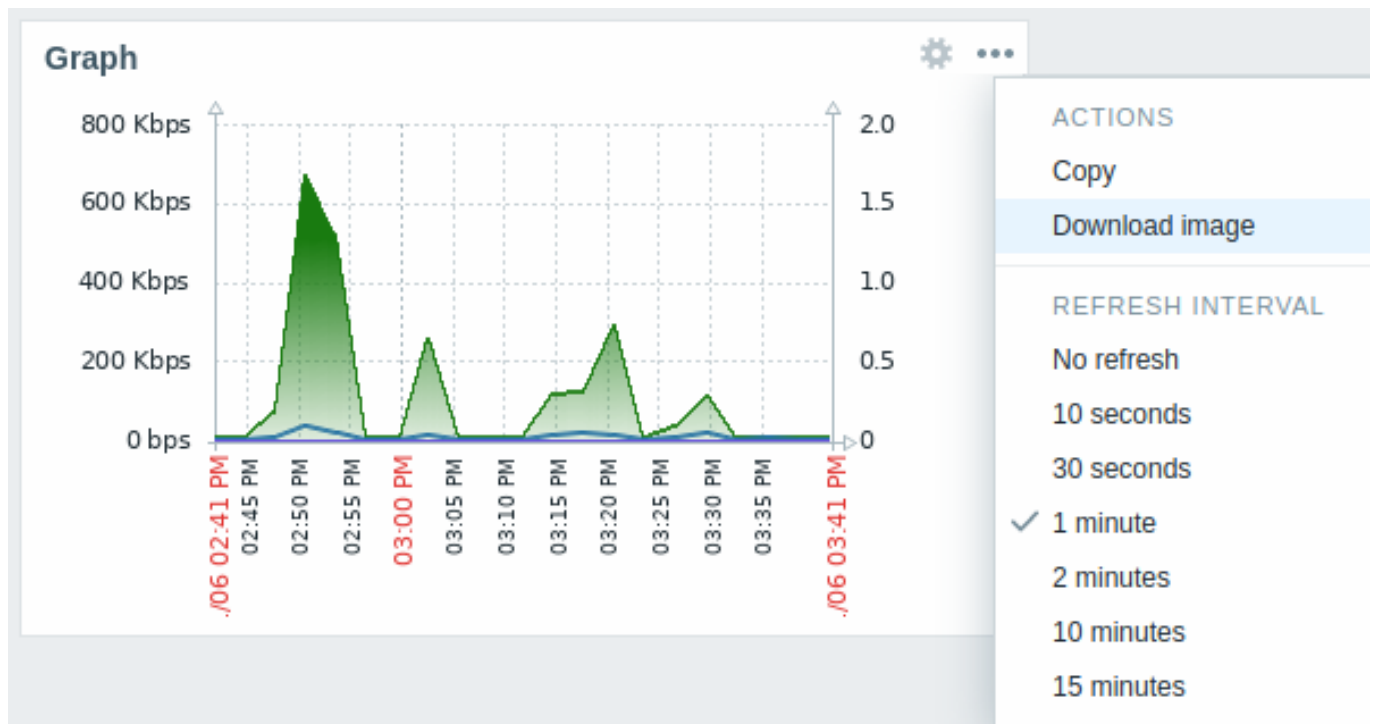
Add

Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|              |  |
|--------------|--|
| Source       | Select graph type:<br><b>Graph</b> - custom graph<br><b>Simple graph</b> - simple graph                                    |
| Graph        | Select the custom graph to display.<br>This option is available if 'Graph' is selected as <i>Source</i> .                  |
| Item         | Select the item to display in a simple graph.<br>This option is available if 'Simple graph' is selected as <i>Source</i> . |
| Show legend  | Unmark this checkbox to hide the legend on the graph (marked by default).  |
| Dynamic item | Set graph to display different data depending on the selected host.  |

Information displayed by the classic graph widget can be downloaded as .png image using the **widget menu**:



A screenshot of the widget will be saved to the Downloads folder.

10 Graph prototype

#### Overview

In the graph prototype widget, you can display a grid of graphs created from either a graph prototype or an item prototype by low-level discovery.

#### Configuration

To configure, select *Graph prototype* as widget type:

Add widget

Type
Graph prototype

Show header
☒

Name
Graph prototype

Refresh interval
Default (1 minute)

Source
Graph prototype
Simple graph prototype

\* Graph prototype
Zabbix server: Interface {#IFNAME}: Network traffic
Select

Show legend
☒

Dynamic item
☐

\* Columns
2

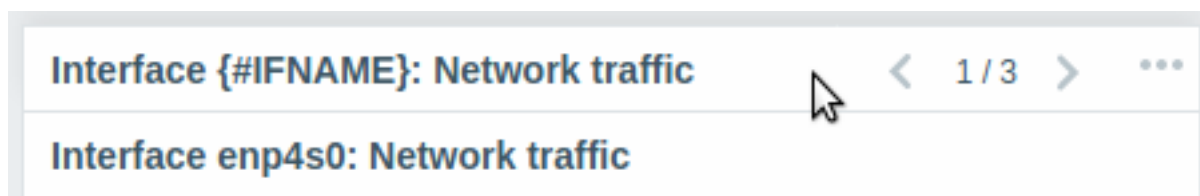
\* Rows
1

Add
Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                        |  |
|------------------------|--|
| <i>Source</i>          | Select source: either a <b>Graph prototype</b> or a <b>Simple graph prototype</b> .  |
| <i>Graph prototype</i> | Select a graph prototype to display discovered graphs of the graph prototype.<br>This option is available if 'Graph prototype' is selected as Source.                            |
| <i>Item prototype</i>  | Select an item prototype to display simple graphs based on discovered items of an item prototype.<br>This option is available if 'Simple graph prototype' is selected as Source. |
| <i>Show legend</i>     | Mark this checkbox to show the legend on the graphs (marked by default).   |
| <i>Dynamic item</i>    | Set graphs to display different data depending on the selected host.   |
| <i>Columns</i>         | Enter the number of columns of graphs to display within a graph prototype widget.  |
| <i>Rows</i>            | Enter the number of rows of graphs to display within a graph prototype widget.   |

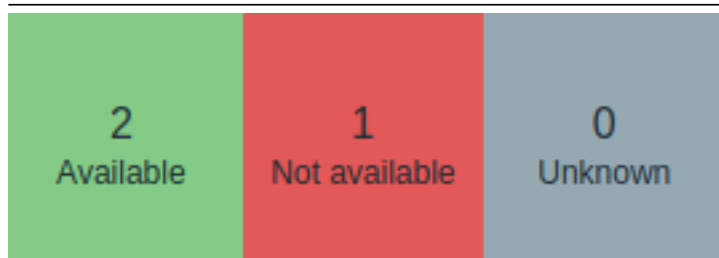
While the *Columns* and *Rows* settings allow fitting more than one graph in the widget, there still may be more discovered graphs than there are columns/rows in the widget. In this case paging becomes available in the widget and a slide-up header allows to switch between pages using the left and right arrows.



## 11 Host availability

### Overview

In the host availability widget, high-level statistics about host availability are displayed in four colored columns/lines.



Horizontal display (columns).



Vertical display (lines).

Host availability in each column/line is counted as follows:

- *Available* - hosts with all interfaces available
- *Not available* - hosts with at least one interface unavailable
- *Unknown* - hosts with at least one interface unknown (none unavailable)
- *Total* - total of all hosts

#### Configuration

To configure, select *Host availability* as type:

Add widget
×

Type
Host availability
Show header
☒

Name
Host availability

Refresh interval
Default (15 minutes)

Host groups
Zabbix servers
Select
type here to search

Interface type
☒ Zabbix agent
☐ SNMP
☐ JMX
☐ IPMI

Layout
Horizontal
Vertical

Show hosts in maintenance
☐

Add
Cancel

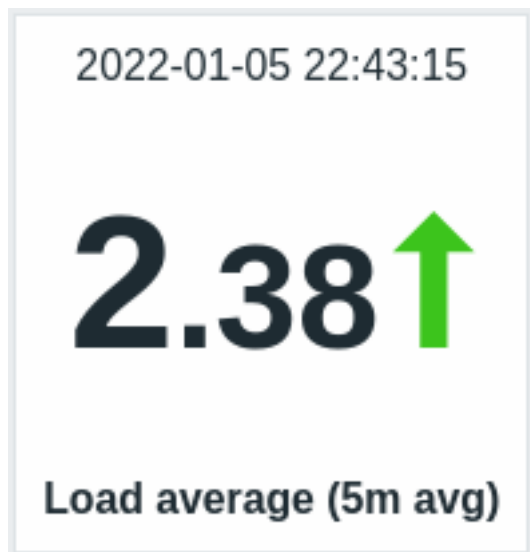
In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                                  |   |
|----------------------------------|---|
| <i>Host groups</i>               | Select host group(s). This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups. Scroll down to select. Click on 'x' to remove the selected. |
| <i>Interface type</i>            | Select which host interfaces you want to see availability data for.<br>Availability of all interfaces is displayed by default if nothing is selected.   |
| <i>Layout</i>                    | Select horizontal display (columns) or vertical display (lines).  |
| <i>Show hosts in maintenance</i> | Include hosts that are in maintenance in the statistics.  |

## 12 Item value

### Overview

This widget is useful for displaying the value of a single item prominently.



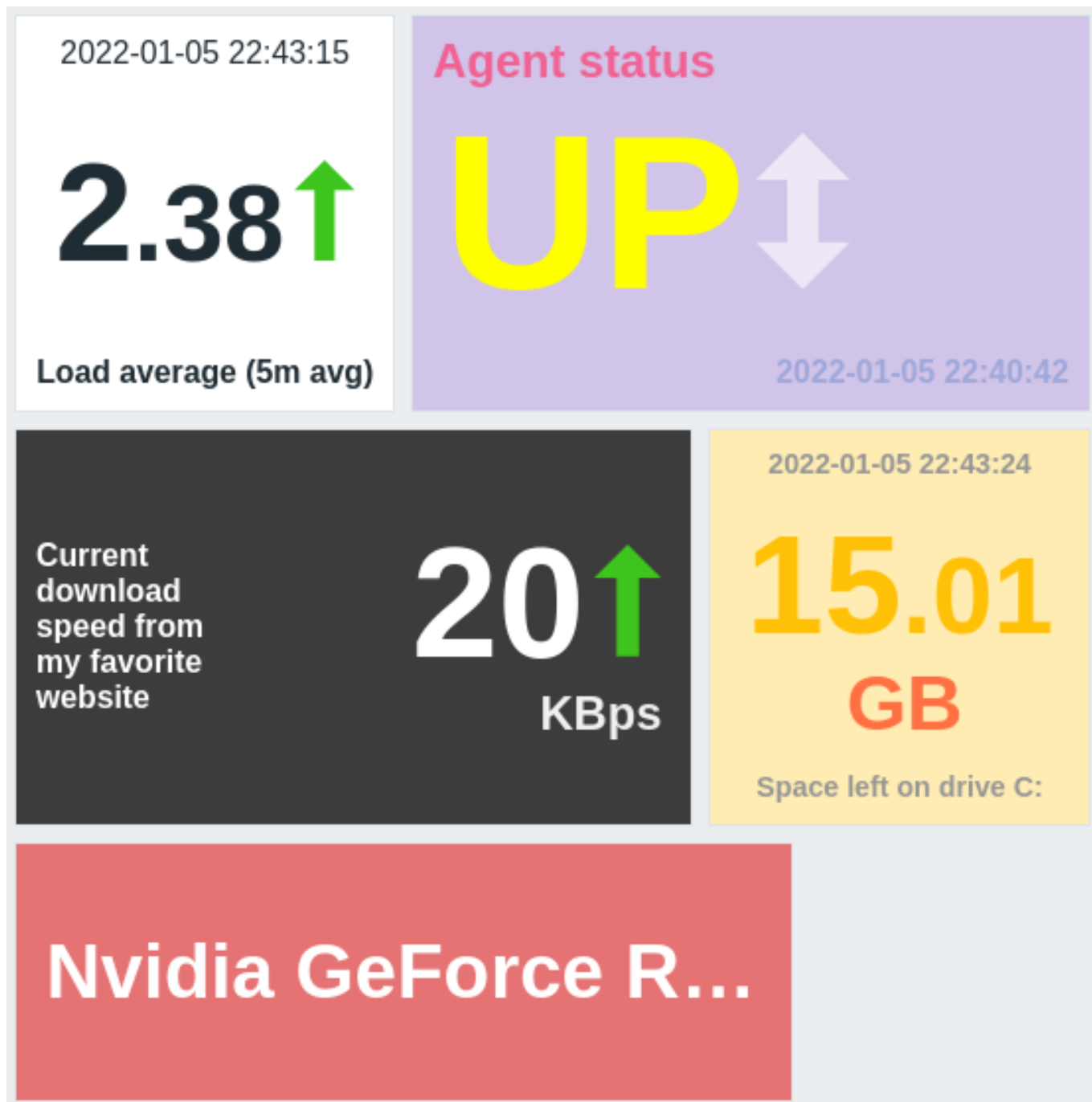
Besides the value itself, additional elements can be displayed, if desired:

- time of the metric
- item description
- change indicator for the value
- item unit

The widget can display numeric and string values. String values are displayed on a single line and truncated, if needed. "No data" is displayed, if there is no value for the item.

Clicking on the value leads to an ad-hoc graph for numeric items or latest data for string items.

The widget and all elements in it can be visually fine-tuned using **advanced configuration** options, allowing to create a wide variety of visual styles:



#### Configuration

To configure, select *Item value* as the widget type:

×

Edit widget

Type

Item value

▼

Show header

☒

Name

Item value

Refresh interval

Default (1 minute)

▼

\* Item

New host: CPU load average

×

Select

\* Show

☒ Description

☒ Value

☒ Time

☒ Change indicator

Advanced configuration

☐

Dynamic item

☐

Apply

Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                               |  |
|-------------------------------|--|
| <b>Item</b>                   | Select the item.   |
| <b>Show</b>                   | Mark the checkbox to display the respective element (description, value, time, change indicator).<br>Unmark to hide.<br>At least one element must be selected. |
| <b>Advanced configuration</b> | Mark the checkbox to display <b>advanced configuration</b> options.  |
| <b>Dynamic item</b>           | Mark the checkbox to display a different value depending on the selected host.   |

#### Advanced configuration

Advanced configuration options become available if the *Advanced configuration* checkbox is marked (see screenshot) and only for those elements that are selected in the *Show* field (see above).

Additionally, advanced configuration allows to change the background color for the whole widget.



## Advanced configuration



\* Description ?

{ITEM.NAME}

Horizontal position

Left

Center

Right

Size

15

%

Vertical position

Top

Middle

Bottom

Bold

☐

Color

D

Value

Decimal places

2

Size

35

%

Horizontal position

Left

Center

Right

Size

45

%

Vertical position

Top

Middle

Bottom

Bold

☒

Color

D



Units

Position

After value



Size

35

%

Bold

☒

Color

D

Time

Horizontal position

Left

Center

Right

Size

15

%

Vertical position

Top

Middle

Bottom

Bold

☐

Color

D

Change indicator



D



D



D

Background color

D

### Description

Enter the item description. This description may override the default item name. Multiline descriptions are supported. A combination of text and supported macros is possible. {HOST.\*}, {ITEM.\*}, {INVENTORY.\*} and user macros are supported.

Horizontal position

Select horizontal position of the item description - left, right or center.

Vertical position

Select vertical position of the item description - top, bottom or middle.

Size

Enter font size height for the item description (in percent relative to total widget height).

Bold

Mark the checkbox to display item description in bold type.

Color

Select the item description color from the color picker.

D stands for default color (depends on the frontend theme). To return to the default value, click the *Use default* button in the color picker.

### Value

Decimal places

Select how many decimal places will be displayed with the value. This value will affect only float items. For items with units set to "s", if this value is greater than 0 (the default is 2), the widget rounds the most significant time unit and displays a numeric value (e.g. "10.43m") instead of converting the value into a full time string. When set to 0, the seconds are converted to a human-readable time string (for example, "4h 56m 30s").

Size

Enter font size height for the decimal places (in percent relative to total widget height).

Horizontal position

Select horizontal position of the item value - left, right or center.

|                            |  |
|----------------------------|--|
| <i>Vertical position</i>   | Select vertical position of the item value - top, bottom or middle.  |
| <i>Size</i>                | Enter font size height for the item value (in percent relative to total widget height).<br><i>Note</i> that the size of item value is prioritised; other elements have to concede space for the value. With the change indicator though, if the value is too large, it will be truncated to show the change indicator.   |
| <i>Bold</i>                | Mark the checkbox to display item value in bold type.  |
| <i>Color</i>               | Select the item value color from the color picker.<br>D stands for default color (depends on the frontend theme). To return to the default value, click the <i>Use default</i> button in the color picker.   |
| <i>Units</i>               | Mark the checkbox to display units with the item value. If you enter a unit name, it will override the unit from item configuration.   |
| <i>Position</i>            | Select the item unit position - above, below, before or after the value.   |
| <i>Size</i>                | Enter font size height for the item unit (in percent relative to total widget height).   |
| <i>Bold</i>                | Mark the checkbox to display item unit in bold type.   |
| <i>Color</i>               | Select the item unit color from the color picker.<br>D stands for default color (depends on the frontend theme). To return to the default value, click the <i>Use default</i> button in the color picker.  |
| <b>Time</b>                | Time is the clock value from item history.   |
| <i>Horizontal position</i> | Select horizontal position of the time - left, right or center.  |
| <i>Vertical position</i>   | Select vertical position of the time - top, bottom or middle.  |
| <i>Size</i>                | Enter font size height for the time (in percent relative to total widget height).  |
| <i>Bold</i>                | Mark the checkbox to display time in bold type.  |
| <i>Color</i>               | Select the time color from the color picker.<br>D stands for default color (depends on the frontend theme). To return to the default value, click the <i>Use default</i> button in the color picker.   |
| <b>Change indicator</b>    | Select the color of change indicators from the color picker. The change indicators are as follows:<br>↑ - item value is up (for numeric items)<br>↓ - item value is down (for numeric items)<br>⇕ - item value has changed (for string items and items with value mapping)<br>D stands for default color (depends on the frontend theme). To return to the default value, click the <i>Use default</i> button in the color picker.<br>Vertical size of the change indicator is equal to the size of the value (integer part of the value for numeric items).<br><i>Note</i> that up and down indicators are not shown with just one value. |
| <b>Background color</b>    | Select the background color for the whole widget from the color picker.<br>D stands for default color (depends on the frontend theme). To return to the default value, click the <i>Use default</i> button in the color picker.  |

*Note* that multiple elements cannot occupy the same space; if they are placed in the same space, an error message will be displayed.

## 13 Map

### Overview

In the map widget you can display either:

- a single configured network map;
- one of the configured network maps in the **map navigation tree** (when clicking on the map name in the tree).

### Configuration

To configure, select *Map* as type:

Add widget
? ×

Type
Map
Show header
☒

Name
Local network

Refresh interval
Default (15 minutes)

Source type
Map
Map navigation tree

\* Map
Local network
Select

Add
Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|             |  |
|-------------|--|
| Source type | Select to display:<br><b>Map</b> - network map;<br><b>Map navigation tree</b> - one of the maps in the selected map navigation tree.   |
| Map         | Select the map to display.<br>This field is auto-complete so starting to type the name of a map will offer a dropdown of matching maps.  |
| Filter      | This option is available if 'Map' is selected as <i>Source type</i> .<br>Select the map navigation tree to display the maps of.<br>This option is available if 'Map navigation tree' is selected as <i>Source type</i> . |

## 14 Map navigation tree

### Overview

This widget allows building a hierarchy of existing maps while also displaying problem statistics with each included map and map group.

It becomes even more powerful if you link the *Map* widget to the navigation tree. In this case, clicking on a map name in the navigation tree displays the map in full in the *Map* widget.



Statistics with the top-level map in the hierarchy display a sum of problems of all submaps and their own problems.

### Configuration

To configure, select *Map navigation tree* as type:

Add widget

Type

Map navigation tree

Show header

☒

Name

Map tree

Refresh interval

Default (15 minutes)

Show unavailable maps

☐

Add

Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                              |   |
|------------------------------|---|
| <i>Show unavailable maps</i> | <p>Mark this checkbox to display maps that the user does not have read permission to. Unavailable maps in the navigation tree will be displayed with a grayed-out icon.</p> <p>Note that if this checkbox is marked, available <b>submaps</b> are displayed even if the parent level map is unavailable. If unmarked, available submaps to an unavailable parent map will not be displayed at all.</p> <p>Problem count is calculated based on available maps and available map elements.</p> |
|------------------------------|---|

Navigation tree elements are displayed in a list. You can:

- drag an element (including its child elements) to a new place in the list;
- expand or collapse an element to display or hide its child elements;
- add a child element (with or without a linked map) to an element;
- add multiple child elements (with linked maps) to an element;
- edit an element;
- remove an element (including its child elements).

Map tree

root

+

▼ All

+

×

Stockholm

+

×

London

+

×

► Munich

+

×

#### Element configuration

To configure a navigation tree element, either add a new element or edit an existing element.

×

Edit tree element

\* Name

London

Linked map

London network ×

Select

☐

Add submaps

Add

Cancel

The following navigation tree element configuration parameters are available:

|                    |   |
|--------------------|---|
| <i>Name</i>        | Enter the navigation tree element name.   |
| <i>Linked map</i>  | Select the map to link to the navigation tree element.<br>This field is auto-complete so starting to type the name of a map will offer a dropdown of matching maps. |
| <i>Add submaps</i> | Mark this checkbox to add the <b>submaps</b> of the linked map as child elements to the navigation tree element.  |

## 15 Plain text

### Overview

In the plain text widget, you can display the latest item data in plain text.

### Configuration

To configure, select *Plain text* as type:

×

Add widget

Type

Plain text ▾

Show header

☒

Name

Available memory

Refresh interval

Default (1 minute) ▾

\* Items

Zabbix server: Available memory ×

type here to search

Select

Items location

Left

Top

\* Show lines

25

Show text as HTML

☐

Dynamic items

☐

Add

Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                          |  |
|--------------------------|--|
| <i>Items</i>             | Select the items.  |
| <i>Items location</i>    | Choose the location of selected items to be displayed in the widget. |
| <i>Show lines</i>        | Set how many latest data lines will be displayed in the widget.      |
| <i>Show text as HTML</i> | Set to display text as HTML.   |
| <i>Dynamic item</i>      | Set to display different data depending on the selected host.        |

16 Problem hosts

Overview

In the problem host widget, you can display high-level information about host availability.

Configuration

To configure, select *Problem hosts* as type:

Add widget

Type

Problem hosts

Show header

☒

Name

Problem hosts

Refresh interval

Default (1 minute)

Host groups

Linux servers

type here to search

Select

Exclude host groups

type here to search

Select

Hosts

type here to search

Select

Problem

Severity

☐ Not classified

☐ Warning

☐ High

☐ Information

☐ Average

☐ Disaster

Tags

And/Or

Or

tag

Contains

value

Remove

Add

Show suppressed problems

☐

Hide groups without problems

☐

Problem display

All

Separated

Unacknowledged only

Add

Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                    |   |
|--------------------|---|
| <i>Host groups</i> | Enter host groups to display in the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.<br>Specifying a parent host group implicitly selects all nested host groups.<br>Host data from these host groups will be displayed in the widget. If no host groups are entered, all host groups will be displayed. |
|--------------------|---|

|                                     |   |
|-------------------------------------|---|
| <i>Exclude host groups</i>          | <p>Enter host groups to hide from the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.</p> <p>Specifying a parent host group implicitly selects all nested host groups.</p> <p>Host data from these host groups will not be displayed in the widget. For example, hosts 001, 002, 003 may be in Group A and hosts 002, 003 in Group B as well. If we select to <i>show</i> Group A and <i>exclude</i> Group B at the same time, only data from host 001 will be displayed in the Dashboard.</p>  |
| <i>Hosts</i>                        | <p>Enter hosts to display in the widget. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts.</p> <p>If no hosts are entered, all hosts will be displayed.</p>   |
| <i>Problem</i>                      | <p>You can limit the number of problem hosts displayed by the problem name. If you enter a string here, only those hosts with problems whose name contains the entered string will be displayed.</p> <p>Macros are not expanded.</p>  |
| <i>Severity</i>                     | <p>Mark problem severities to filter problems to be displayed in the widget.</p> <p>If no severities are marked, all problems will be displayed.</p>  |
| <i>Tags</i>                         | <p>Specify problem tags to limit the number of problems displayed in the widget. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.</p> <p>There are several operators available for each condition:</p> <p><b>Exists</b> - include the specified tag names</p> <p><b>Equals</b> - include the specified tag names and values (case-sensitive)</p> <p><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p><b>Does not exist</b> - exclude the specified tag names</p> <p><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)</p> <p><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p>There are two calculation types for conditions:</p> <p><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition</p> <p><b>Or</b> - enough if one condition is met</p> |
| <i>Show suppressed problems</i>     | <p>Mark the checkbox to display problems that would otherwise be suppressed (not shown) because of host maintenance.</p>  |
| <i>Hide groups without problems</i> | <p>Mark the <i>Hide groups without problems</i> option to hide data from host groups without problems in the widget.</p>  |
| <i>Problem display</i>              | <p>Display problem count as:</p> <p><b>All</b> - full problem count will be displayed</p> <p><b>Separated</b> - unacknowledged problem count will be displayed separated as a number of the total problem count</p> <p><b>Unacknowledged only</b> - only the unacknowledged problem count will be displayed.</p>  |

## 17 Problems

### Overview

In this widget you can display current problems. The information in this widget is similar to *Monitoring → Problems*.

### Configuration

To configure, select *Problems* as type:

Add widget

Type
Problems
Show header

Name
Problems

Refresh interval
Default (1 minute)

Show
Recent problems
Problems
History

Host groups
type here to search
Select

Exclude host groups
type here to search
Select

Hosts
type here to search
Select

Problem

Severity
☐ Not classified
☐ Warning
☐ High
☐ Information
☐ Average
☐ Disaster

Tags
And/Or
Or
tag
Contains
value
Add

Show tags
None
1
2
3

Add
Cancel

You can limit how many problems are displayed in the widget in various ways - by problem status, problem name, severity, host group, host, event tag, acknowledgment status, etc.

#### Show

Filter by problem status:

**Recent problems** - unresolved and recently resolved problems are displayed (default)

**Problems** - unresolved problems are displayed

**History** - history of all events is displayed

#### Host groups

Enter host groups to display problems of in the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.

Specifying a parent host group implicitly selects all nested host groups.

Problems from these host groups will be displayed in the widget. If no host groups are entered, problems from all host groups will be displayed.

#### Exclude host groups

Enter host groups to hide problems of from the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.

Specifying a parent host group implicitly selects all nested host groups.

Problems from these host groups will not be displayed in the widget. For example, hosts 001, 002, 003 may be in Group A and hosts 002, 003 in Group B as well. If we select to *show* Group A and *exclude* Group B at the same time, only problems from host 001 will be displayed in the widget.

#### Hosts

Enter hosts to display problems of in the widget. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts.

If no hosts are entered, problems of all hosts will be displayed.



|                                 |   |
|---------------------------------|---|
| <i>Problem</i>                  | You can limit the number of problems displayed by their name. If you enter a string here, only those problems whose name contains the entered string will be displayed. Macros are not expanded.  |
| <i>Severity</i>                 | Mark problem severities to filter problems to be displayed in the widget.<br>If no severities are marked, all problems will be displayed.   |
| <i>Tags</i>                     | Specify problem tags to limit the number of problems displayed in the widget. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.<br>There are several operators available for each condition:<br><b>Exists</b> - include the specified tag names<br><b>Equals</b> - include the specified tag names and values (case-sensitive)<br><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br><b>Does not exist</b> - exclude the specified tag names<br><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)<br><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br>There are two calculation types for conditions:<br><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition<br><b>Or</b> - enough if one condition is met<br>When filtered, the tags specified here will be displayed first with the problem, unless overridden by the <i>Tag display priority</i> (see below) list. |
| <i>Show tags</i>                | Select the number of displayed tags:<br><b>None</b> - no <i>Tags</i> column in <i>Monitoring</i> → <i>Problems</i><br><b>1</b> - <i>Tags</i> column contains one tag<br><b>2</b> - <i>Tags</i> column contains two tags<br><b>3</b> - <i>Tags</i> column contains three tags<br>To see all tags for the problem roll your mouse over the three dots icon.   |
| <i>Tag name</i>                 | Select tag name display mode:<br><b>Full</b> - tag names and values are displayed in full<br><b>Shortened</b> - tag names are shortened to 3 symbols; tag values are displayed in full<br><b>None</b> - only tag values are displayed; no names   |
| <i>Tag display priority</i>     | Enter tag display priority for a problem, as a comma-separated list of tags (for example: <i>Services, Applications, Application</i> ). Tag names only should be used, no values. The tags of this list will always be displayed first, overriding the natural ordering by alphabet.  |
| <i>Show operational data</i>    | Select the mode for displaying <b>operational data</b> :<br><b>None</b> - no operational data is displayed<br><b>Separately</b> - operational data is displayed in a separate column<br><b>With problem name</b> - append operational data to the problem name, using parentheses for the operational data  |
| <i>Show suppressed problems</i> | Mark the checkbox to display problems that would otherwise be suppressed (not shown) because of host maintenance.   |
| <i>Show unacknowledged only</i> | Mark the checkbox to display unacknowledged problems only.  |
| <i>Sort entries by</i>          | Sort entries by:<br><b>Time</b> (descending or ascending)<br><b>Severity</b> (descending or ascending)<br><b>Problem name</b> (descending or ascending)<br><b>Host</b> (descending or ascending).   |
| <i>Show timeline</i>            | Mark the checkbox to display a visual timeline.   |
| <i>Show lines</i>               | Specify the number of problem lines to display.   |

## 18 Problems by severity

### Overview

In this widget, you can display problems by severity. You can limit what hosts and triggers are displayed in the widget and define how the problem count is displayed.

### Configuration

To configure, select *Problems by severity* as type:

Add widget

TypeProblems by severityShow header

NameProblems by severity

Refresh intervalDefault (1 minute)

Host groupstype here to searchSelect

Exclude host groupstype here to searchSelect

Hoststype here to searchSelect

Problem

Severity☐ Not classified☐ Warning☐ High☐ Information☐ Average☐ Disaster

TagsAnd/Or Or

tagContainsvalueRemove

Add

ShowHost groupsTotals

LayoutHorizontalVertical

Show operational dataNoneSeparatelyWith problem name

Show suppressed problems

Hide groups without problems

Problem displayAllSeparatedUnacknowledged only

Show timeline

AddCancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                            |   |
|----------------------------|---|
| <i>Host groups</i>         | Enter host groups to display in the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.<br>Specifying a parent host group implicitly selects all nested host groups.<br>Host data from these host groups will be displayed in the widget. If no host groups are entered, all host groups will be displayed.   |
| <i>Exclude host groups</i> | Enter host groups to hide from the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.<br>Specifying a parent host group implicitly selects all nested host groups.<br>Host data from these host groups will not be displayed in the widget. For example, hosts 001, 002, 003 may be in Group A and hosts 002, 003 in Group B as well. If we select to <i>show</i> Group A and <i>exclude</i> Group B at the same time, only data from host 001 will be displayed in the Dashboard. |
| <i>Hosts</i>               | Enter hosts to display in the widget. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts.<br>If no hosts are entered, all hosts will be displayed.  |
| <i>Problem</i>             | You can limit the number of problem hosts displayed by the problem name. If you enter a string here, only those hosts with problems whose name contains the entered string will be displayed.<br>Macros are not expanded.   |
| <i>Severity</i>            | Mark problem severities to filter problems to be displayed in the widget.<br>If no severities are marked, all problems will be displayed.   |

|                                     |   |
|-------------------------------------|---|
| <i>Tags</i>                         | <p>Specify problem tags to limit the number of problems displayed in the widget. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.</p> <p>There are several operators available for each condition:</p> <p><b>Exists</b> - include the specified tag names</p> <p><b>Equals</b> - include the specified tag names and values (case-sensitive)</p> <p><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p><b>Does not exist</b> - exclude the specified tag names</p> <p><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)</p> <p><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p>There are two calculation types for conditions:</p> <p><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition</p> <p><b>Or</b> - enough if one condition is met</p> |
| <i>Show</i>                         | <p>Select the show option:</p> <p><b>Host groups</b> - display problems per host group</p> <p><b>Totals</b> - display a problem total for all selected host groups in colored blocks corresponding to the problem severity.</p>   |
| <i>Layout</i>                       | <p>Select the layout option:</p> <p><b>Horizontal</b> - colored blocks of totals will be displayed horizontally</p> <p><b>Vertical</b> - colored blocks of totals will be displayed vertically</p> <p>This field is available for editing if 'Totals' is selected as the <i>Show</i> option.</p>  |
| <i>Show operational data</i>        | <p>Display operational data (see description of <i>Operational data</i> in <i>Monitoring &gt; Problems</i>) as:</p> <p><b>None</b> - operational data will not be displayed</p> <p><b>Separately</b> - operational data will be displayed as a separate line</p> <p><b>With problem name</b> - operational data will be displayed together with the problem name.</p>   |
| <i>Show suppressed problems</i>     | <p>Mark the checkbox to display problems that would otherwise be suppressed (not shown) because of host maintenance.</p>  |
| <i>Hide groups without problems</i> | <p>Mark the <i>Hide groups without problems</i> option to hide data from host groups without problems in the widget.</p>  |
| <i>Problem display</i>              | <p>Display problem count as:</p> <p><b>All</b> - full problem count will be displayed</p> <p><b>Separated</b> - unacknowledged problem count will be displayed separated as a number of the total problem count</p> <p><b>Unacknowledged only</b> - only the unacknowledged problem count will be displayed.</p>  |
| <i>Show timeline</i>                | <p>Mark the checkbox to display a visual timeline.</p>  |

## 19 SLA report

### Overview

This widget is useful for displaying *SLA reports*. Functionally it is similar to the *Services -> SLA report* section.

### Configuration

To configure, select *SLA report* as type:

### Edit widget

|      |            |   |
|------|------------|---|
| Type | SLA report | ▼ |
|------|------------|---|

Show header ☒

|      |      |
|------|------|
| Name | SLA3 |
|------|------|

|                  |                      |   |
|------------------|----------------------|---|
| Refresh interval | Default (No refresh) | ▼ |
|------------------|----------------------|---|

\* SLA SLA:3 X Select

| Service | type here to search | Select |
|---------|---------------------|--------|
|---------|---------------------|--------|

|              |    |
|--------------|----|
| Show periods | 15 |
|--------------|----|

From

To YYYY-MM-DD

Apply

Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                     |   |
|---------------------|---|
| <i>SLA</i>          | Select the SLA for the report.  |
| <i>Service</i>      | Select the service for the report.  |
| <i>Show periods</i> | Set how many periods will be displayed in the widget (20 by default, 100 maximum).  |
| <i>From</i>         | Select the beginning date for the report.<br><b>Relative dates</b> are supported: now, now/d, now/w-1w etc; supported date modifiers: d, w, M, y. |
| <i>To</i>           | Select the end date for the report.<br><b>Relative dates</b> are supported: now, now/d, now/w-1w etc; supported date modifiers: d, w, M, y.       |

## 20 System information

## Overview

This widget displays the same information as in *Reports* → *System information*, however, a single dashboard widget can only display either the system stats or the high availability nodes at a time (not both).

## Configuration

To configure, select *System information* as type:

Add widget

×

Type

System information

Show header

☒

Name

System information

Refresh interval

Default (15 minutes)

Show

System stats

High availability nodes

Add

Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

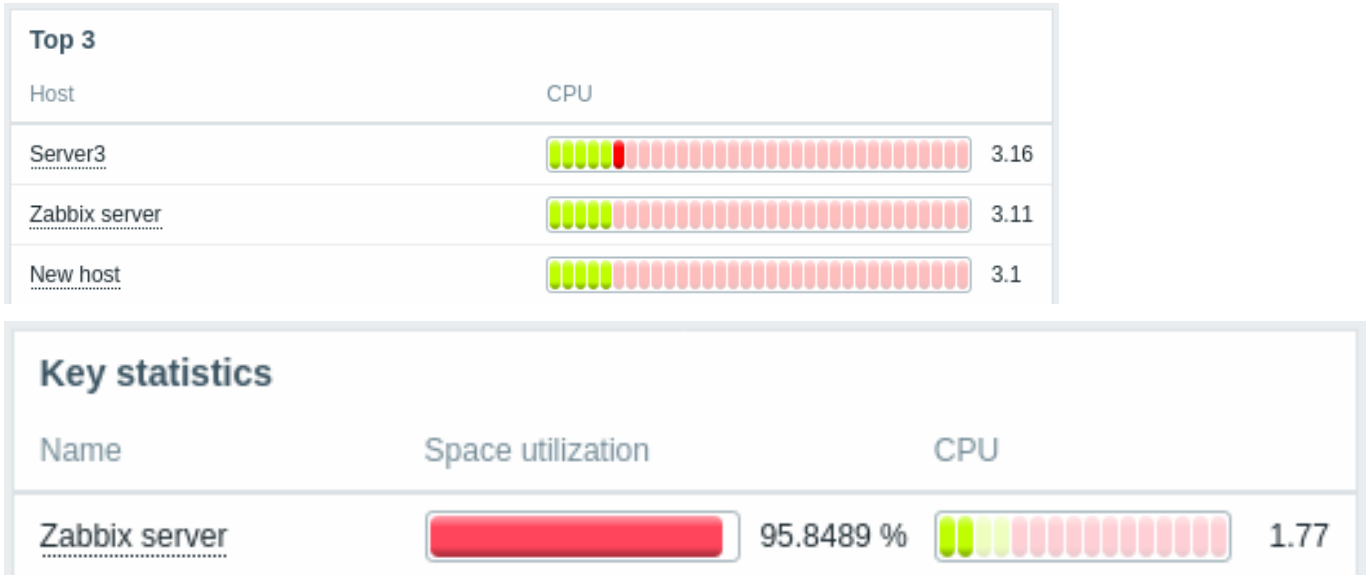
|      |  |
|------|--|
| Show | Select what to display:<br><b>System stats</b> - display a summary of key Zabbix server and system data;<br><b>High availability nodes</b> - display the status of high availability nodes (if <b>high availability cluster</b> is enabled). |
|------|--|

## 21 Top hosts

### Overview

This widget provides a way to create custom tables for displaying the data situation, allowing to display *Top N*-like reports and progress-bar reports useful for capacity planning.

The maximum number of hosts that can be displayed is 100.



### Configuration

To configure, select *Top hosts* as type:

Add widget

×

Type

Top hosts

Show header

☒

Name

default

Refresh interval

Default (1 minute)

Host groups

type here to search

Select

Hosts

type here to search

Select

Host tags

And/Or

Or

tag

Contains

value

Remove

Add

\* Columns

Add

Order

Top N

Bottom N

\* Order column

Add item column

\* Host count

10

Add

Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                     |   |
|---------------------|---|
| <i>Host groups</i>  | Host groups to display data for.  |
| <i>Hosts</i>        | Hosts to display data for.  |
| <i>Host tags</i>    | Specify tags to limit the number of hosts displayed in the widget. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.<br><br>There are several operators available for each condition:<br><b>Exists</b> - include the specified tag names<br><b>Equals</b> - include the specified tag names and values (case-sensitive)<br><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br><b>Does not exist</b> - exclude the specified tag names<br><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)<br><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br>There are two calculation types for conditions:<br><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition<br><b>Or</b> - enough if one condition is met |
| <i>Columns</i>      | Add data <b>columns</b> to display.<br>The column order determines their display from left to right.  |
| <i>Order</i>        | Columns can be reordered by dragging up and down by the handle before the column name.<br>Specify the ordering of rows:<br><b>Top N</b> - in descending order by the <i>Order column</i> aggregated value<br><b>Bottom N</b> - in ascending order by the <i>Order column</i> aggregated value   |
| <i>Order column</i> | Specify the column from the defined <i>Columns</i> list to use for <i>Top N</i> or <i>Bottom N</i> ordering.  |
| <i>Host count</i>   | Count of host rows to be shown (1-100).   |

New column

Name

Data

Item value

\* Item

type here to search

Select

Time shift

none

Aggregation function

none

Display

As is

Bar

Indicators

History data

Auto

History

Trends

Base color

Thresholds

Threshold

Action

Add

Add

Cancel

Common column parameters:

|                   |  |
|-------------------|--|
| <i>Name</i>       | Name of the column.  |
| <i>Data</i>       | Data type to display in the column:<br><b>Item value</b> - value of the specified item<br><b>Host name</b> - host name of the item specified in the <i>Item value</i> column<br><b>Text</b> - static text string                                     |
| <i>Base color</i> | Background color of the column; fill color if <i>Item value</i> data is displayed as bar/indicators.<br>For <i>Item value</i> data the default color can be overridden by custom color, if the item value is over one of the specified "Thresholds". |

Specific parameters for item value columns:

|                             |   |
|-----------------------------|---|
| <i>Item</i>                 | Select the item.<br>Selecting non-numeric items is supported since Zabbix 6.0.4.  |
| <i>Time shift</i>           | Specify time shift if required.<br>You may use <b>time suffixes</b> in this field. Negative values are allowed.   |
| <i>Aggregation function</i> | Specify which aggregation function to use:<br><b>min</b> - display the smallest value<br><b>max</b> - display the largest value<br><b>avg</b> - display the average value<br><b>sum</b> - display the sum of values<br><b>count</b> - display the count of values<br><b>first</b> - display the first value<br><b>last</b> - display the last value<br><b>none</b> - display all values (no aggregation)<br>Aggregation allows to display an aggregated value for the chosen interval (5 minutes, an hour, a day), instead of all values. |
| <i>Aggregation interval</i> | Note that only numeric items can be displayed in this column if this setting is not "none".<br>Specify the interval for aggregating values. You may use <b>time suffixes</b> in this field. A numeric value without a suffix will be regarded as seconds.   |
| <i>Display</i>              | This field will not be displayed if <i>Aggregation function</i> is "none".<br>Define how the value should be displayed:<br><b>As is</b> - as regular text<br><b>Bar</b> - as solid, color-filled bar<br><b>Indicators</b> - as segmented, color-filled bar<br>Note that only numeric items can be displayed in this column if this setting is not "as is".  |

|                   |   |
|-------------------|---|
| <i>History</i>    | Take data from history or trends:<br><b>Auto</b> - automatic selection<br><b>History</b> - take history data<br><b>Trends</b> - take trend data   |
| <i>Min</i>        | This setting applies only to numeric data. Non-numeric data will always be taken from history.<br>Minimum value for bar/indicators.   |
| <i>Max</i>        | Maximum value for bar/indicators.   |
| <i>Thresholds</i> | Specify threshold values when the background/fill color should change. The list will be sorted in ascending order when saved.<br>Note that only numeric items can be displayed in this column if thresholds are used. |

Specific parameters for text columns:

|             |   |
|-------------|---|
| <i>Text</i> | Enter the string to display. May contain host and inventory <b>macros</b> . |
|-------------|---|

## 22 Trigger overview

### Overview

In the trigger overview widget, you can display the trigger states for a group of hosts.

- The trigger states are displayed as colored blocks (the color of the blocks for PROBLEM triggers depends on the problem severity color, which can be adjusted in the **problem update** screen). Note that recent trigger state changes (within the last 2 minutes) will be displayed as blinking blocks.
- Gray up and down arrows indicate triggers that have dependencies. On mouseover, dependency details are revealed.
- A checkbox icon indicates acknowledged problems. All problems or resolved problems of the trigger must be acknowledged for this icon to be displayed.

Clicking on a trigger block provides context-dependent links to problem events of the trigger, the problem acknowledgment screen, trigger configuration, trigger URL or a simple graph/latest values list.

Note that 50 records are displayed by default (configurable in *Administration* → *General* → **GUI**, using the *Max number of columns and rows in overview tables* option). If more records exist than are configured to display, a message is displayed at the bottom of the table, asking to provide more specific filtering criteria. There is no pagination. Note that this limit is applied first, before any further filtering of data, for example, by tags.

### Configuration

To configure, select *Trigger overview* as type:



Add widget
✕

Type
Trigger overview

Show header
☒

Name

Refresh interval
Default (1 minute)

Show
Recent problems
Problems
Any

Host groups
Select

Hosts
Select

Tags
And/Or
Or

Contains
Remove

Add

Show suppressed problems
☐

Hosts location
Left
Top

Add
Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                    |  |
|--------------------|--|
| <i>Show</i>        | <p>Filter triggers by trigger state:</p> <p><b>Recent problems</b> - (<i>default</i>) show triggers that recently have been or still are in a PROBLEM state (resolved and unresolved);</p> <p><b>Problems</b> - show triggers that are in a PROBLEM state (unresolved);</p> <p><b>Any</b> - show all triggers.</p> |
| <i>Host groups</i> | Select the host group(s). This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.  |
| <i>Hosts</i>       | Select hosts. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts. Scroll down to select. Click on 'x' to remove the selected.  |

|                                 |   |
|---------------------------------|---|
| <i>Tags</i>                     | <p>Specify tags to filter the triggers displayed in the widget.<br/>It is possible to include as well as exclude specific tags and tag values.<br/>Several conditions can be set. Tag name matching is always case-sensitive.</p> <p><b>Note:</b> If the parameter <i>Show</i> is set to 'Any', all triggers will be displayed even if tags are specified. However, while recent trigger state changes (displayed as blinking blocks) will update for all triggers, the trigger state details (problem severity color and whether the problem is acknowledged) will only update for triggers that match the specified tags.</p> <p>There are several operators available for each condition:<br/> <b>Exists</b> - include the specified tag names;<br/> <b>Equals</b> - include the specified tag names and values (case-sensitive);<br/> <b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive);<br/> <b>Does not exist</b> - exclude the specified tag names;<br/> <b>Does not equal</b> - exclude the specified tag names and values (case-sensitive);<br/> <b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive).</p> <p>There are two calculation types for conditions:<br/> <b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the <i>Or</i> condition;<br/> <b>Or</b> - enough if one condition is met.</p> |
| <i>Show suppressed problems</i> | Mark the checkbox to display problems that would otherwise be suppressed (not shown) because of host maintenance.   |
| <i>Hosts location</i>           | Select host location - left or top.   |

## 23 URL

### Overview

This widget displays the content retrieved from the specified URL.

### Configuration

To configure, select *URL* as type:

Add widget

Type

URL

Show header

☒

Name

URL

Refresh interval

Default (No refresh)

\* URL

http://

Dynamic item

☐

Add

Cancel

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                     |  |
|---------------------|--|
| <b>URL</b>          | Enter the URL to display.<br>External URLs must start with <code>http://</code> or <code>https://</code> .<br>Since Zabbix 4.4.8, internal URLs support relative paths (for example, <code>zabbix.php?action=report.status</code> ).<br>{HOST.*} macros are supported. |
| <b>Dynamic item</b> | Set to display different URL content depending on the selected host.<br>This can work if {HOST.*} macros are used in the URL.  |

**Attention:**

Browsers might not load an HTTP page included in the widget if Zabbix frontend is accessed over HTTPS.

24 Web monitoring

Overview

This widget displays a status summary of the active web monitoring scenarios.

Configuration

Add widget

Type

Web monitoring

Show header

☒

Name

Web monitoring

Refresh interval

Default (1 minute)

Host groups

type here to search

Select

Exclude host groups

type here to search

Select

Hosts

type here to search

Select

Tags

And/Or

Or

tag

Contains

value

Remove

Add

Show hosts in maintenance

☒

Add

Cancel

**Note:**

In cases when a user does not have permission to access certain widget elements, that element's name will appear as *Inaccessible* during the widget's configuration. This results in *Inaccessible Item*, *Inaccessible Host*, *Inaccessible Group*, *Inaccessible Map*, and *Inaccessible Graph* appearing instead of the "real" name of the element.

In addition to the parameters that are **common** for all widgets, you may set the following specific options:

|                                  |   |
|----------------------------------|---|
| <i>Host groups</i>               | Enter host groups to display in the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.<br>Specifying a parent host group implicitly selects all nested host groups.<br>Host data from these host groups will be displayed in the widget. If no host groups are entered, all host groups will be displayed.   |
| <i>Exclude host groups</i>       | Enter host groups to hide from the widget. This field is auto-complete so starting to type the name of a group will offer a dropdown of matching groups.<br>Specifying a parent host group implicitly selects all nested host groups.<br>Host data from these host groups will not be displayed in the widget. For example, hosts 001, 002, 003 may be in Group A and hosts 002, 003 in Group B as well. If we select to <i>show</i> Group A and <i>exclude</i> Group B at the same time, only data from host 001 will be displayed in the Dashboard.   |
| <i>Hosts</i>                     | Enter hosts to display in the widget. This field is auto-complete so starting to type the name of a host will offer a dropdown of matching hosts.<br>If no hosts are entered, all hosts will be displayed.  |
| <i>Tags</i>                      | Specify tags to limit the number of web scenarios displayed in the widget. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.<br>There are several operators available for each condition:<br><b>Exists</b> - include the specified tag names<br><b>Equals</b> - include the specified tag names and values (case-sensitive)<br><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br><b>Does not exist</b> - exclude the specified tag names<br><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)<br><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br>There are two calculation types for conditions:<br><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition<br><b>Or</b> - enough if one condition is met |
| <i>Show hosts in maintenance</i> | Include hosts that are in maintenance in the statistics.  |

#### Web monitoring widget

Once you have completed the configuration, you might like to see the widget with the data it displays. To do it, go to *Monitoring* → *Dashboards*, click on the name of a dashboard where you created the widget.

In this example, you can see the widget named "Zabbix frontend" displaying the status of the web monitoring for three host groups: "Internal network," "Linux servers," and "Web servers."

### Zabbix frontend

| Host group ▲     | Ok | Failed | Unknown |
|------------------|----|--------|---------|
| Internal network | 1  |        |         |
| Linux servers    |    | 1      |         |
| Web servers      |    |        | 1       |

A web monitoring widget displays the following information:

- a name of a widget; below it, there are four columns:
  - *Host group* - displays a list of host groups that contain hosts having web scenarios configured;
  - *Ok* - displays a number of web scenarios (in green color) when two conditions are observed:
    - \* Zabbix has collected the latest data for a web scenario(s);
    - \* all steps that were configured in a **web scenario** are in "Ok" *Status*.

- **Failed** - displays a number of web scenarios (in red color), which have some failed steps:
  - \* click on the host name, and it will open a new window; the *Status* column provides detailed information (in red color) on the step where Zabbix failed to collect the data; and also,
  - \* gives a hint for the parameter that has to be corrected in the **configuration form**.

Web monitoring

| Host                   | Name          | Number of steps | Last check | Status   | Tags |
|------------------------|---------------|-----------------|------------|--|------|
| Internal documentation | Internal Wiki | 2               | 38s        | Step "Configuration page" [2 of 2] failed: required pattern "winter" was not found on http://localhost/index.php |      |

Displaying 1 of 1 found

- **Unknown** - displays a number of web scenarios (in grey color) for which Zabbix has neither collected data, nor has an information about the failed steps.

Web monitoring

| Host        | Name        | Number of steps | Last check | Status | Tags |
|-------------|-------------|-----------------|------------|--------|------|
| Zabbix site | Zabbix site | 1               |            |        |      |

Displaying 1 of 1 found

## Viewing the status and data

Clickable links in the widget allow to easily navigate and quickly acquire a full information on each web scenario. Thus, to view:

- the **Status** of a web scenario, click on the name of a host group.
- more detailed statistics, click on the scenario name. In this example it is "Zabbix frontend".
- the details in the case of **Failed** status, click on a host group name; in the window that opens, click on a web scenario name in the *Name* column; it will open more detailed information on the configured steps for which Zabbix failed to collect the data.

Details of web scenario: Internal Wiki

| Step               | Speed      | Response time   | Response code | Status   |
|--------------------|------------|-----------------|---------------|--|
| First page         | 95.94 KBps | 256.75ms        | 200           | OK   |
| Configuration page | 40.46 KBps | 33.5ms          | 200           | Error: required pattern "winter" was not found on http://localhost/index.php |
| <b>TOTAL</b>       |            | <b>290.25ms</b> |               | Error: required pattern "winter" was not found on http://localhost/index.php |

Now, you can return to the **web scenario configuration form** and correct your settings.

To view the details in the case of **Unknown** status, you can repeat the same steps as explained for **Failed**.

### Attention:

At the first monitoring instance, a web scenario is always displayed in **Unknown** state, which is switched to **Failed** or **Ok** state right after the first check. In the case when a host is monitored by the proxy, the status change occurs in accordance with the data collection frequency configured on the proxy.

## 2 Problems

### Overview

In **Monitoring** → **Problems** you can see what problems you currently have. Problems are those triggers that are in the "Problem" state.

Problems

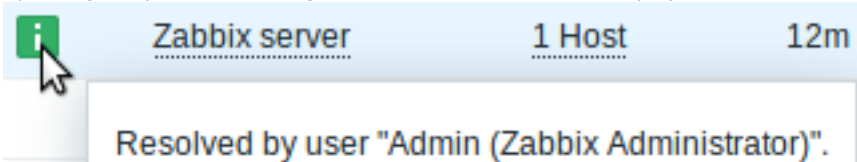
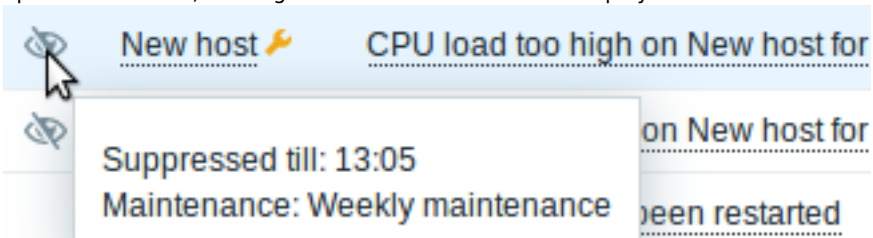

Export to CSV








| Time                | Severity    | Recovery time | Status  | Info | Host          | Problem   | Duration   | Ack | Actions | Tags  |
|---------------------|-------------|---------------|---------|------|---------------|---|------------|-----|---------|---|
| 10:39:56            | Information |               | PROBLEM |      | Zabbix server | Zabbix server: Version has changed (new version: 6.4.0alpha1) | 2m 52s     | No  |         | class: software component: system scope: notice *** |
| Today               |             |               |         |      |               |   |            |     |         |   |
| 2022-07-29 17:16:51 | Average     |               | PROBLEM |      | Zabbix server | Interface wlp3s0: Link down                                   | 2d 17h 25m | No  |         | class: os component: network interface: wlp3s0 ***  |
| July                |             |               |         |      |               |   |            |     |         |   |
| 2022-06-09 13:11:16 | Warning     |               | PROBLEM |      | Zabbix server | /: Disk space is critically low (used > 90%)                  | 1M 22d 21h | No  |         | class: os component: storage filesystem: / ***      |

Displaying 3 of 3 found

0 selected Mass update

| Column | Description                      |
|--------|----------------------------------|
| Time   | Problem start time is displayed. |

| Column           | Description  |
|------------------|--|
| Severity         | <p>Problem severity is displayed.</p> <p>Problem severity is originally based on the severity of the underlying problem trigger, however, after the event has happened it can be updated using the <i>Update problem</i> screen. Color of the problem severity is used as cell background during problem time.</p>   |
| Recovery time    | Problem resolution time is displayed.  |
| Status           | <p>Problem status is displayed:</p> <p><b>Problem</b> - unresolved problem</p> <p><b>Resolved</b> - recently resolved problem. You can hide recently resolved problems using the filter.</p> <p>New and recently resolved problems blink for 2 minutes. Resolved problems are displayed for 5 minutes in total. Both of these values are configurable in <i>Administration</i> → <i>General</i> → <i>Trigger displaying options</i>.</p>   |
| Info             | <p>A green information icon is displayed if a problem is closed by global correlation or manually when updating the problem. Rolling a mouse over the icon will display more details:</p>  <p>The following icon is displayed if a suppressed problem is being shown (see <i>Show suppressed problems</i> option in the filter). Rolling a mouse over the icon will display more details:</p>   |
| Host             | Problem host is displayed.   |
| Problem          | <p>Problem name is displayed.</p> <p>Problem name is based on the name of the underlying problem trigger.</p> <p>Macros in the trigger name are resolved at the time of the problem happening and the resolved values do not update any more.</p> <p><i>Note</i> that it is possible to append the problem name with <b>operational data</b> showing some latest item values.</p> <p>Clicking on the problem name brings up the <b>event menu</b>.</p> <p>Hovering on the  icon after the problem name will bring up the trigger description (for those problems that have it).</p> |
| Operational data | <p><b>Operational data</b> are displayed containing latest item values.</p> <p>Operational data can be a combination of text and item value macros if configured on a trigger level. If no operational data is configured on a trigger level, the latest values of all items from the expression are displayed.</p>  |
| Duration         | <p>This column is only displayed if <i>Separately</i> is selected for <i>Show operational data</i> in the filter.</p> <p>Problem duration is displayed.</p> <p>See also: <b>Negative problem duration</b></p>  |
| Ack              | <p>The acknowledgment status of the problem is displayed:</p> <p><b>Yes</b> - green text indicating that the problem is acknowledged. A problem is considered to be acknowledged if all events for it are acknowledged.</p> <p><b>No</b> - a red link indicating unacknowledged events.</p> <p>If you click on the link you will be taken to the <b>problem update</b> screen where various actions can be taken on the problem, including commenting and acknowledging the problem.</p>   |

| Column  | Description  |
|---------|--|
| Actions | <p>History of activities about the problem is displayed using symbolic icons:</p> <ul style="list-style-type: none"> <li> - comments have been made. The number of comments is also displayed.</li> <li> - problem severity has been increased (e.g. Information → Warning)</li> <li> - problem severity has been decreased (e.g. Warning → Information)</li> <li> - problem severity has been changed, but returned to the original level (e.g. Warning → Information → Warning)</li> <li> - actions have been taken. The number of actions is also displayed.</li> <li> - actions have been taken, at least one is in progress. The number of actions is also displayed.</li> <li> - actions have been taken, at least one has failed. The number of actions is also displayed.</li> </ul> <p>When rolling the mouse over the icons, popups with details about the activity are displayed. See <a href="#">viewing details</a> to learn more about icons used in the popup for actions taken.</p> |
| Tags    | <p>Tags are displayed (if any).</p> <p>In addition, tags from an external ticketing system may also be displayed (see the <i>Process tags</i> option when configuring <a href="#">webhooks</a>).</p>   |

## Operational data of problems

It is possible to display operational data for current problems, i.e. the latest item values as opposed to the item values at the time of the problem.

Operational data display can be configured in the filter of *Monitoring → Problems* or in the configuration of the respective **dashboard widget**, by selecting one of the three options:

- *None* - no operational data is displayed
- *Separately* - operational data is displayed in a separate column

| Time     | <input type="checkbox"/> Severity | Recovery time | Status  | Info | Host ▲        | Problem  | Operational data     | Duration  |
|----------|-----------------------------------|---------------|---------|------|---------------|--|----------------------|-----------|
| 09:28:35 | <input type="checkbox"/> Average  |               | PROBLEM |      | Zabbix server | Zabbix discoverer processes more than 75% busy | Current value: 100 % | 3h 32m 8s |

- *With problem name* - operational data is appended to the problem name and in parentheses. Operational data are appended to the problem name only if the *Operational data* field is non-empty in the trigger configuration.

| Time     | <input type="checkbox"/> Severity | Recovery time | Status  | Info | Host ▲        | Problem   | Duration   |
|----------|-----------------------------------|---------------|---------|------|---------------|---|------------|
| 09:28:35 | <input type="checkbox"/> Average  |               | PROBLEM |      | Zabbix server | Zabbix discoverer processes more than 75% busy (Current value: 100 %) | 3h 29m 34s |

The content of operational data can be configured with each **trigger**, in the *Operational data* field. This field accepts an arbitrary string with macros, most importantly, the `{ITEM.LASTVALUE<1-9>}` macro.

`{ITEM.LASTVALUE<1-9>}` in this field will always resolve to the latest values of items in the trigger expression. `{ITEM.VALUE<1-9>}` in this field will resolve to the item values at the moment of trigger status change (i.e. change into problem, change into OK, being closed manually by a user or being closed by correlation).

Note that closing the problem manually does not produce a new value so the resolved value of `{ITEM.LASTVALUE<1-9>}` or `{ITEM.VALUE<1-9>}` will still show the value from the problem time.

`{ITEM.LASTVALUE<1-9>}` or `{ITEM.VALUE<1-9>}` will resolve to *\*UNKNOWN\** if the latest history value has been collected more than the *Max history display period* time ago (see [Administration → General](#)).

## Negative problem duration

It is actually possible in some common situations to have negative problem duration i.e. when the problem resolution time is earlier than problem creation time, e. g.:

- If some host is monitored by proxy and a network error happens, leading to no data received from the proxy for a while, the `nodata(/host/key)` trigger will be fired by the server. When the connection is restored, the server will receive item data

from the proxy having a time from the past. Then, the nodata(/host/key) problem will be resolved and it will have a negative problem duration;

- When item data that resolve the problem event are sent by Zabbix sender and contain a timestamp earlier than the problem creation time, a negative problem duration will also be displayed.

**Note:**

Negative problem duration is not affecting **SLA calculation** or **Availability report** of a particular trigger in any way; it neither reduces nor expands problem time.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Mass update* - update the selected problems by navigating to the **problem update** screen

To use this option, mark the checkboxes before the respective problems, then click on the *Mass update* button.

Buttons

The button to the right offers the following option:

Export to CSV

Export content from all pages to a CSV file.

View mode buttons, being common for all sections, are described on the **Monitoring** page.

Using filter

You can use the filter to display only the problems you are interested in. For better search performance, data is searched with macros unresolved.

The filter is located above the table. Favorite filter settings can be saved as tabs and then quickly accessed by clicking on the **tabs** above the filter.

Servers

Datcenters

Databases

Show

Recent problems

Problems

History

Host groups

Linux servers

Select

Hosts

type here to search

Select

Triggers

type here to search

Select

Problem

Severity

Not classified

Warning

High

Information

Average

Disaster

Age less than

14

days

Host inventory

Type

Remove

Tags

And/Or

Or

tag

Contains

value

Remove

Show tags

None

1

2

3

Tag name

Full

Shortened

None

Tag display priority

comma-separated list

Show operational data

None

Separately

With problem name

Show suppressed problems

Show unacknowledged only

Compact view

Show timeline

Show details

Highlight whole row

Update

Apply

Reset

| Parameter      | Description   |
|----------------|---|
| Show           | Filter by problem status:<br><b>Recent problems</b> - unresolved and recently resolved problems are displayed (default)<br><b>Problems</b> - unresolved problems are displayed<br><b>History</b> - history of all events is displayed |
| Host groups    | Filter by one or more host groups.<br>Specifying a parent host group implicitly selects all nested host groups.   |
| Hosts          | Filter by one or more hosts.  |
| Triggers       | Filter by one or more triggers.   |
| Problem        | Filter by problem name.   |
| Severity       | Filter by trigger (problem) severity.   |
| Age less than  | Filter by how old the problem is.   |
| Host inventory | Filter by inventory type and value.   |



| Parameter                       | Description   |
|---------------------------------|---|
| <i>Tags</i>                     | <p>Filter by <b>event tag</b> name and value. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.</p> <p>There are several operators available for each condition:</p> <p><b>Exists</b> - include the specified tag names</p> <p><b>Equals</b> - include the specified tag names and values (case-sensitive)</p> <p><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p><b>Does not exist</b> - exclude the specified tag names</p> <p><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)</p> <p><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p>There are two calculation types for conditions:</p> <p><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition</p> <p><b>Or</b> - enough if one condition is met</p> <p>When filtered, the tags specified here will be displayed first with the problem, unless overridden by the <i>Tag display priority</i> (see below) list.</p> |
| <i>Show tags</i>                | <p>Select the number of displayed tags:</p> <p><b>None</b> - no <i>Tags</i> column in <i>Monitoring → Problems</i></p> <p><b>1</b> - <i>Tags</i> column contains one tag</p> <p><b>2</b> - <i>Tags</i> column contains two tags</p> <p><b>3</b> - <i>Tags</i> column contains three tags</p> <p>To see all tags for the problem roll your mouse over the three dots icon.</p>   |
| <i>Tag name</i>                 | <p>Select tag name display mode:</p> <p><b>Full</b> - tag names and values are displayed in full</p> <p><b>Shortened</b> - tag names are shortened to 3 symbols; tag values are displayed in full</p> <p><b>None</b> - only tag values are displayed; no names</p>  |
| <i>Tag display priority</i>     | <p>Enter tag display priority for a problem, as a comma-separated list of tags (for example: <i>Services, Applications, Application</i>). Tag names only should be used, no values. The tags of this list will always be displayed first, overriding the natural ordering by alphabet.</p>  |
| <i>Show operational data</i>    | <p>Select the mode for displaying <b>operational data</b>:</p> <p><b>None</b> - no operational data is displayed</p> <p><b>Separately</b> - operational data is displayed in a separate column</p> <p><b>With problem name</b> - append operational data to the problem name, using parentheses for the operational data</p>  |
| <i>Show suppressed problems</i> | <p>Mark the checkbox to display problems that would otherwise be suppressed (not shown) because of host maintenance.</p>  |
| <i>Compact view</i>             | <p>Mark the checkbox to enable compact view.</p>  |
| <i>Show details</i>             | <p>Mark the checkbox to display underlying trigger expressions of the problems. Disabled if <i>Compact view</i> checkbox is marked.</p>   |
| <i>Show unacknowledged only</i> | <p>Mark the checkbox to display unacknowledged problems only.</p>   |
| <i>Show timeline</i>            | <p>Mark the checkbox to display the visual timeline and grouping. Disabled if <i>Compact view</i> checkbox is marked.</p>   |
| <i>Highlight whole row</i>      | <p>Mark the checkbox to highlight the full line for unresolved problems. The problem severity color is used for highlighting.</p> <p>Enabled only if the <i>Compact view</i> checkbox is marked in the standard blue and dark themes.</p> <p><i>Highlight whole row</i> is not available in the high-contrast themes.</p>   |

#### Tabs for favorite filters

Frequently used sets of filter parameters can be saved in tabs.

To save a new set of filter parameters, open the main tab, and configure the filter settings, then press the *Save as* button. In a new popup window, define *Filter properties*.

## Filter properties



\* Name

Show number of records ☒

Set custom time period ☒

From

To

Delete

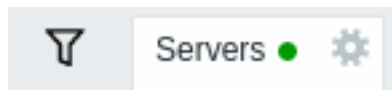
Save

Cancel

| Parameter                     | Description  |
|-------------------------------|--|
| <i>Name</i>                   | The name of the filter to display in the tab list.   |
| <i>Show number of records</i> | Check, if you want the number of problems to be displayed next to the tab name.  |
| <i>Set custom time period</i> | Check to set specific default time period for this filter set. If set, you will only be able to change the time period for this tab by updating filter settings. For tabs without a custom time period, the time range can be changed by pressing the time selector button in the top right corner (button name depends on selected time interval: This week, Last 30 minutes, Yesterday, etc.). This option is available only for filters in <i>Monitoring→Problems</i> . |
| <i>From/To</i>                | <b>Time period</b> start and end in absolute (Y-m-d H:i:s) or relative time syntax (now-1d). Available, if <i>Set custom time period</i> is checked.   |

When saved, the filter is created as a named filter tab and immediately activated.

To edit the filter properties of an existing filter, press the gear symbol next to the active tab name.



### Notes:

- To hide the filter area, click on the name of the current tab. Click on the active tab name again to open the filter area again.
- Keyboard navigation is supported: use arrows to switch between tabs, press *Enter* to open.
- The left/right buttons above the filter may be used to switch between saved filters. Alternatively, the downward pointing button opens a drop-down menu with all saved filters and you can click on the one you need.
- Filter tabs can be re-arranged by dragging and dropping.
- If the settings of a saved filter have been changed (but not saved), a green dot is displayed after the filter name. To update the filter according to the new settings, click on the *Update* button, which is displayed instead of the *Save as* button.
- Current filter settings are remembered in the user profile. When the user opens the page again, the filter settings will have stayed the same.

### Note:

To share filters, copy and send to others a URL of an active filter. After opening this URL, other users will be able to save this set of parameters as a permanent filter in their Zabbix account.

See also: [Page parameters](#).

### Filter buttons

Apply

Apply specified filtering criteria (without saving).

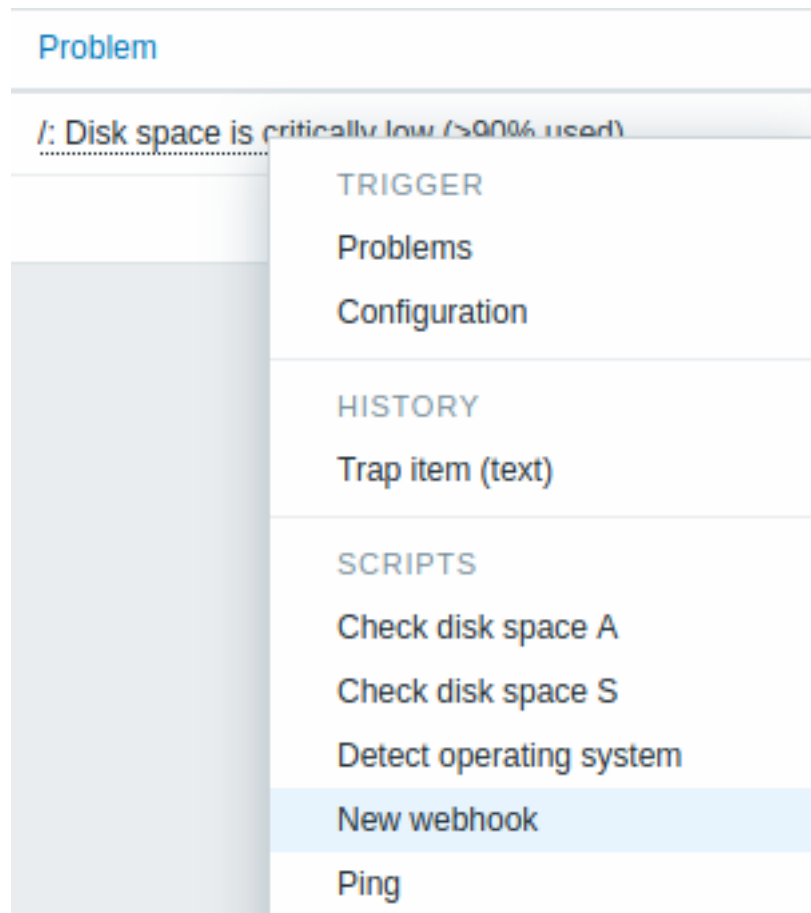
Reset

Reset current filter and return to saved parameters of the current tab. On the main tab, this will clear the filter.

|         |  |
|---------|--|
| Save as | Save current filter parameters in a new tab. Only available on the main tab.               |
| Update  | Replace tab parameters with currently specified parameters. Not available on the main tab. |

## Event menu

Clicking on the problem name brings up the event menu:



The event menu allows to:

- filter the problems of the trigger
- access the trigger configuration
- access a simple graph/item history of the underlying item(s)
- access an external ticket of the problem (if configured, see the *Include event menu entry* option when configuring **webhooks**)
- execute global **scripts** (these scripts need to have their scope defined as 'Manual event action'). This feature may be handy for running scripts used for managing problem tickets in external systems.

## Viewing details












The times for problem start and recovery in *Monitoring* → *Problems* are links. Clicking on them opens more details of the event.

## Event details

| Trigger details     |   | Actions                  |                     |                              |            |   |
|---------------------|---|--------------------------|---------------------|------------------------------|------------|---|
| Host                | New host                                      | Step                     | Time                | User/Recipient               | Action     | Message/Command   |
| Trigger             | CPU load too high on "New host" for 3 minutes |                          | 2019-10-15 16:18:04 | Admin (Zabbix Administrator) | ✓          |   |
| Severity            | Warning                                       |                          | 2019-10-15 16:17:42 | Admin (Zabbix Administrator) | ✉ +        | OK.   |
| Problem expression  | {New host:system.cpu.load.avg(3m)}>2          | 1                        | 2019-10-15 16:12:36 | Admin (Zabbix Administrator) | ✉          | Problem: CPU load too high on "New host" for 3 minutes Sent   |
| Recovery expression |   |                          |                     | @inbox.lv                    |            | Problem started at 16:12:35 on 2019.10.15<br>Problem name: CPU load too high on "New host" for 3 minutes<br>Host: New host<br>Severity: Not classified<br>Original problem ID: 295677 |
| Event generation    | Normal  |                          | 2019-10-15 16:12:35 |                              |            |   |
| Allow manual close  | No  |                          |                     |                              |            |   |
| Enabled             | Yes   |                          |                     |                              |            |   |
| Event details       |   | Event list [previous 20] |                     |                              |            |   |
| Event               | CPU load too high on "New host" for 3 minutes | Time                     | Recovery time       | Status                       | Age        | Duration  |
| Operational data    | 1.99  | 2019-10-15 16:12:35      |                     | PROBLEM                      | 7m 29s     | 7m 29s  |
| Severity            | Information                                   | 2019-10-15 15:10:05      | 2019-10-15 16:08:35 | RESOLVED                     | 1h 9m 59s  | 58m 30s   |
| Time                | 2019-10-15 16:12:35                           | 2019-10-15 14:58:05      | 2019-10-15 15:08:35 | RESOLVED                     | 1h 21m 59s | 10m 30s   |
| Acknowledged        | Yes   | 2019-10-15 14:50:35      | 2019-10-15 14:54:35 | RESOLVED                     | 1h 29m 29s | 4m  |
| Tags                | Service: Operations                           | 2019-10-15 13:14:05      | 2019-10-15 13:25:35 | RESOLVED                     | 3h 5m 59s  | 11m 30s   |
| Description         |   | 2019-10-15 13:02:05      | 2019-10-15 13:08:35 | RESOLVED                     | 3h 17m 59s | 6m 30s  |

Note how the problem severity differs for the trigger and the problem event - for the problem event it has been updated using the [Update problem screen](#).

In the action list, the following icons are used to denote the activity type:

-  - problem event generated
-  - message has been sent
-  - problem event acknowledged
-  - problem event unacknowledged
-  - a comment has been added
-  - problem severity has been increased (e.g. Information → Warning)
-  - problem severity has been decreased (e.g. Warning → Information)
-  - problem severity has been changed, but returned to the original level (e.g. Warning → Information → Warning)
-  - a remote command has been executed
-  - problem event has recovered
-  - the problem has been closed manually


## 3 Hosts

### Overview

The *Monitoring* → *Hosts* section displays a full list of monitored hosts with detailed information about host interface, availability, tags, current problems, status (enabled/disabled), and links to easily navigate to the host's latest data, problem history, graphs, dashboards and web scenarios.

### Hosts

| <div> <a href="#">Servers</a> <a href="#">Datacenters</a> <a href="#">Customer</a> <a href="#">MySQL</a> </div> <div>Create host</div> |                 |              |        |         |                                 |                          |                           |                              |                     |
|--|-----------------|--------------|--------|---------|---------------------------------|--------------------------|---------------------------|------------------------------|---------------------|
| Name   | Interface       | Availability | Tags   | Status  | Latest data                     | Problems                 | Graphs                    | Dashboards                   | Web                 |
| Apache server DC1  | 127.0.0.1:10050 | ZBX          |        | Enabled | <a href="#">Latest data</a>     | <a href="#">Problems</a> | <a href="#">Graphs</a>    | <a href="#">Dashboards</a>   | <a href="#">Web</a> |
| Zabbix NYC   | 127.0.0.1:10050 | ZBX          | Apache | Enabled | <a href="#">Latest data</a> 2   | 1                        | <a href="#">Graphs</a> 27 | <a href="#">Dashboards</a> 3 | <a href="#">Web</a> |
| Zabbix server  | 127.0.0.1:10050 | ZBX          |        | Enabled | <a href="#">Latest data</a> 163 | 1 2 1 1                  | <a href="#">Graphs</a> 27 | <a href="#">Dashboards</a> 3 | <a href="#">Web</a> |
| Zabbix Tokyo   | 127.0.0.1:10050 | ZBX          |        | Enabled | <a href="#">Latest data</a> 26  | 1                        | <a href="#">Graphs</a> 5  | <a href="#">Dashboards</a> 2 | <a href="#">Web</a> |

| Column              | Description  |
|---------------------|--|
| <i>Name</i>         | The visible host name. Clicking on the name brings up the <b>host menu</b> .<br><br>An orange wrench icon  after the name indicates that this host is in maintenance.<br>Click on the column header to sort hosts by name in ascending or descending order.   |
| <i>Interface</i>    | The main interface of the host is displayed.   |
| <i>Availability</i> | Host <b>availability</b> per configured interface.<br>Icons represent only those interface types (Zabbix agent, SNMP, IPMI, JMX) that are configured. If you position the mouse on the icon, a popup list of all interfaces of this type appears with each interface details, status and errors.<br>The column is empty for hosts with no interfaces.<br>The current status of all interfaces of one type is displayed by the respective icon color:<br><b>Green</b> - all interfaces available<br><b>Yellow</b> - at least one interface available and at least one unavailable; others can have any value including 'unknown'<br><b>Red</b> - no interfaces available<br><b>Gray</b> - at least one interface unknown (none unavailable)<br>Note that active Zabbix agent items do not affect host availability. |
| <i>Tags</i>         | <b>Tags</b> of the host and all linked templates, with macros unresolved.  |
| <i>Status</i>       | Host status - <i>Enabled</i> or <i>Disabled</i> .<br>Click on the column header to sort hosts by status in ascending or descending order.  |
| <i>Latest data</i>  | Clicking on the link will open the <i>Monitoring - Latest data</i> page with all the latest data collected from the host.<br><br>The number of items with latest data is displayed in gray (displayed since Zabbix 6.0.5).   |
| <i>Problems</i>     | The number of open host problems sorted by severity. The color of the square indicates problem severity. The number on the square means the number of problems for the given severity.<br>Clicking on the icon will open <i>Monitoring - Problems</i> page for the current host.<br>If a host has no problems, a link to the Problems section for this host is displayed as text.<br>Use the filter to select whether suppressed problems should be included (not included by default).  |
| <i>Graphs</i>       | Clicking on the link will display graphs configured for the host. The number of graphs is displayed in gray.<br><br>If a host has no graphs, the link is disabled (gray text) and no number is displayed.  |
| <i>Dashboards</i>   | Clicking on the link will display dashboards configured for the host. The number of dashboards is displayed in gray.<br><br>If a host has no dashboards, the link is disabled (gray text) and no number is displayed.  |
| <i>Web</i>          | Clicking on the link will display web scenarios configured for the host. The number of web scenarios is displayed in gray.<br><br>If a host has no web scenarios, the link is disabled (gray text) and no number is displayed.   |

## Buttons

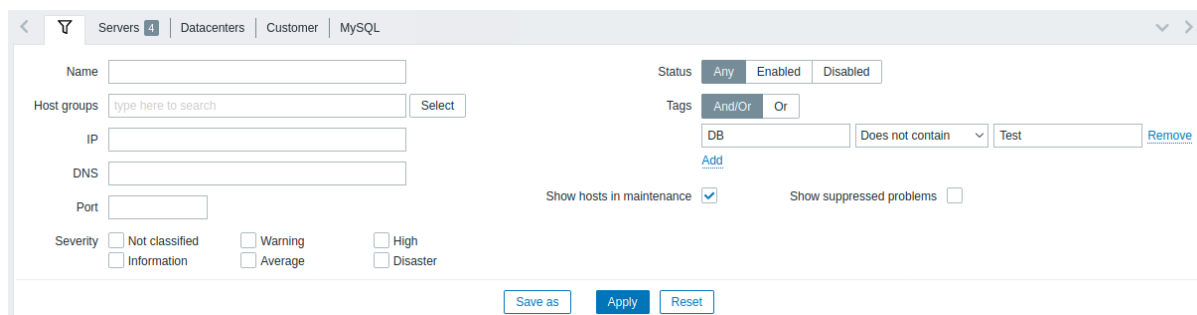
*Create host* allows to create a **new host**. This button is available for Admin and Super Admin users only.

View mode buttons being common for all sections are described on the **Monitoring** page.

## Using filter

You can use the filter to display only the hosts you are interested in. For better search performance, data is searched with macros unresolved.

The filter is located above the table. It is possible to filter hosts by name, host group, IP or DNS, interface port, tags, problem severity, status (enabled/disabled/any); you can also select whether to display suppressed problems and hosts that are currently in maintenance.



The screenshot shows the Zabbix host filter interface. It includes a search bar for Name, Host groups, IP, and DNS. There are checkboxes for Status (Any, Enabled, Disabled), Tags (And/Or, Or), and Severity (Not classified, Warning, High, Information, Average, Disaster). There are also checkboxes for 'Show hosts in maintenance' and 'Show suppressed problems'. At the bottom, there are buttons for 'Save as', 'Apply', and 'Reset'.

| Parameter                        | Description  |
|----------------------------------|--|
| <i>Name</i>                      | Filter by visible host name.   |
| <i>Host groups</i>               | Filter by one or more host groups.<br>Specifying a parent host group implicitly selects all nested host groups.  |
| <i>IP</i>                        | Filter by IP address.  |
| <i>DNS</i>                       | Filter by DNS name.  |
| <i>Port</i>                      | Filter by port number.   |
| <i>Severity</i>                  | Filter by problem severity. By default problems of all severities are displayed. Problems are displayed if not suppressed.   |
| <i>Status</i>                    | Filter by host status.   |
| <i>Tags</i>                      | Filter by host tag name and value. Hosts can be filtered by host-level tags as well as tags from all linked templates, including parent templates.<br>It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.<br>There are several operators available for each condition:<br><b>Exists</b> - include the specified tag names<br><b>Equals</b> - include the specified tag names and values (case-sensitive)<br><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br><b>Does not exist</b> - exclude the specified tag names<br><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)<br><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br>There are two calculation types for conditions:<br><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition<br><b>Or</b> - enough if one condition is met |
| <i>Show hosts in maintenance</i> | Mark the checkbox to display hosts that are in maintenance (displayed by default).   |
| <i>Show suppressed problems</i>  | Mark the checkbox to display problems that would otherwise be suppressed (not shown) because of host maintenance.  |

### Saving filter

Favorite filter settings can be saved as tabs and then quickly accessed by clicking on the respective tab above the filter.

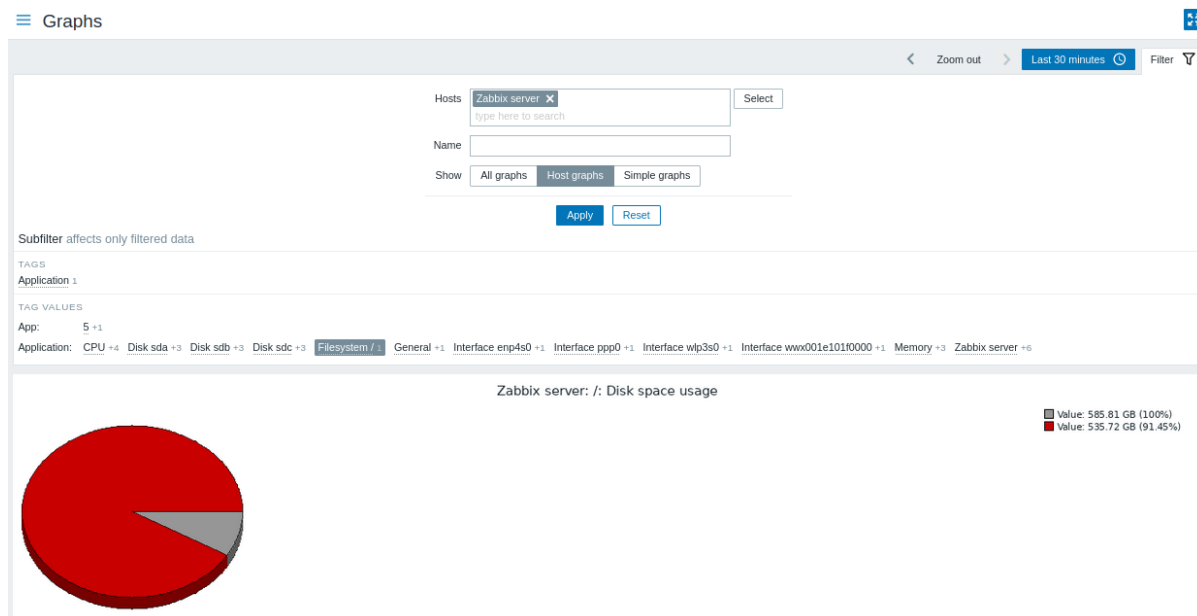
See more details about [saving filters](#).

### 1 Graphs

#### Overview

Host graphs can be accessed from *Monitoring* → *Hosts* by clicking on Graphs for the respective host.

Any [custom graph](#) that has been configured for the host can be displayed, as well as any [simple graph](#).



Graphs are sorted by:

- graph name (custom graphs)
- item name (simple graphs)

Graphs for disabled hosts are also accessible.

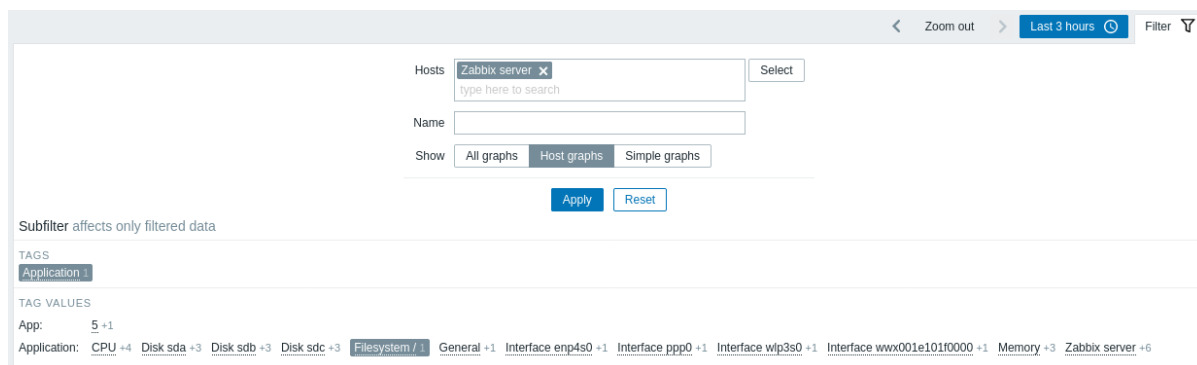
Time period selector

Take note of the time period selector above the graph. It allows selecting often required periods with one mouse click.

See also: [Time period selector](#)

Using filter

To view a specific graph, select it in the filter. The filter allows to specify the host, the graph name and the *Show* option (all/host graphs/simple graphs).



If no host is selected in the filter, no graphs are displayed.

Using subfilter

The subfilter allows to further modify the filtering from the main filter.

It contains clickable links for a quick access to related graphs. Graphs are related by common entity - tag name or value. When a tag name/value is clicked, it is highlighted with a gray background, and graphs are immediately filtered (no need to click *Apply* in the main filter). Clicking another tag name/value adds it to the filtered results. Clicking the tag name/value again removes the filtering.

Subfilters are generated based on the filtered data, which is limited to 1000 records. If you want to see more records in the subfilter, you need to increase the value of *Limit for search and filter results* parameter (in *Administration* -> *General* -> *GUI*).

Unlike the main filter, the subfilter is updated together with each table refresh request to always get up-to-date information of available filtering options and their counter numbers.

The number of entities displayed is limited to 100 horizontally. If there are more, a three-dot icon is displayed at the end; it is not clickable. Vertical lists (such as tags with their values) are limited to 20 entries. If there are more, a three-dot icon is displayed; it is not clickable.

A number next to each clickable entity indicates the number of graphs it has in the results of the main filter.

Once one entity is selected, the numbers with other available entities are displayed with a plus sign indicating how many graphs may be added to the current selection.

## Buttons

View mode buttons, being common for all sections, are described on the [Monitoring](#) page.

## 2 Web scenarios

### Overview

Host **web scenario** information can be accessed from *Monitoring → Hosts* by clicking on Web for the respective host.

≡ Web monitoring ⌵

| Host     | Name ▲          | Number of steps | Last check | Status | Tags                       |
|----------|-----------------|-----------------|------------|--------|----------------------------|
| New host | Zabbix frontend | 5               | 46s        | OK     | Application: Zabbix fro... |

Displaying 1 of 1 found

Data of disabled hosts is also accessible. The name of a disabled host is listed in red.

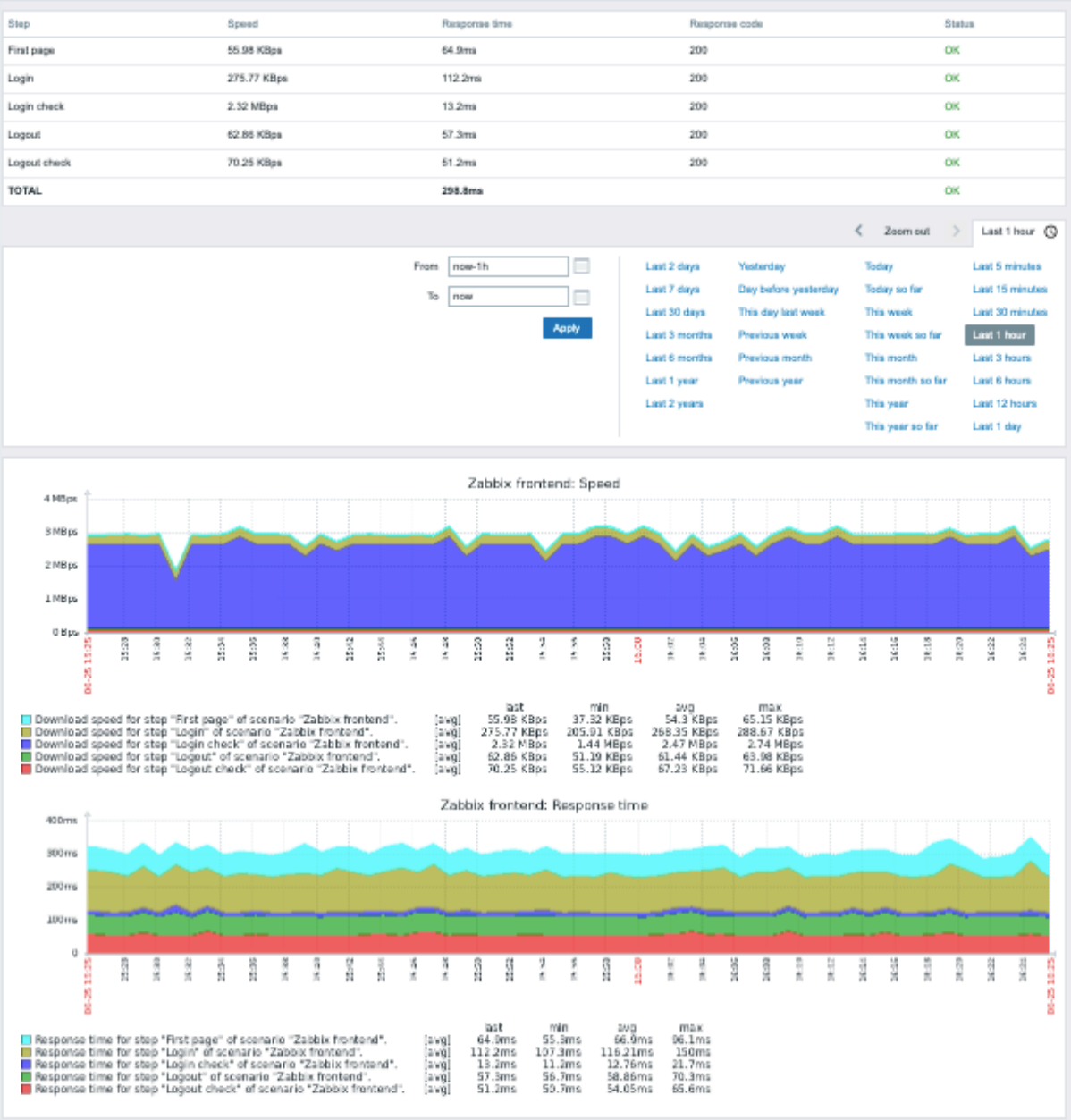
The maximum number of scenarios displayed per page depends on the *Rows per page* user profile **setting**.

By default, only values that fall within the last 24 hours are displayed. This limit has been introduced with the aim of improving initial loading times for large pages of latest data. You can extend this time period by changing the value of *Max history display period* parameter in the *Administration→General* menu section.

The scenario name is link to more detailed statistics about it:



Details of web scenario: Zabbix frontend



Using filter

The page shows a list of all web scenarios of the selected host. To view web scenarios for another host or host group without returning to the *Monitoring* → *Hosts* page, select that host or group in the filter. You may also filter scenarios based on tags.

Buttons

View mode buttons being common for all sections are described on the *Monitoring* page.

4 Latest data

Overview

In this section you can view the latest values gathered by items.

Graphs are also available for the item values.

Latest data

Memory

CPU

Server

Web checks

Subfilter affects only filtered data

HOSTS

Zabbix server 2

TAG VALUES

Application: Interface enp4s0 Interface ppp0 +2 Interface wlp3s0 +2

| <input type="checkbox"/> Host | Name ▲        | Last check                      | Last value | Change    | Tags     | Info                             |
|-------------------------------|---------------|---------------------------------|------------|-----------|----------|----------------------------------|
| <input type="checkbox"/>      | Zabbix server | Interface enp4s0: Bits received | 3s         | 5.35 Kbps | -496 bps | Application: Interface ... Graph |
| <input type="checkbox"/>      | Zabbix server | Interface enp4s0: Bits sent     | 3s         | 992 bps   | -144 bps | Application: Interface ... Graph |

0 selected

Display stacked graph

Display graph

Execute now

Displaying 2 of 2 found

This section contains:


- the **filter** (collapsed by default)
- the **subfilter** (never collapsed)
- the item list


Items are displayed with their name, time since the last check, **last value**, change amount, tags, and a link to a simple graph/history of item values.


Clicking on the item name opens the item menu with links to available graphs and the item configuration.

Values in the *Last value* column are displayed with unit conversion and value mapping applied. To view raw data, hover over the value.

Tags in the item list are clickable. If you click on a tag, this tag becomes enabled in the **subfilter**. The item list now displays the items corresponding to this tag and any other previously selected tags in the subfilter. Note that once the items have been filtered in this way, tags in the list are no longer clickable. Further modification based on tags (e.g. remove, add another filter) must be done in the subfilter.

If an item has errors, for example, has become unsupported, an information icon will be displayed in the *Info* column . Hover over the icon for details.

An icon with a question mark  is displayed next to the item name for all items that have a description. Hover over this icon to see a tooltip with the item description.

If a host to which the item belongs is in maintenance, an orange wrench icon  is displayed after the host's name.

**Note:** The name of a disabled host is displayed in red. Data of disabled hosts, including graphs and item value lists, is also accessible in *Latest data*.

By default, only values that fall within the last 24 hours are displayed. This limit has been introduced with the aim of improving initial loading times for large pages of the latest data. This time period can be extended by changing the value of the *Max history display period* parameter in *Administration* → *General*.

**Attention:**


For items with an update frequency of 1 day or more the change amount will never be displayed (with the default setting). Also in this case the last value will not be displayed at all if it was received more than 24 hours ago.

Buttons

View mode buttons being common for all sections are described on the **Monitoring** page.

Using filter

You can use the filter to display only the items you are interested in. For better search performance, data is searched with macros unresolved.

The filter icon  is located above the table and the subfilter. Click on it to expand the filter.

The screenshot shows the Zabbix web interface for the 'Memory' tab. The top navigation bar includes 'Memory', 'CPU', 'Server', and 'Web checks'. The main filter area has sections for 'Host groups' (with a search box and 'Select' button), 'Hosts' (with a dropdown showing 'Zabbix server' and a 'Select' button), and 'Name' (with a search box). The 'Tags' section has a dropdown for 'And/Or' (set to 'And/Or'), a search box for 'tag', a dropdown for 'Contains', a search box for 'value', and a 'Remove' button. Below this is an 'Add' button. The 'Show tags' section has a dropdown for 'None', '1', '2', '3' (set to '3'), and a 'Tag name' dropdown for 'Full', 'Shortened', 'None' (set to 'Full'). The 'Tag display priority' section has a search box for 'comma-separated list'. The 'Show details' section has a checked checkbox. Below these are buttons for 'Update', 'Apply', and 'Reset'. A 'Subfilter affects only filtered data' message is shown. The 'TAGS' section shows 'Application 6'. The 'TAG VALUES' section shows 'App: 1 +1 2 +1 3 +1 5 +2' and a list of application items with their counts: 'Application: CPU +17 Disk sda +6 Disk sdb +6 Disk sdc +6 Filesystem / +5 General +9 Interface enp4s0 +9 Interface ppp0 +8 Interface wlp3s0 +8 Interface wwx001e101f0000 +8 Inventory +3 Memory 6 Monitoring agent +3 Security +1 Status +2 Web checks +9 Zabbix raw items +7 Zabbix server +44'. The 'DATA' section shows 'With data 130 Without data 33'.

The filter allows to narrow the list by host group, host, item name, tag and other settings. Specifying a parent host group in the filter implicitly selects all nested host groups. See *Monitoring -> Problems* for details on filtering by tags.

*Show details* allows to extend the information displayed for the items. Such details as the refresh interval, history and trends settings, item type, and item errors (fine/unsupported) are displayed.

### Saving filter

Favorite filter settings can be saved as tabs and then quickly accessed by clicking on the respective tab above the filter.

See more details about *saving filters*.

### Using subfilter

The subfilter allows to further modify the filtering from the main filter.

It contains clickable links for a quick access to related items. Items are related by common entity - host, tag name or value, item state, or data status. When an entity is clicked, the entity is highlighted with a gray background, and items are immediately filtered (no need to click *Apply* in the main filter). Clicking another entity adds it to the filtered results. Clicking the entity again removes the filtering.

Subfilters are generated based on the filtered data, which is limited to 1000 records. If there are 20 hosts each having 100 items (so 2000 records in total), only half of the hosts will be visible in the subfilter. If you want to see more records in the subfilter, you need to increase the value of *Limit for search and filter results* parameter (in *Administration -> General -> GUI*).

Unlike the main filter, the subfilter is updated together with each table refresh request to always get up-to-date information of available filtering options and their counter numbers.

For each entity group (e.g. tags, hosts) up to 10 rows of entities are displayed. If there are more entities, this list can be expanded to a maximum of 1000 entries (the value of `SUBFILTER_VALUES_PER_GROUP` in *frontend definitions*) by clicking on a three-dot icon displayed at the end. Once expanded to the maximum, the list cannot be collapsed. (Note that a non-expandable maximum of 100 is the limit before Zabbix 6.0.5.)

In the list of *Tag values* up to 10 rows of tag names are displayed. If there are more tag names with values, this list can be expanded to a maximum of 200 tag names by clicking on a three-dot icon displayed at the bottom. Once expanded to the maximum, the list cannot be collapsed. (Note that a non-expandable maximum of 20 rows is the limit before Zabbix 6.0.5.)

For each tag name up to 10 rows of values are displayed (expandable to 1000 entries (the value of `SUBFILTER_VALUES_PER_GROUP` in *frontend definitions*)).

The host options in the subfilter are available only if no hosts or more than one host is selected in the main filter.

By default, items with and without data are displayed in the item list. If only one host is selected in the main filter, the subfilter offers the option to filter only items with data, only without data, or both for this host.

A number next to each clickable entity indicates the number of items it has in the results of the main filter. Entities without items are not displayed, unless they were selected in the subfilter before.

Once one entity is selected, the numbers with other available entities are displayed with a plus sign indicating how many items may be added to the current selection.

### Graphs

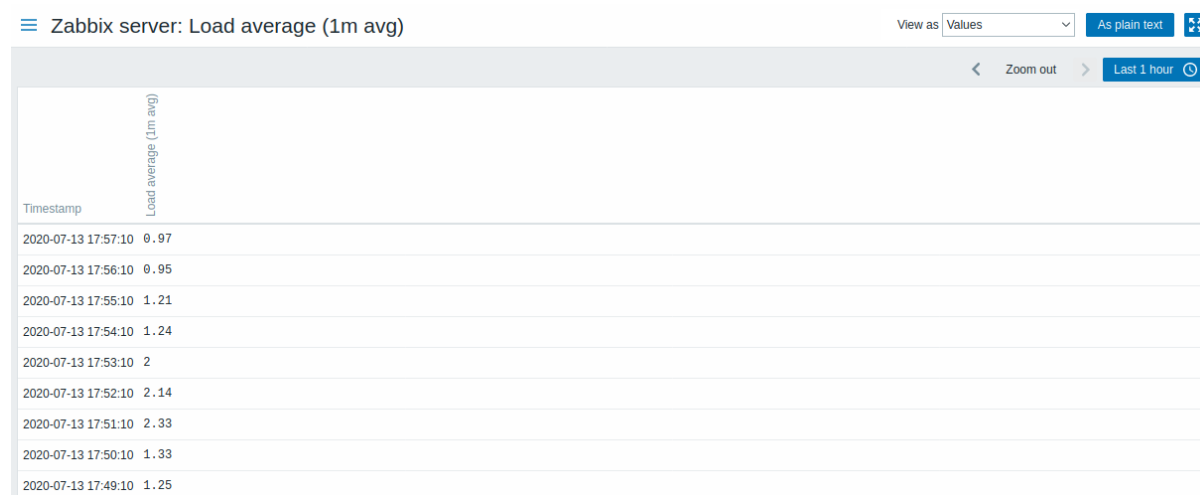
#### Ad-hoc graphs for comparing items

You may use the checkbox in the first column to select several items and then compare their data in a simple or stacked **ad-hoc graph**. To do that, select items of interest, then click on the required graph button below the table.

### Links to value history/simple graph

The last column in the latest value list offers:

- a **History** link (for all textual items) - leading to listings (*Values/500 latest values*) displaying the history of previous item values.
- a **Graph** link (for all numeric items) - leading to a **simple graph**. However, once the graph is displayed, a dropdown on the upper right offers a possibility to switch to *Values/500 latest values* as well.



The values displayed in this list are "raw", that is, no postprocessing is applied.

#### Note:

The total amount of values displayed is defined by the value of *Limit for search and filter results* parameter, set in **Administration → General**.

## 5 Maps

### Overview

In the *Monitoring → Maps* section you can configure, manage and view **network maps**.

When you open this section, you will either see the last map you accessed or a listing of all maps you have access to.

All maps can be either public or private. Public maps are available to all users, while private maps are accessible only to their owner and the users the map is shared with.

### Map listing

The screenshot shows the 'Maps' section in Zabbix. At the top, there are buttons for 'Create map' and 'Import'. Below is a table listing maps. The table has columns: 'Name', 'Width', 'Height', and 'Actions'. There are two maps listed: 'Local network' and 'Local network2'. At the bottom, there's a status bar showing '0 selected' and buttons for 'Export' and 'Delete'.

| Name           | Width | Height | Actions                |
|----------------|-------|--------|------------------------|
| Local network  | 600   | 400    | Properties Constructor |
| Local network2 | 680   | 200    | Properties Constructor |

Displaying 2 of 2 found

Displayed data:

| Column  | Description   |
|---------|---|
| Name    | Name of the map. Click on the name to <b>view</b> the map.  |
| Width   | Map width is displayed.   |
| Height  | Map height is displayed.  |
| Actions | Two actions are available:<br><b>Properties</b> - edit general map <b>properties</b><br><b>Constructor</b> - access the grid for adding <b>map elements</b> |

To **configure** a new map, click on the *Create map* button in the top right-hand corner. To import a map from a YAML, XML, or JSON file, click on the *Import* button in the top right-hand corner. The user who imports the map will be set as its owner.

Two buttons below the list offer some mass-editing options:

- *Export* - export the maps to a YAML, XML, or JSON file
- *Delete* - delete the maps

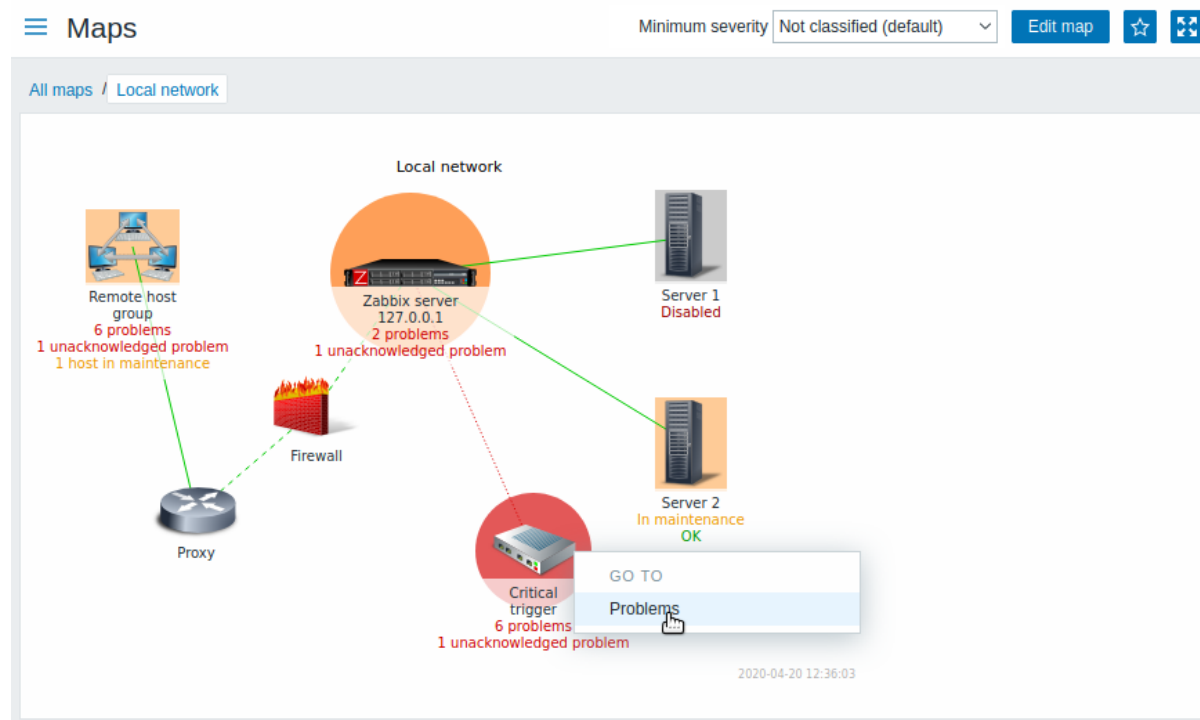
To use these options, mark the checkboxes before the respective maps, then click on the required button.

Using filter

You can use the filter to display only the maps you are interested in. For better search performance, data is searched with macros unresolved.

Viewing maps

To view a map, click on its name in the list of all maps.



You can use the drop-down in the map title bar to select the lowest severity level of the problem triggers to display. The severity marked as *default* is the level set in the map configuration. If the map contains a sub-map, navigating to the sub-map will retain the higher-level map severity (except if it is *Not classified*, in this case, it will not be passed to the sub-map).

Icon highlighting

If a map element is in problem status, it is highlighted with a round circle. The fill color of the circle corresponds to the severity color of the problem. Only problems on or above the selected severity level will be displayed with the element. If all problems are acknowledged, a thick green border around the circle is displayed.

Additionally:

- a host in **maintenance** is highlighted with an orange, filled square. Note that maintenance highlighting has priority over the problem severity highlighting (since Zabbix 6.0.5, only if the map element is host).
- a disabled (not-monitored) host is highlighted with a gray, filled square.

Highlighting is displayed if the *Icon highlighting* check-box is marked in map **configuration**.

Recent change markers

Inward pointing red triangles around an element indicate a recent trigger status change - one that's happened within the last 30 minutes. These triangles are shown if the *Mark elements on trigger status change* check-box is marked in map **configuration**.

Links

Clicking on a map element opens a menu with some available links.

Buttons

Buttons to the right offer the following options:

## Edit map

Go to map constructor to edit the map content.



Add map to the favorites widget in the **Dashboard**.



The map is in the favorites widget in the **Dashboard**. Click to remove map from the favorites widget.

View mode buttons being common for all sections are described on the **Monitoring** page.

### Readable summary in maps

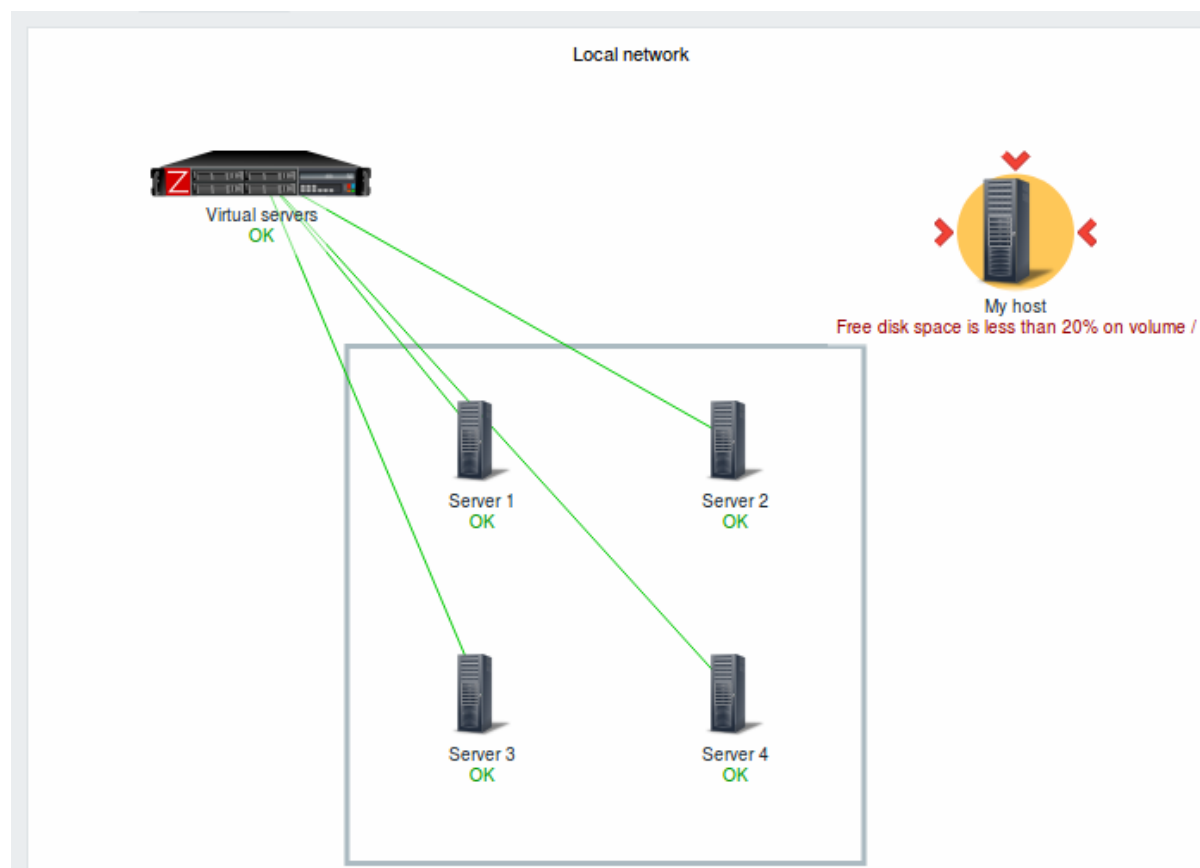
A hidden "aria-label" property is available allowing map information to be read with a screen reader. Both general map description and individual element description is available, in the following format:

- for map description: <Map name>, <\* of \* items in problem state>, <\* problems in total>.
- for describing one element with one problem: <Element type>, Status <Element status>, <Element name>, <Problem description>.
- for describing one element with multiple problems: <Element type>, Status <Element status>, <Element name>, <\* problems>.
- for describing one element without problems: <Element type>, Status <Element status>, <Element name>.

For example, this description is available:

'Local network, 1 of 6 elements in problem state, 1 problem in total. Host, Status problem, My host, Free disk space is less than 20% on volume /

for the following map:



### Referencing a network map

Network maps can be referenced by both sysmapid and mapname GET parameters. For example,

`http://zabbix/zabbix/zabbix.php?action=map.view&mapname=Local%20network`

will open the map with that name (Local network).

If both sysmapid (map ID) and mapname (map name) are specified, mapname has higher priority.

6 Discovery

Overview

In the *Monitoring* → *Discovery* section results of **network discovery** are shown. Discovered devices are sorted by the discovery rule.

Status of discovery

Discovery rule

type here to search

Select

Apply

Reset

Filter

| Discovered device                     | Monitored host   | Uptime/Downtime  | SNMPv2 agent iso.3.6.1.2.1.1.0 |
|---------------------------------------|--|------------------|--------------------------------|
| Local network (14 devices)            |  |                  |                                |
| 192.168.3.114 (radix-ilo.zabbix.lan)  | Integrated Lights-Out 4 2.61 Jul 27 2018   |                  | 1d 2h 47m                      |
| 192.168.3.72 (winxp.zabbix.lan)       | Linux zeus 4.8.6.5-smp_2 SMP Sun Nov 13 14_58_11 CDT 2016 i686   | 7 days, 20:37:53 | 7d 20h 37m                     |
| 192.168.3.70 (win2008i386.zabbix.lan) | Hardware_ x86 Family 6 Model 23 Stepping 6 AT_AT COMPATIBLE - Software_ Windows Version 6.0 _Build 6001 Multiprocessor Free_ | 2 days, 02:23:47 | 2d 2h 23m                      |

If a device is already monitored, the host name will be listed in the *Monitored host* column, and the duration of the device being discovered or lost after previous discovery is shown in the *Uptime/Downtime* column.

After that follow the columns showing the state of individual services for each discovered device (red cells show services that are down). Service uptime or downtime is included within the cell.

**Attention:**  
Only those services that have been found on at least one device will have a column showing their state.

Buttons

View mode buttons being common for all sections are described on the **Monitoring** page.

Using filter

You can use the filter to display only the discovery rules you are interested in. For better search performance, data is searched with macros unresolved.

With nothing selected in the filter, all enabled discovery rules are displayed. To select a specific discovery rule for display, start typing its name in the filter. All matching enabled discovery rules will be listed for selection. More than one discovery rule can be selected.

2 Services

Overview

The Services menu is for the **service monitoring** functions of Zabbix.

1 Services

Overview



In this section you can see a high-level status of whole services that have been configured in Zabbix, based on your infrastructure.

A service may be a hierarchy consisting of several levels of other services, called "child" services, which are attributes to the overall status of the service (see also an overview of the **service monitoring** functionality.)

The main categories of service status are *OK* or *Problem*, where the *Problem* status is expressed by the corresponding problem severity name and color.


While the view mode allows to monitor services with their status and other details, you can also **configure** the service hierarchy in this section (add/edit services, child services) by switching to the edit mode.


To switch from the view to the edit mode (and back) click on the respective button in the upper right corner:

-  - view services
-  - add/edit services, and child services

Note that access to editing depends on **user role** settings.

## Viewing services

 Services
 

View Edit 

| Name                            | Status | Root cause                        | Created at | Tags   |
|---------------------------------|--------|-----------------------------------|------------|--------|
| <a href="#">Availability 2</a>  | High   | Nodata trigger, Nodata trigger 1h | 2000-01-01 | SLA: 3 |
| <a href="#">Disc space</a>      | OK     |                                   | 2000-01-01 | SLA: 1 |
| <a href="#">Example service</a> | OK     |                                   | 2000-01-01 | SLA: 5 |

Displaying 3 of 3 found

A list of the existing services is displayed.

Displayed data:

| Parameter         | Description   |
|-------------------|---|
| <i>Name</i>       | Service name.<br>The service name is a link to <b>service details</b> .   |
| <i>Status</i>     | The number after the name indicates how many <b>child services</b> the service has.<br>Service status:<br><b>OK</b> - no problems<br><b>&lt;problem color and severity&gt;</b> - indicates a problem and its severity. In case of multiple problems, the color and severity of the most critical problem are displayed.                               |
| <i>Root cause</i> | Underlying problems that directly or indirectly affect the service status are listed.<br>The same problems are listed as returned by the {SERVICE.ROOTCAUSE} <b>macro</b> .<br>Click on the problem name to see more details about it in <i>Monitoring</i> → <i>Problems</i> .<br>Problems that do not affect the service status are not in the list. |
| <i>Created at</i> | The time when the service was created is displayed.   |
| <i>Tags</i>       | <b>Tags</b> of the service are displayed. Tags are used to identify a service in service <b>actions</b> and <b>SLAs</b> .   |

## Buttons




View mode buttons being common for all sections are described on the **Monitoring** page.


## Using filter

You can use the filter to display only the services you are interested in.










## Editing services

Click on the *Edit* button to access the edit mode. When in edit mode, the listing is complemented with checkboxes before the entries and also these additional options:

-  - add a child service to this service
-  - edit this service
-  - delete this service

 Services
 

Create service View Edit

| <input type="checkbox"/> Name                            | Status | Root cause   | Created at | Tags   |   |
|--|--------|--|------------|--------|---|
| <input type="checkbox"/> <a href="#">Availability 2</a>  | High   | Nodata trigger, Nodata trigger 1h, Temperature is too high | 2000-01-01 | SLA: 3 |    |
| <input type="checkbox"/> <a href="#">Disc space</a>      | OK     |  | 2000-01-01 | SLA: 1 |    |
| <input type="checkbox"/> <a href="#">Example service</a> | OK     |  | 2000-01-01 | SLA: 5 |    |

Displaying 3 of 3 found

To **configure** a new service, click on the *Create service* button in the top right-hand corner.

## Service details



To access service details, click on the service name. To return to the list of all services, click on *All services*.

Service details include the info box and the list of child services.

| Name        | Reporting period   | SLO  | SLI | Uptime | Downtime   | Error budget | Created at | Tags                    |
|-------------|--------------------|------|-----|--------|------------|--------------|------------|-------------------------|
| Connections | 2022-01-09 - 01-15 | 100% | 0   | 0      | 4d 10h 48m | -4d 10h 48m  | 2000-01-01 | SLA: 2 Type: Connection |
| Servers     |                    |      |     |        |            |              | 2000-01-01 | SLA: 4 Type: CPU        |

To access the info box, click on the *Info* tab. The info box contains the following entries:

- Names of parent services (if any)
- Current status of this service
- Current SLA(s) of this service, in the format `SLA name:service level indicator`. 'SLA name' is also a link to the SLA report for this service. If you position the mouse on the info box next to the service-level indicator (SLI), a pop-up info list is displayed with SLI details. The service-level indicator displays the current service level, in percentage.
- Service tags

The info box also contains a link to the [service configuration](#).

To use the filter for child services, click on the *Filter* tab.

When in edit mode, the child service listing is complemented with additional editing options:

- add a child service to this service
- edit this service
- delete this service

## 2 Service actions

### Overview

In the *Services* → *Service actions* section users can [configure](#) and maintain service actions.

Configured actions are displayed in the list with respect to the user role permissions (see *Access to services* in [user roles](#)). Users will only see actions for services their user role grants access to.

Displayed data, filter and available mass editing options are the same as for other types of [actions](#).

## 3 SLA

### Overview

This section allows to view and [configure](#) SLAs.

#### SLAs

| Name  | SLO   | Effective date | Reporting period | Timezone                        | Schedule | SLA report | Status  |
|-------|-------|----------------|------------------|---------------------------------|----------|------------|---------|
| SLA:1 | 99.9% | 2022-01-01     | Weekly           | System default: (UTC+00:00) UTC | Custom   | SLA report | Enabled |
| SLA:2 | 100%  | 2000-01-01     | Weekly           | System default: (UTC+00:00) UTC | Custom   | SLA report | Enabled |
| SLA:3 | 100%  | 2000-01-01     | Weekly           | System default: (UTC+00:00) UTC | 24x7     | SLA report | Enabled |
| SLA:4 | 99.9% | 2000-01-01     | Weekly           | System default: (UTC+00:00) UTC | 24x7     | SLA report | Enabled |
| SLA:5 | 95%   | 2000-01-01     | Weekly           | System default: (UTC+00:00) UTC | 24x7     | SLA report | Enabled |

A list of the configured SLAs is displayed. *Note* that only the SLAs related to services accessible to the user will be displayed (as read-only, unless *Manage SLA* is enabled for the user role).

Displayed data:

| Parameter               | Description  |
|-------------------------|--|
| <i>Name</i>             | The SLA name is displayed.<br>The name is a link to <b>SLA configuration</b> .                           |
| <i>SLO</i>              | The service level objective (SLO) is displayed.  |
| <i>Effective date</i>   | The date of starting SLA calculation is displayed.   |
| <i>Reporting period</i> | The period used in the SLA report is displayed - <i>daily, weekly, monthly, quarterly, or annually</i> . |
| <i>Time zone</i>        | The SLA time zone is displayed.  |
| <i>Schedule</i>         | The SLA schedule is displayed - 24x7 or custom.  |
| <i>SLA report</i>       | Click on the link to see the SLA report for this SLA.  |
| <i>Status</i>           | The SLA status is displayed - enabled or disabled.   |

#### 4 SLA report

## Overview

This section allows to view **SLA** reports, based on the criteria selected in the filter.

SLA reports can also be displayed as a **dashboard widget**.

## Report

The filter allows to select the report based on the SLA name as well as the service name. It is also possible to limit the displayed period.

≡ SLA report

Filter

SLA

SLA:3

Select

From

YYYY-MM-DD

...

Service

type here to search

Select

To

YYYY-MM-DD

...

Apply

Reset

| Service      | SLO  | 2020-06 | 2020-07 | 2020-08 | 2020-09 | 2020-10 | 2020-11 | 2020-12 | 2021-01 | 2021-02 | 2021-03 | 2021-04 | 2021-05 | 2021-06 | 2021-07 | 2021-08 | 2021-09 | 2021-10 | 2021-11 | 2021-12 | 2022-01 |
|--------------|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Availability | 100% | 100     | 100     | 100     | 100     | 100     | 100     | 100     | 100     | 100     | 100     | 100     | 100     | 100     | 72.5434 | 0.0028  | 28.8072 | 17.049  | 0       | 0       | 0       |

Displaying 1 of 1 found

Each column (period) displays the SLI for that period. SLIs that are in breach of the set SLO are highlighted in red.

20 periods are displayed in the report. A maximum of 100 periods can be displayed, if both the *From* date and *To* date are specified.

## Report details

If you click on the service name in the report, you can access another report that displays a more detailed view.

≡ SLA report

SLA: 3 ×

Select

From YYYY-MM-DD ⋮

To YYYY-MM-DD ⋮

Service: Availability ×

Select

Apply

Reset

| Month   | SLO  | SLI     | Uptime      | Downtime    | Error budget | Excluded downtimes |
|---------|------|---------|-------------|-------------|--------------|--------------------|
| 2022-01 | 100% | 0       | 0           | 12d 16h 16m | -12d 16h 16m |                    |
| 2021-12 | 100% | 0       | 0           | 1m 1d       | -1m 1d       |                    |
| 2021-11 | 100% | 0       | 0           | 1m          | -1m          |                    |
| 2021-10 | 100% | 17.049  | 5d 6h 50m   | 25d 17h 9m  | -25d 17h 9m  |                    |
| 2021-09 | 100% | 28.8072 | 8d 15h 24m  | 21d 8h 35m  | -21d 8h 35m  |                    |
| 2021-08 | 100% | 0.0028  | 1m 15s      | 1m 23h      | -1m 23h      |                    |
| 2021-07 | 100% | 72.5434 | 22d 11h 43m | 8d 12h 16m  | -8d 12h 16m  |                    |
| 2021-06 | 100% | 100     | 1m          | 0           | 0            |                    |
| 2021-05 | 100% | 100     | 1m 1d       | 0           | 0            |                    |
| 2021-04 | 100% | 100     | 1m          | 0           | 0            |                    |
| 2021-03 | 100% | 100     | 1m 1d       | 0           | 0            |                    |
| 2021-02 | 100% | 100     | 28d         | 0           | 0            |                    |

Note that **negative problem duration** does not affect SLA calculation or reporting.

3 Inventory

Overview

The Inventory menu features sections providing an overview of host inventory data by a chosen parameter as well as the ability to view host inventory details.

1 Overview

Overview

The *Inventory* → *Overview* section provides ways of having an overview of **host inventory** data.

For an overview to be displayed, choose host groups (or none) and the inventory field by which to display data. The number of hosts corresponding to each entry of the chosen field will be displayed.

≡ Host inventory overview

Filter

Host groups

type here to search

Select

Grouping by

Type

Apply

Reset

| Type          | Host count |
|---------------|------------|
| Server        | 4          |
| Zabbix server | 1          |

The completeness of an overview depends on how much inventory information is maintained with the hosts. Numbers in the *Host count* column are links; they lead to these hosts being filtered out in the *Host Inventories* table.

≡ Host inventory

Filter

Host groups

type here to search

Select

Field

Type

equals

Server

Apply

Reset

| Host          | Group          | Name       | Type          | OS   | Serial number | Tag | MAC address |
|---------------|----------------|------------|---------------|--|---------------|-----|-------------|
| Zabbix server | Zabbix servers | martins-hp | Zabbix server | Linux version 5.3.0-46-generic (buildd@lcy01-amd64-013) (gcc version 7.5.0 (Ubuntu 7.5.0-3ubuntu1~18.04)) #38~18.04.1-Ubuntu SMP |               |     |             |

Displaying 1 of 1 found

2 Hosts

Overview

In the *Inventory* → *Hosts* section **inventory data** of hosts are displayed.

You can filter the hosts by host group(s) and by any inventory field to display only the hosts you are interested in.

≡ Host inventory

Filter

Host groups

type here to search

Select

Field

Type

contains

Zab

Apply

Reset

| Host          | Group          | Name       | Type          | OS   | Serial number | Tag | MAC address |
|---------------|----------------|------------|---------------|--|---------------|-----|-------------|
| Zabbix server | Zabbix servers | martins-hp | Zabbix server | Linux version 5.3.0-46-generic (buildd@lcy01-amd64-013) (gcc version 7.5.0 (Ubuntu 7.5.0-3ubuntu1~18.04)) #38~18.04.1-Ubuntu SMP |               |     |             |

Displaying 1 of 1 found

To display all host inventories, press the "Reset" button.

While only some key inventory fields are displayed in the table, you can also view all available inventory information for that host. To do that, click on the host name in the first column.

Inventory details

The **Overview** tab contains some general information about the host, latest monitoring data, and host configuration options:

≡ Host inventory

OverviewDetails

Host nameZabbix server

Agent interfaces

| IP address | DNS name | Connect to       | Port  |
|------------|----------|------------------|-------|
| 127.0.0.1  |          | <div>IPDNS</div> | 10050 |

SNMP interfaces

|           |  |                  |     |
|-----------|--|------------------|-----|
| 127.0.0.1 |  | <div>IPDNS</div> | 161 |
|-----------|--|------------------|-----|

OS

Linux version 5.3.0-46-generic (buildd@lcy01-amd64-013) (gcc version 7.5.0 (Ubuntu 7.5.0-3ubuntu1~18.04)) #38~18.04.1-Ubuntu SMP

Monitoring

WebLatest dataProblemsGraphsDashboards

Configuration

HostItems 148Triggers 67Graphs 28Discovery 4Web 1

Cancel

The **Details** tab contains all available inventory details for the host:

OverviewDetails

TypeZabbix server

Name

martins-hp

OS

Linux version 5.3.0-46-generic (buildd@lcy01-amd64-013) (gcc version 7.5.0 (Ubuntu 7.5.0-3ubuntu1~18.04)) #38~18.04.1-Ubuntu SMP

Cancel

The completeness of inventory data depends on how much inventory information is maintained with the host. If no information is maintained, the *Details* tab is disabled.

4 Reports

Overview

The Reports menu features several sections that contain a variety of predefined and user-customizable reports focused on displaying an overview of such parameters as system information, triggers and gathered data.

1 System information

Overview

In Reports → System information, a summary of key Zabbix server and system data is displayed. System data is collected using *internal items*.

Note that in a high availability setup, it is possible to redirect the system information source (server instance). To do this, edit the *zabbix.conf.php* file - uncomment and set \$ZBX\_SERVER or both \$ZBX\_SERVER and \$ZBX\_SERVER\_PORT to a server other than the one shown active. Note that when setting \$ZBX\_SERVER only, a default value (10051) for \$ZBX\_SERVER\_PORT will be used.

With the high availability setup enabled, a separate block is displayed below the system stats with details of high availability nodes. This block is visible to Zabbix *Super Admin* users only.

*System information* is also available as a dashboard **widget**.

## System stats

### System information

| Parameter  | Value   | Details                   |
|--|---------|---------------------------|
| Zabbix server is running                           | Yes     | 192.168.8.103:10051       |
| Number of hosts (enabled/disabled)                 | 5       | 4 / 1                     |
| Number of templates                                | 140     |                           |
| Number of items (enabled/disabled/not supported)   | 199     | 155 / 29 / 15             |
| Number of triggers (enabled/disabled [problem/ok]) | 89      | 87 / 2 [8 / 79]           |
| Number of users (online)                           | 3       | 1                         |
| Required server performance, new values per second | 1.96    |                           |
| High availability cluster                          | Enabled | Fail-over delay: 1 minute |

| Name  | Address             | Last access | Status  |
|-------|---------------------|-------------|---------|
| base  | 192.168.8.103:10051 | 2s          | Active  |
| base2 | localhost:10051     | 5m 11s      | Stopped |

## Displayed data:

| Parameter   | Value   | Details   |
|---|---|---|
| <i>Zabbix server is running</i>                           | Status of Zabbix server:<br><b>Yes</b> - server is running<br><b>No</b> - server is not running<br><i>Note:</i> To display the rest of the information the web, frontend needs the server to be running and there must be at least one trapper process started on the server (StartTrappers parameter in <code>zabbix_server.conf</code> file > 0). | Location and port of Zabbix server.   |
| <i>Number of hosts</i>                                    | Total number of hosts configured is displayed.  | Number of monitored hosts/not monitored hosts.  |
| <i>Number of templates</i>                                | Total number of templates is displayed.   |   |
| <i>Number of items</i>                                    | Total number of items is displayed.   | Number of monitored/disabled/unsupported host-level items.<br>Items on disabled hosts are counted as disabled.  |
| <i>Number of triggers</i>                                 | Total number of triggers is displayed.  | Number of enabled/disabled host-level triggers; split of the enabled triggers according to "Problem"/"OK" states.<br><br>Triggers listed under the "OK" state include triggers with the status "Unknown".<br>Triggers dependent on disabled items or assigned to disabled hosts are counted as disabled.  |
| <i>Number of users</i>                                    | Total number of users configured is displayed.  | Number of users online.   |
| <i>Required server performance, new values per second</i> | The expected number of new values processed by Zabbix server per second is displayed.   | <i>Required server performance</i> is an estimate and can be useful as a guideline. For precise numbers of values processed, use the <code>zabbix[ocache,values,all]</code> <b>internal item</b> .<br><br>Enabled items from monitored hosts are included in the calculation. Log items are counted as one value per item update interval. Regular interval values are counted; flexible and scheduling interval values are not. The calculation is not adjusted during a "nodata" maintenance period. Trapper items are not counted. |
| <i>Database history tables upgraded</i>                   | Database upgrade status:<br><b>No</b> - database history tables have not been upgraded  | This field is displayed if database upgrade to extended range for numeric (float) values has not been completed. See <a href="#">instructions for enabling an extended range of numeric (float) values</a> .  |

| Parameter                 | Value   | Details                                      |
|---------------------------|---|--|
| High availability cluster | Status of <b>high availability cluster</b> for Zabbix server:<br><b>disabled</b> - standalone server<br><b>enabled</b> - at least one high availability node exists | If enabled, the failover delay is displayed. |

System information will also display an error message in the following conditions:

- The database used does not have the required character set or collation (UTF-8).
- The version of the database is below or above the **supported range** (available only to users with the *Super admin role* type).
- **Housekeeping** for **TimescaleDB** is incorrectly configured (history or trend tables contain compressed chunks, but *Override item history period* or *Override item trend period* options are disabled).

#### High availability nodes

If **high availability cluster** is enabled, then another block of data is displayed with the status of each high availability node.

| Name        | Address            | Last access             | Status      |
|-------------|--------------------|-------------------------|-------------|
| node-active | 192.168.1.13:10051 | 12s                     | Active      |
| node6       | 192.168.1.10:10053 | 1h 2m 40s               | Unavailable |
| node7       | 192.168.1.11:10053 | 3m 40s                  | Unavailable |
| node4       | 192.168.1.8:10052  | 1h 34m 29s              | Stopped     |
| node5       | 192.168.1.9:10053  | 1h 9m 51s               | Stopped     |
| node8       | 192.168.1.12:10051 | 21m 16s                 | Stopped     |
| node1       | 192.168.1.5:10051  | 17s                     | Standby     |
| node2       | 192.168.1.6:10051  | 16s                     | Standby     |
| node3       | 192.168.1.7:10052  | 16s 2021-10-20 17:58:47 | Standby     |

Displayed data:

| Column             | Description  |
|--------------------|--|
| <i>Name</i>        | Node name, as defined in server configuration.   |
| <i>Address</i>     | Node IP address and port.  |
| <i>Last access</i> | Time of node last access.  |
| <i>Status</i>      | Hovering over the cell shows the timestamp of last access in long format.<br>Node status:<br><b>Active</b> - node is up and working<br><b>Unavailable</b> - node hasn't been seen for more than failover delay (you may want to find out why)<br><b>Stopped</b> - node has been stopped or couldn't start (you may want to start it or delete it)<br><b>Standby</b> - node is up and waiting |

## 2 Scheduled reports

### Overview

In *Reports* → *Scheduled reports*, users with sufficient permissions can configure scheduled generation of PDF versions of the dashboards, which will be sent by email to specified recipients.

#### Scheduled reports

[Create report](#)

Show All Created by me

Status Any Enabled Disabled Expired

[Filter](#)

[Apply](#) [Reset](#)

| <input type="checkbox"/> Name              | Owner                        | Repeats | Period       | Last sent | Status  | Info |
|--|------------------------------|---------|--------------|-----------|---------|------|
| <input type="checkbox"/> Global view daily | Admin (Zabbix Administrator) | Daily   | Previous day | Never     | Enabled |      |

Displaying 1 of 1 found

The opening screen displays information about scheduled reports, which can be filtered out for easy navigation - see **Using filter** section below.

Displayed data:

| Column           | Description   |
|------------------|---|
| <i>Name</i>      | Name of the report. Clicking it opens the report <b>configuration form</b> .  |
| <i>Owner</i>     | User who created the report.  |
| <i>Repeats</i>   | Report generation frequency (daily/weekly/monthly/yearly).  |
| <i>Period</i>    | Period for which the report is prepared.  |
| <i>Last sent</i> | The date and time when the latest report has been sent.   |
| <i>Status</i>    | Current status of the report (enabled/disabled/expired). Users with sufficient permissions can change the status by clicking it - from "Enabled" to "Disabled" (and back); from "Expired" to "Disabled" (and back). For users with insufficient rights, the status is not clickable.  |
| <i>Info</i>      | Displays informative icons:<br>A red icon indicates that report generation has failed; hovering over it will display a tooltip with the error information.<br>A yellow icon indicates that a report was generated, but sending to some (or all) recipients has failed or that a report is expired; hovering over it will display a tooltip with additional information. |

Using filter

You may use the filter to narrow down the list of reports. For better search performance, data is searched with macros unresolved.

The following filtering options are available:

- *Name* - partial name match is allowed
- *Show* - created by current user or all reports
- *Status* - select between "Any" (show all reports), "Enabled", "Disabled", or "Expired"

The filter is located below the *Scheduled reports* section name. It can be opened and collapsed by clicking the *Filter* tab in the upper right corner.

Mass update

Sometimes you may want to delete or change the status of a number of reports at once. Instead of opening each individual report for editing, you may use the mass update function for that.

To mass-update some reports, do the following:

- Mark the checkboxes of the reports to update in the list
- Click the required button below the list to make the changes (*Enable*, *Disable*, or *Delete*)

### 3 Availability report

Overview

In *Reports* → *Availability report* you can see what proportion of time each trigger has been in problem/ok state. The percentage of time for each state is displayed.

Thus it is easy to determine the availability situation of various elements on your system.

≡ Availability report Mode By host ▾

< Zoom out > Last 1 hour ⌚ Filter 🏠

Host groups  Select

Hosts  Select

Apply Reset

| Host          | Name   | Problems | Ok        | Graph                |
|---------------|--|----------|-----------|----------------------|
| Zabbix server | /: Disk space is critically low (used > 90%)                     |          | 100.0000% | <a href="#">Show</a> |
| Zabbix server | /: Disk space is low (used > 80%)                                | 0.0556%  | 99.9444%  | <a href="#">Show</a> |
| Zabbix server | /: Running out of free inodes (free < 10%)                       |          | 100.0000% | <a href="#">Show</a> |
| Zabbix server | /: Running out of free inodes (free < 20%)                       |          | 100.0000% | <a href="#">Show</a> |
| Zabbix server | /etc/passwd has been changed                                     |          | 100.0000% | <a href="#">Show</a> |
| Zabbix server | Configured max number of open filedescriptors is too low (< 256) |          | 100.0000% | <a href="#">Show</a> |

From the drop-down in the upper right corner, you can choose the selection mode - whether to display triggers by hosts or by triggers belonging to a template.

Availability report

Mode By trigger template

Template group

all

Template

all

Template trigger

all

Host group

all

Apply

Reset

Host

Name

Problems

Ok

Graph

My host

/etc/passwd has been changed

100.0000%

Show

My host

Configured max number of open filedescriptors is too low (< 256)

100.0000%

Show

My host

Configured max number of processes is too low (< 1024)

100.0000%

Show

My host

Getting closer to process limit (over 80% used)

100.0000%

Show

My host

High CPU utilization (over 90% for 5m)

100.0000%

Show

My host

High memory utilization ( >90% for 5m)

100.0000%

Show

My host

High swap space usage ( less than 50% free)

100.0000%

Show

My host

Lack of available memory ( < 20M of 15.54 GB)

100.0000%

Show

My host

Load average is too high (per CPU load over 1.5 for 5m)

100.0000%

Show

The name of the trigger is a link to the latest events of that trigger.

### Using filter

The filter can help narrow down the number of hosts and/or triggers displayed. For better search performance, data is searched with macros unresolved.

The filter is located below the *Availability report* section name. It can be opened and collapsed by clicking on the *Filter* tab on the right.

### Filtering by trigger template

In the *by trigger template* mode results can be filtered by one or several parameters listed below.

| Parameter               | Description   |
|-------------------------|---|
| <i>Template group</i>   | Select all hosts with triggers from templates belonging to that group. Any host group that includes at least one template can be selected.  |
| <i>Template</i>         | Select hosts with triggers from the chosen template and all nested templates. Only triggers inherited from the selected template will be displayed. If a nested template has additional own triggers, those triggers will not be displayed. |
| <i>Template trigger</i> | Select hosts with chosen trigger. Other triggers of the selected hosts will not be displayed.   |
| <i>Host group</i>       | Select hosts belonging to the group.  |

### Filtering by host

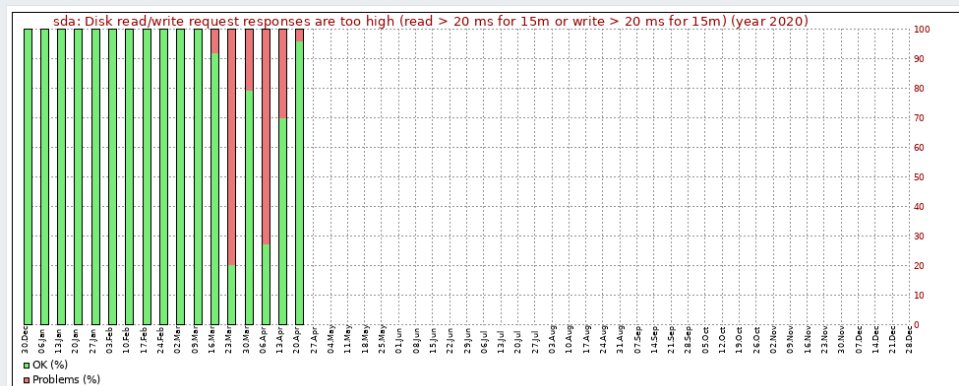
In the *by host* mode results can be filtered by a host or by the host group. Specifying a parent host group implicitly selects all nested host groups.

### Time period selector

The **time period selector** allows to select often required periods with one mouse click. The time period selector can be opened by clicking on the time period tab next to the filter.

Clicking on *Show* in the Graph column displays a bar graph where availability information is displayed in bar format each bar representing a past week of the current year.





The green part of a bar stands for OK time and red for problem time.

## 4 Triggers top 100

### Overview

In *Reports* → *Triggers top 100* you can see the triggers that have changed their state most often within the period of evaluation, sorted by the number of status changes.

### 100 busiest triggers

< Zoom out >
Last 30 days 
Filter

Host groups  Select

Hosts  Select

Severity
☒ Not classified
☒ Warning
☒ High
☒ Information
☒ Average
☒ Disaster

Apply Reset

| Host                          | Trigger  | Severity    | Number of status changes |
|-------------------------------|--|-------------|--------------------------|
| <a href="#">New host</a>      | <a href="#">CPU load too high on New host for 3 minutes</a>                | Warning     | 92                       |
| <a href="#">Zabbix server</a> | <a href="#">Disk I/O is overloaded on Zabbix server</a>                    | Warning     | 88                       |
| <a href="#">New host</a>      | <a href="#">Disk I/O is overloaded on New host</a>                         | Warning     | 82                       |
| <a href="#">New host</a>      | <a href="#">New host has just been restarted</a>                           | Information | 19                       |
| <a href="#">Zabbix server</a> | <a href="#">Zabbix server has just been restarted</a>                      | Information | 19                       |
| <a href="#">Zabbix server</a> | <a href="#">Lack of free swap space on Zabbix server</a>                   | Warning     | 16                       |
| <a href="#">New host</a>      | <a href="#">Lack of free swap space on New host</a>                        | Warning     | 12                       |
| <a href="#">New host</a>      | <a href="#">Zabbix agent on New host is unreachable for 5 minutes</a>      | Average     | 8                        |
| <a href="#">Zabbix server</a> | <a href="#">Zabbix agent on Zabbix server is unreachable for 5 minutes</a> | Average     | 8                        |
| <a href="#">New host</a>      | <a href="#">/etc/passwd has been changed on New host</a>                   | Warning     | 4                        |

Both host and trigger column entries are links that offer some useful options:

- for host - links to user-defined scripts, latest data, inventory, graphs, and dashboards for the host
- for trigger - links to latest events, the trigger configuration form, and a simple graph

### Using filter

You may use the filter to display triggers by host group, host, or trigger severity. Specifying a parent host group implicitly selects all nested host groups. For better search performance, data is searched with macros unresolved.

The filter is located below the *100 busiest triggers* bar. It can be opened and collapsed by clicking on the *Filter* tab on the right.

### Time period selector

The **time period selector** allows to select often required periods with one mouse click. The time period selector can be opened by clicking on the time period tab next to the filter.

5 Audit

Overview

In the *Reports* → *Audit* section, the records of user and system activity can be viewed.

**Note:**

For audit records to be collected and displayed, the *Enable audit logging* checkbox has to be marked in the *Administration* → *General* → *Audit log* section. Without this setting enabled, the history of activities will not be recorded in the database and will not be shown in the audit log.

Audit log

| Time                | User  | IP        | Resource | ID | Action       | Recordset ID              | Details  |
|---------------------|-------|-----------|----------|----|--------------|---------------------------|--|
| 2022-05-30 12:07:34 | Admin | 127.0.0.1 | User     | 4  | Update       | cl3sicbqq0000z8ep87xz41zs | Description: Database manager<br>user.lang: default => en_GB |
| 2022-05-30 12:07:13 | Admin | 127.0.0.1 | User     | 1  | Login        | cl3sibvqn0000z8ep40q8w1k  |  |
| 2022-05-30 12:07:13 | guest | 127.0.0.1 | User     | 2  | Failed login | cl3sibvqn0000z8ep40q8w1k  |  |
| 2022-05-30 12:07:12 | guest | 127.0.0.1 | User     | 2  | Failed login | cl3sibvem0000z8epv1m1xizi |  |

Audit log displays the following data:

| Column       | Description   |
|--------------|---|
| Time         | Timestamp of the audit record.  |
| User         | User who performed the activity.  |
| IP           | IP from which the activity was initiated.   |
| Resource     | Type of the affected resource ( <i>API token</i> , <i>Action</i> , <i>Authentication</i> , <i>Autoregistration</i> , etc.).   |
| ID           | ID of the affected resource.<br>Clicking on the hyperlink will result in filtering audit log records by this resource ID.   |
| Action       | Type of the activity ( <i>Add</i> , <i>Delete</i> , <i>Execute</i> , <i>Failed login</i> , <i>History clear</i> , <i>Login</i> , <i>Logout</i> , <i>Update</i> ).   |
| Recordset ID | Shared ID for all audit log records created as a result of the same operation. For example, when linking a template to a host, a separate audit log record is created for each inherited template entity (item, trigger, etc.) - all these records will have the same <i>Recordset ID</i> .<br>Clicking on the hyperlink will result in filtering audit log records by this <i>Recordset ID</i> . |
| Details      | Description of the resource and detailed information about the performed activity. If a record contains more than two rows, an additional link <i>Details</i> will be displayed. Click on this link to view the full list of changes.   |

Using filter

The filter is located below the *Audit log* bar. It can be opened and collapsed by clicking on the *Filter* tab in the upper right corner.

Zoom out

Last 3 hours

Filter

Users

Select

Resource

All

Resource ID

Recordset ID

Actions

☐ Add

☒ Failed login

☐ Logout

☐ Delete

☐ History clear

☐ Update

☐ Execute

☒ Login

Apply

Reset

You may use the filter to narrow down the records by user, affected resource, resource ID and performed operation (*Recordset ID*). You may also select the action (e.g., add, update, delete, etc.) for the resource. Since Zabbix 6.0.5, one or more actions can be selected.

For better search performance, all data is searched with macros unresolved.

Time period selector

The **time period selector** allows to select often required periods with one mouse click. The time period selector can be opened by clicking on the time period tab next to the filter.

6 Action log

Overview

In the Reports → Action log section users can view details of operations (notifications, remote commands) executed within an action.

Action log

<Zoom out>

This month

Filter

Recipients

Select

Apply

Reset

| Time                | Action                                   | Type  | Recipient   | Message  | Status | Info |
|---------------------|--|-------|---|--|--------|------|
| 2020-06-09 15:47:16 | Report problems to Zabbix administrators | Email | Admin (Zabbix Administrator) marina.generalova@zabbix.com | <b>Subject:</b> Resolved in 2m: High CPU utilization (over 75% for 5m)<br><br><b>Message:</b> Problem has been resolved at 15:47:13 on 2020.06.09<br>Problem name: High CPU utilization (over 75% for 5m)<br>Problem duration: 2m<br>Host: Zabbix server<br>Severity: Warning<br>Original problem ID: 1287 | Sent   |      |
| 2020-06-09 15:44:40 | Report problems to Zabbix administrators | Email | Admin (Zabbix Administrator) marina.generalova@zabbix.com | <b>Subject:</b> Resolved in 3m: Zabbix agent is not available (for 1m)<br><br><b>Message:</b> Problem has been resolved at 15:44:37 on 2020.06.09<br>Problem name: Zabbix agent is not available (for 1m)<br>Problem duration: 3m<br>Host: Zabbix server<br>Severity: Average<br>Original problem ID: 1286 | Sent   |      |

Displayed data:

| Column       | Description  |
|--------------|--|
| Time         | Timestamp of the operation.  |
| Action       | Name of the action causing operations is displayed.  |
| Type         | Operation type is displayed.   |
| Recipient(s) | Username, name, surname (in parentheses) and e-mail address of the notification recipient is displayed.  |
| Message      | The content of the message, remote command or global script name is displayed.<br>A remote command is separated from the target host with a colon symbol: <host>:<command>.<br>If the remote command is executed on Zabbix server, then the information has the following format: Zabbix server:<command>  |
| Status       | Operation status is displayed:<br>In progress - action is in progress<br>For actions in progress the number of retries left is displayed - the remaining number of times the server will try to send the notification.<br>Sent - notification has been sent<br>Executed - command has been executed<br>Not sent - action has not been completed. |
| Info         | Error information (if any) regarding the action execution is displayed.  |

Using filter

You may use the filter to narrow down the records by the message recipient(s). For better search performance, data is searched with macros unresolved.

The filter is located below the Action log bar. It can be opened and collapsed by clicking on the Filter tab on the right.

Time period selector

The time period selector allows to select often required periods with one mouse click. The time period selector can be opened by clicking on the time period tab next to the filter.

7 Notifications

Overview

In the Reports → Notifications section a report on the number of notifications sent to each user is displayed.

From the dropdowns in the top right-hand corner you can choose the media type (or all), period (data for each day/week/month/year) and year for the notifications sent.

| Month    | Admin (Zabbix Administrator) | Database manager | guest | user (New User) |
|----------|------------------------------|------------------|-------|-----------------|
| January  |                              |                  |       |                 |
| February |                              |                  |       |                 |
| March    |                              |                  |       |                 |
| April    | 48                           |                  |       |                 |
| May      | 568                          |                  |       |                 |

Each column displays totals per one system user.

## 5 Configuration

### Overview

The Configuration menu contains sections for setting up major Zabbix functions, such as hosts and host groups, data gathering, data thresholds, sending problem notifications, creating data visualization and others.

### 1 Items

### Overview

The item list for a template can be accessed from *Configuration* → *Templates* by clicking on *Items* for the respective template.

A list of existing items is displayed.

| All templates / Template OS Linux by Zabbix agent... |   |            |                 |          |         |        |                       |         |                           | Items 41 | Triggers 14 | Graphs 8 | Dashboards 1 | Discovery rules 3 | Web scenarios | Filter |  |
|--|---|------------|-----------------|----------|---------|--------|-----------------------|---------|---------------------------|----------|-------------|----------|--------------|-------------------|---------------|--------|--|
| <input type="checkbox"/>                             | Name  | Triggers   | Key             | Interval | History | Trends | Type                  | Status  | Tags                      |          |             |          |              |                   |               |        |  |
| <input type="checkbox"/>                             | ... Template Module Zabbix agent active: Host name of Zabbix agent running                        |            | agent.hostname  | 1h       | 7d      |        | Zabbix agent (active) | Enabled | Application: Monitorin... |          |             |          |              |                   |               |        |  |
| <input type="checkbox"/>                             | ... Template Module Zabbix agent active: Zabbix agent ping  | Triggers 1 | agent.ping      | 1m       | 7d      | 365d   | Zabbix agent (active) | Enabled | Application: Status       |          |             |          |              |                   |               |        |  |
| <input type="checkbox"/>                             | ... Template Module Zabbix agent active: Version of Zabbix agent running                          |            | agent.version   | 1h       | 7d      |        | Zabbix agent (active) | Enabled | Application: Monitorin... |          |             |          |              |                   |               |        |  |
| <input type="checkbox"/>                             | ... Template Module Linux generic by Zabbix agent active: Maximum number of open file descriptors | Triggers 1 | kernel.maxfiles | 1h       | 7d      | 365d   | Zabbix agent (active) | Enabled | Application: General      |          |             |          |              |                   |               |        |  |
| <input type="checkbox"/>                             | ... Template Module Linux generic by Zabbix agent active: Maximum number of processes             | Triggers 2 | kernel.maxproc  | 1h       | 7d      | 365d   | Zabbix agent (active) | Enabled | Application: General      |          |             |          |              |                   |               |        |  |
| <input type="checkbox"/>                             | ... Template Module Linux generic by Zabbix agent active: Number of processes                     | Triggers 1 | proc.num        | 1m       | 7d      | 365d   | Zabbix agent (active) | Enabled | Application: General      |          |             |          |              |                   |               |        |  |
| <input type="checkbox"/>                             | ... Template Module Linux generic by Zabbix agent active: Number of running processes             |            | proc.num[,run]  | 1m       | 7d      | 365d   | Zabbix agent (active) | Enabled | Application: General      |          |             |          |              |                   |               |        |  |

Displayed data:

| Column           | Description   |
|------------------|---|
| <i>Item menu</i> | Click on the three-dot icon to open the menu for this specific item with these options:<br><b>Create trigger</b> - create a trigger based on this item<br><b>Triggers</b> - click to see a list with links to already-configured trigger of this item<br><b>Create dependent item</b> - create a dependent item for this item<br><b>Create dependent discovery rule</b> - create a dependent discovery rule for this item |
| <i>Template</i>  | Template the item belongs to.<br>This column is displayed only if multiple templates are selected in the filter.  |
| <i>Name</i>      | Name of the item displayed as a blue link to item details.<br>Clicking on the item name link opens the item <b>configuration form</b> .<br>If the item is inherited from another template, the template name is displayed before the item name, as a gray link. Clicking on the template link will open the item list on that template level.   |
| <i>Triggers</i>  | Moving the mouse over Triggers will display an infobox displaying the triggers associated with the item.<br>The number of the triggers is displayed in gray.  |
| <i>Key</i>       | Item key is displayed.  |
| <i>Interval</i>  | Frequency of the check is displayed.  |

| Column         | Description  |
|----------------|--|
| <i>History</i> | How many days item data history will be kept is displayed.   |
| <i>Trends</i>  | How many days item trends history will be kept is displayed.   |
| <i>Type</i>    | Item type is displayed (Zabbix agent, SNMP agent, simple check, etc).  |
| <i>Status</i>  | Item status is displayed - <i>Enabled</i> or <i>Disabled</i> . By clicking on the status you can change it - from Enabled to Disabled (and back).                              |
| <i>Tags</i>    | Item tags are displayed.<br>Up to three tags (name:value pairs) can be displayed. If there are more tags, a "... " link is displayed that allows to see all tags on mouseover. |

To configure a new item, click on the *Create item* button at the top right corner.

## Mass editing options

Buttons below the list offer some mass-editing options:

- *Enable* - change item status to *Enabled*.
- *Disable* - change item status to *Disabled*.
- *Copy* - copy the items to other hosts or templates.
- *Mass update* - **update several properties** for a number of items at once.
- *Delete* - delete the items.

To use these options, mark the checkboxes before the respective items, then click on the required button.

## Using filter

The item list may contain a lot of items. By using the filter, you can filter out some of them to quickly locate the items you're looking for. For better search performance, data is searched with macros unresolved.

The *Filter* icon is available at the top right corner. Clicking on it will open a filter where you can specify the desired filtering criteria.

| Parameter                  | Description   |
|----------------------------|---|
| <i>Template groups</i>     | Filter by one or more template groups.<br>Only template groups that contain at least one template can be selected.<br>Specifying a parent template group implicitly selects all nested template groups. |
| <i>Templates</i>           | Filter by one or more templates.  |
| <i>Name</i>                | Filter by item name.  |
| <i>Key</i>                 | Filter by item key.   |
| <i>Value mapping</i>       | Filter by the value map used.   |
| <i>Type</i>                | This parameter is not displayed if the <i>Templates</i> option is empty.  |
| <i>Type of information</i> | Filter by item type (Zabbix agent, SNMP agent, etc.).<br>Filter by type of information (Numeric unsigned, float, etc.).   |

| Parameter              | Description   |
|------------------------|---|
| <i>History</i>         | Filter by how long item history is kept.  |
| <i>Trends</i>          | Filter by how long item trends are kept.  |
| <i>Update interval</i> | Filter by item update interval.   |
| <i>Tags</i>            | Specify tags to limit the number of items displayed. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.<br>There are several operators available for each condition:<br><b>Exists</b> - include the specified tag names<br><b>Equals</b> - include the specified tag names and values (case-sensitive)<br><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br><b>Does not exist</b> - exclude the specified tag names<br><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)<br><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br>There are two calculation types for conditions:<br><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition<br><b>Or</b> - enough if one condition is met |
| <i>Status</i>          | Filter by item status - <i>Enabled</i> or <i>Disabled</i> .   |
| <i>Triggers</i>        | Filter items with (or without) triggers.  |
| <i>Inherited</i>       | Filter items inherited (or not inherited) from linked templates.  |

## Using subfilter

The subfilter allows to further modify the filtering from the main filter.

It contains clickable links for a quick access to related items. Items are related by common entity - tag, item type, item update interval, etc. When an entity is clicked, the entity is highlighted with a gray background, and items are immediately filtered (no need to click *Apply* in the main filter). Clicking another entity adds it to the filtered results. Clicking the entity again removes the filtering.

Subfilter affects only filtered data

TAGS

component: application 1 component: cpu 17 component: environment 1 component: memory 7 component: os 3 component: raw 1 component: security 1

TYPES

Zabbix agent 40 Zabbix internal 1 Dependent item 2

TYPE OF INFORMATION

Numeric (float) 19 Character 7 Numeric (unsigned) 16 Text 1

WITH TRIGGERS

Without triggers 23 With triggers 20

HISTORY

0 1 1w 42

TRENDS

0 1 52w 1d 34

INTERVAL

30s 1 1m 29 15m 3 1h 8

Subfilters are generated based on the filtered data, which is limited to 1000 records. If you want to see more records in the subfilter, you need to increase the value of *Limit for search and filter results* parameter (in *Administration* -> *General* -> *GUI*).

Unlike the main filter, the subfilter is updated with each table refresh request to always have up-to-date information of available filtering options and their counter numbers.

The number of entities displayed is limited to 100 horizontally. If there are more, a three-dot icon is displayed at the end; it is not clickable.

A number next to each clickable entity indicates the number of items grouped in it (based on the results of the main filter). When an entity is clicked, the numbers with other available entities are displayed with a plus sign indicating how many items may be added to the current selection. Entities without items are not displayed unless selected in the subfilter before.

2 Triggers

## Overview

The trigger list for a template can be accessed from *Configuration* → *Templates* by clicking on *Triggers* for the respective template.

Triggers Create trigger

All templates / Linux OS agent Items 42 Triggers 14 Graphs 8 Dashboards 1 Discovery rules 3 Web scenarios Filter

| <input type="checkbox"/> | Severity    | Name  | Operational data                                   | Expression  | Status  | Tags |
|--------------------------|-------------|---|--|---|---------|------|
| <input type="checkbox"/> | Information | Template Module Linux generic by Zabbix agent: <a href="#">/etc/passwd has been changed</a><br><b>Depends on:</b><br>Linux OS agent: Operating system description has changed<br>Linux OS agent: System name has changed (new name: {ITEM.VALUE}) |  | <code>(last(/Linux OS agent/vfs.file.cksum[/etc/passwd],#1)&lt;=&gt;last(/Linux OS agent/vfs.file.cksum[/etc/passwd],#2))&gt;0</code> | Enabled |      |
| <input type="checkbox"/> | Information | Template Module Linux generic by Zabbix agent: <a href="#">Configured maximum number of open file descriptors is too low (&lt; { \$KERNEL.MAXFILES.MIN})</a>  |  | <code>last(/Linux OS agent/kernel.maxfiles)&lt;{\$KERNEL.MAXFILES.MIN}</code>   | Enabled |      |
| <input type="checkbox"/> | Information | Template Module Linux generic by Zabbix agent: <a href="#">Configured maximum number of processes is too low (&lt; { \$KERNEL.MAXPROC.MIN})</a><br><b>Depends on:</b><br>Linux OS agent: Getting closer to process limit (over 80% used)          |  | <code>last(/Linux OS agent/kernel.maxproc)&lt;{\$KERNEL.MAXPROC.MIN}</code>   | Enabled |      |
| <input type="checkbox"/> | Warning     | Template Module Linux generic by Zabbix agent: <a href="#">Getting closer to process limit (over 80% used)</a>  | {ITEM.LASTVALUE1} active, {ITEM.LASTVALUE2} limit. | <code>last(/Linux OS agent/proc.num)/last(/Linux OS agent/kernel.maxproc)*100&gt;80</code>  | Enabled |      |
| <input type="checkbox"/> | Warning     | Template Module Linux CPU by Zabbix agent: <a href="#">High CPU utilization (over { \$CPU.UTIL.CRIT}% for 5m)</a><br><b>Depends on:</b><br>Linux OS agent: Load average is too high (per CPU load over { \$LOAD_AVG_PER_CPU.MAX.WARN} for 5m)     | Current utilization: {ITEM.LASTVALUE1}             | <code>min(/Linux OS agent/system.cpu.util,5m)&gt;{\$CPU.UTIL.CRIT}</code>   | Enabled |      |

Displayed data:

| Column           | Description  |
|------------------|--|
| Severity         | Severity of the trigger is displayed by both name and cell background color.   |
| Template         | Template the trigger belongs to.<br>This column is displayed only if multiple templates are selected in the filter.  |
| Name             | Name of the trigger displayed as a blue link to trigger details.<br>Clicking on the trigger name link opens the trigger <b>configuration form</b> .<br>If the trigger is inherited from another template, the template name is displayed before the trigger name, as a gray link. Clicking on the template link will open the trigger list on that template level. |
| Operational data | Operational data definition of the trigger, containing arbitrary strings and macros that will resolve dynamically in <i>Monitoring</i> → <i>Problems</i> .   |
| Expression       | Trigger expression is displayed. The template-item part of the expression is displayed as a link, leading to the item configuration form.  |
| Status           | Trigger status is displayed - <i>Enabled</i> or <i>Disabled</i> . By clicking on the status you can change it - from Enabled to Disabled (and back).   |
| Tags             | If a trigger contains tags, tag name and value are displayed in this column.   |

To configure a new trigger, click on the *Create trigger* button at the top right corner.

### Mass editing options

Buttons below the list offer some mass-editing options:

- *Enable* - change trigger status to *Enabled*
- *Disable* - change trigger status to *Disabled*
- *Copy* - copy the triggers to other hosts or templates
- *Mass update* - update several properties for a number of triggers at once
- *Delete* - delete the triggers

To use these options, mark the checkboxes before the respective triggers, then click on the required button.

### Using filter

You can use the filter to display only the triggers you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* icon is available at the top right corner. Clicking on it will open a filter where you can specify the desired filtering criteria.

All templates / Linux by Zabbix agent Items 43 Triggers 15 Graphs 8 Dashboards 3 Discovery rules 3 Web scenarios
Filter

Template groups
Select

Tags
And/Or Or

Templates
Linux by Zabbix agent x
Select

tag

Remove

Name

Inherited
All Yes No

Severity
☐ Not classified
☐ Warning
☐ High

With dependencies
All Yes No

☐ Information
☐ Average
☐ Disaster

Status
All Enabled Disabled

Apply Reset

| Parameter         | Description   |
|-------------------|---|
| Template groups   | Filter by one or more template groups.<br>Only template groups that contain at least one template can be selected.  |
| Templates         | Filter by one or more templates.<br>If host groups are already selected above, template selection is limited to those groups.   |
| Name              | Filter by trigger name.   |
| Severity          | Select to filter by one or several trigger severities.  |
| Status            | Filter by trigger status.   |
| Tags              | Filter by trigger tag name and value. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.<br>There are several operators available for each condition:<br><b>Exists</b> - include the specified tag names<br><b>Equals</b> - include the specified tag names and values (case-sensitive)<br><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br><b>Does not exist</b> - exclude the specified tag names<br><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)<br><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br>There are two calculation types for conditions:<br><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition<br><b>Or</b> - enough if one condition is met<br>Macros and <b>macro functions</b> are supported in tag name and tag value fields. |
| Inherited         | Filter triggers inherited (or not inherited) from linked templates.   |
| With dependencies | Filter triggers with (or without) dependencies.   |

### 3 Graphs

#### Overview

The custom graph list for a template can be accessed from *Configuration* → *Templates* by clicking on *Graphs* for the respective template.

A list of existing graphs is displayed.

Graphs

Create graph

| All templates / Template App Zabbix Server Applications 1 Items 46 Triggers 34 Graphs 6 Dashboards 1 Discovery rules Web scenarios |       |        |            | Filter |
|--|-------|--------|------------|--------|
| <input type="checkbox"/> Name  | Width | Height | Graph type |        |
| <input type="checkbox"/> Value cache effectiveness   | 900   | 200    | Stacked    |        |
| <input type="checkbox"/> Zabbix cache usage, % used  | 900   | 200    | Normal     |        |
| <input type="checkbox"/> Zabbix data gathering process busy %  | 900   | 200    | Normal     |        |
| <input type="checkbox"/> Zabbix internal process busy %  | 900   | 200    | Normal     |        |
| <input type="checkbox"/> Zabbix internal queues  | 900   | 200    | Normal     |        |
| <input type="checkbox"/> Zabbix server performance   | 900   | 200    | Normal     |        |

Displayed data:



| Column            | Description  |
|-------------------|--|
| <i>Template</i>   | Template the graph belongs to.<br>This column is displayed only if multiple templates are selected in the filter.  |
| <i>Name</i>       | Name of the custom graph, displayed as a blue link to graph details.<br>Clicking on the graph name link opens the graph <b>configuration form</b> .<br>If the graph is inherited from another template, the template name is displayed before the graph name, as a gray link. Clicking on the template link will open the graph list on that template level. |
| <i>Width</i>      | Graph width is displayed.  |
| <i>Height</i>     | Graph height is displayed.   |
| <i>Graph type</i> | Graph type is displayed - <i>Normal</i> , <i>Stacked</i> , <i>Pie</i> or <i>Exploded</i> .   |

To configure a new graph, click on the *Create graph* button at the top right corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Copy* - copy the graphs to other hosts or templates
- *Delete* - delete the graphs

To use these options, mark the checkboxes before the respective graphs, then click on the required button.

Using filter

You can filter graphs by host group and template. For better search performance, data is searched with macros unresolved.

#### 4 Discovery rules

##### Overview

The list of low-level discovery rules for a template can be accessed from *Configuration* → *Templates* by clicking on *Discovery* for the respective template.

A list of existing low-level discovery rules is displayed. It is also possible to see all discovery rules independently of the template, or all discovery rules of a specific host group by changing the filter settings.

Discovery rules

Create discovery rule

| All templates / Template Server Cisco UCS SNMPv2 Items 11 Triggers 6 Graphs Dashboards <b>Discovery rules 9</b> Web scenarios |   |                   |                       |                  |                 |                        |          |            |         |        |
|---|---|-------------------|-----------------------|------------------|-----------------|------------------------|----------|------------|---------|--------|
|   |   |                   |                       |                  |                 |                        |          |            |         | Filter |
| <input type="checkbox"/> Template   | Name  | Items             | Triggers              | Graphs           | Hosts           | Key                    | Interval | Type       | Status  |        |
| <input type="checkbox"/>  | Template Server Cisco UCS SNMPv2 Array Controller Cache Discovery | Item prototypes 1 | Trigger prototypes 2  | Graph prototypes | Host prototypes | array.cache.discovery  | 1h       | SNMP agent | Enabled |        |
| <input type="checkbox"/>  | Template Server Cisco UCS SNMPv2 Array Controller Discovery       | Item prototypes 2 | Trigger prototypes 3  | Graph prototypes | Host prototypes | array.discovery        | 1h       | SNMP agent | Enabled |        |
| <input type="checkbox"/>  | Template Server Cisco UCS SNMPv2 FAN Discovery                    | Item prototypes 1 | Trigger prototypes 2  | Graph prototypes | Host prototypes | fan.discovery          | 1h       | SNMP agent | Enabled |        |
| <input type="checkbox"/>  | Template Server Cisco UCS SNMPv2 Physical Disk Discovery          | Item prototypes 4 | Trigger prototypes 2  | Graph prototypes | Host prototypes | physicalDisk.discovery | 1h       | SNMP agent | Enabled |        |
| <input type="checkbox"/>  | Template Server Cisco UCS SNMPv2 PSU Discovery                    | Item prototypes 1 | Trigger prototypes 2  | Graph prototypes | Host prototypes | psu.discovery          | 1h       | SNMP agent | Enabled |        |
| <input type="checkbox"/>  | Template Server Cisco UCS SNMPv2 Temperature CPU Discovery        | Item prototypes 1 | Trigger prototypes 3  | Graph prototypes | Host prototypes | temp.cpu.discovery     | 1h       | SNMP agent | Enabled |        |
| <input type="checkbox"/>  | Template Server Cisco UCS SNMPv2 Temperature Discovery            | Item prototypes 4 | Trigger prototypes 12 | Graph prototypes | Host prototypes | temp.discovery         | 1h       | SNMP agent | Enabled |        |
| <input type="checkbox"/>  | Template Server Cisco UCS SNMPv2 Unit Discovery                   | Item prototypes 3 | Trigger prototypes 3  | Graph prototypes | Host prototypes | unit.discovery         | 1h       | SNMP agent | Enabled |        |
| <input type="checkbox"/>  | Template Server Cisco UCS SNMPv2 Virtual Disk Discovery           | Item prototypes 3 | Trigger prototypes 1  | Graph prototypes | Host prototypes | virtualdisk.discovery  | 1h       | SNMP agent | Enabled |        |
| Displaying 9 of 9 found   |   |                   |                       |                  |                 |                        |          |            |         |        |
| 0 selected Enable Disable Delete  |   |                   |                       |                  |                 |                        |          |            |         |        |

Displayed data:

| Column          | Description   |
|-----------------|---|
| <i>Template</i> | The template discovery rule belongs to.   |
| <i>Name</i>     | Name of the rule, displayed as a blue link.<br>Clicking on the rule name opens the low-level discovery rule <b>configuration form</b> .<br>If the discovery rule is inherited from another template, the template name is displayed before the rule name, as a gray link. Clicking on the template link will open the discovery rule list on that template level. |
| <i>Items</i>    | A link to the list of item prototypes is displayed.   |
| <i>Triggers</i> | The number of existing item prototypes is displayed in gray.<br>A link to the list of trigger prototypes is displayed.<br>The number of existing trigger prototypes is displayed in gray.   |

| Column          | Description   |
|-----------------|---|
| <i>Graphs</i>   | A link to the list of graph prototypes displayed.<br>The number of existing graph prototypes is displayed in gray.  |
| <i>Hosts</i>    | A link to the list of host prototypes displayed.<br>The number of existing host prototypes is displayed in gray.  |
| <i>Key</i>      | The item key used for discovery is displayed.   |
| <i>Interval</i> | The frequency of performing discovery is displayed.   |
| <i>Type</i>     | The item type used for discovery is displayed (Zabbix agent, SNMP agent, etc).  |
| <i>Status</i>   | Discovery rule status is displayed - <i>Enabled</i> or <i>Disabled</i> . By clicking on the status you can change it - from Enabled to Disabled (and back). |

To configure a new low-level discovery rule, click on the *Create discovery rule* button at the top right corner.

#### Mass editing options

Buttons below the list offer some mass-editing options:

- *Enable* - change the low-level discovery rule status to *Enabled*
- *Disable* - change the low-level discovery rule status to *Disabled*
- *Delete* - delete the low-level discovery rules

To use these options, mark the checkboxes before the respective discovery rules, then click on the required button.

#### Using filter

You can use the filter to display only the discovery rules you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* icon is available at the top right corner. Clicking on it will open a filter where you can specify the desired filtering criteria such as template, discovery rule name, item key, item type, etc.

| Parameter                         | Description   |
|-----------------------------------|---|
| <i>Template groups</i>            | Filter by one or more template groups.<br>Only template groups that contain at least one template can be selected.<br>Specifying a parent template group implicitly selects all nested template groups. |
| <i>Templates</i>                  | Filter by one or more templates.  |
| <i>Name</i>                       | Filter by discovery rule name.  |
| <i>Key</i>                        | Filter by discovery item key.   |
| <i>Type</i>                       | Filter by discovery item type.  |
| <i>Update interval</i>            | Filter by update interval.  |
| <i>Keep lost resources period</i> | Not available for Zabbix trapper and dependent items.   |
| <i>Status</i>                     | Filter by discovery rule status (All/Enabled/Disabled).   |

## 1 Item prototypes

### Overview

In this section the configured item prototypes of a low-level discovery rule on the template are displayed.

If the template is linked to the host, item prototypes will become the basis of creating real host **items** during low-level discovery.

Item prototypes

Create item prototype

All templates / Template Module Linux filesystems...

Discovery list / Mounted filesystem discovery

Item prototypes 4

Trigger prototypes 4

Graph prototypes 1

Host prototypes

| <input type="checkbox"/> | Name ▲                           | Key                           | Interval | History | Trends | Type         | Create enabled | Discover | Tags                       |
|--------------------------|----------------------------------|-------------------------------|----------|---------|--------|--------------|----------------|----------|----------------------------|
| <input type="checkbox"/> | ... {#FSNAME}: Free inodes in %  | vfs.fs.inode[{#FSNAME},pfree] | 1m       | 7d      | 365d   | Zabbix agent | Yes            | Yes      | Application: Filesystem... |
| <input type="checkbox"/> | ... {#FSNAME}: Space utilization | vfs.fs.size[{#FSNAME},pused]  | 1m       | 7d      | 365d   | Zabbix agent | Yes            | Yes      | Application: Filesystem... |
| <input type="checkbox"/> | ... {#FSNAME}: Total space       | vfs.fs.size[{#FSNAME},total]  | 1m       | 7d      | 365d   | Zabbix agent | Yes            | Yes      | Application: Filesystem... |
| <input type="checkbox"/> | ... {#FSNAME}: Used space        | vfs.fs.size[{#FSNAME},used]   | 1m       | 7d      | 365d   | Zabbix agent | Yes            | Yes      | Application: Filesystem... |

0 selected

Create enabled

Create disabled

Mass update

Delete

Displaying 4 of 4 found

Displayed data:

| Column         | Description  |
|----------------|--|
| Name           | <p>Name of the item prototype, displayed as a blue link.</p> <p>Clicking on the name opens the item prototype <b>configuration form</b>.</p> <p>If the item prototype belongs to a linked template, the template name is displayed before the item name, as a gray link. Clicking on the template link will open the item prototype list on the linked template level.</p> |
| Key            | Key of the item prototype is displayed.  |
| Interval       | Frequency of the check is displayed.   |
| History        | How many days to keep item data history is displayed.  |
| Trends         | How many days to keep item trends history is displayed.  |
| Type           | Type of the item prototype is displayed (Zabbix agent, SNMP agent, simple check, etc).   |
| Create enabled | <p>Create the item based on this prototype as:</p> <p><b>Yes</b> - enabled</p> <p><b>No</b> - disabled. You can switch between 'Yes' and 'No' by clicking on them.</p>   |
| Discover       | <p>Discover the item based on this prototype:</p> <p><b>Yes</b> - discover</p> <p><b>No</b> - do not discover. You can switch between 'Yes' and 'No' by clicking on them.</p>  |
| Tags           | Tags of the item prototype is displayed.   |

To configure a new item prototype, click on the *Create item prototype* button at the top right corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Create enabled* - create these items as *Enabled*
- *Create disabled* - create these items as *Disabled*
- *Mass update* - mass update these item prototypes
- *Delete* - delete these item prototypes

To use these options, mark the checkboxes before the respective item prototypes, then click on the required button.

2 Trigger prototypes

Overview

In this section the configured trigger prototypes of a low-level discovery rule on the template are displayed.

If the template is linked to the host, trigger prototypes will become the basis of creating real host **triggers** during low-level discovery.

| <input type="checkbox"/> | Severity | Name ▲  | Operational data   | Expression  | Create enabled      | Discover            | Tags |
|--------------------------|----------|---|--|---|---------------------|---------------------|------|
| <input type="checkbox"/> | Average  | {#FSNAME}: Disk space is critically low (used > {SVFS.FS.PUSED.MAX.CRIT:"{#FSNAME}"})%  | Space used: {ITEM.LASTVALUE3} of {ITEM.LASTVALUE2} ({ITEM.LASTVALUE1}) | <b>last</b> (/Template Module Linux filesystems by Zabbix agent/vfs.fs.size[{#FSNAME},pused])>{SVFS.FS.PUSED.MAX.CRIT:"{#FSNAME}"}) and (( <b>last</b> (/Template Module Linux filesystems by Zabbix agent/vfs.fs.size[{#FSNAME},total])- <b>last</b> (/Template Module Linux filesystems by Zabbix agent/vfs.fs.size[{#FSNAME},used]))<5G or <b>timeleft</b> (/Template Module Linux filesystems by Zabbix agent/vfs.fs.size[{#FSNAME},pused],1h,100)<1d)  | <a href="#">Yes</a> | <a href="#">Yes</a> |      |
| <input type="checkbox"/> | Warning  | {#FSNAME}: Disk space is low (used > {SVFS.FS.PUSED.MAX.WARN:"{#FSNAME}"})%<br><b>Depends on:</b><br>Template Module Linux filesystems by Zabbix agent: {#FSNAME}: Disk space is critically low (used > {SVFS.FS.PUSED.MAX.CRIT:"{#FSNAME}"})%                    | Space used: {ITEM.LASTVALUE3} of {ITEM.LASTVALUE2} ({ITEM.LASTVALUE1}) | <b>last</b> (/Template Module Linux filesystems by Zabbix agent/vfs.fs.size[{#FSNAME},pused])>{SVFS.FS.PUSED.MAX.WARN:"{#FSNAME}"}) and (( <b>last</b> (/Template Module Linux filesystems by Zabbix agent/vfs.fs.size[{#FSNAME},total])- <b>last</b> (/Template Module Linux filesystems by Zabbix agent/vfs.fs.size[{#FSNAME},used]))<10G or <b>timeleft</b> (/Template Module Linux filesystems by Zabbix agent/vfs.fs.size[{#FSNAME},pused],1h,100)<1d) | <a href="#">Yes</a> | <a href="#">Yes</a> |      |
| <input type="checkbox"/> | Average  | {#FSNAME}: Running out of free inodes (free < {SVFS.FS.INODE.PFREE.MIN.CRIT:"{#FSNAME}"})%  | Free inodes: {ITEM.LASTVALUE1}   | <b>min</b> (/Template Module Linux filesystems by Zabbix agent/vfs.fs.inode[{#FSNAME},pfree],5m)<{SVFS.FS.INODE.PFREE.MIN.CRIT:"{#FSNAME}"})  | <a href="#">Yes</a> | <a href="#">Yes</a> |      |
| <input type="checkbox"/> | Warning  | {#FSNAME}: Running out of free inodes (free < {SVFS.FS.INODE.PFREE.MIN.WARN:"{#FSNAME}"})%<br><b>Depends on:</b><br>Template Module Linux filesystems by Zabbix agent: {#FSNAME}: Running out of free inodes (free < {SVFS.FS.INODE.PFREE.MIN.CRIT:"{#FSNAME}"})% | Free inodes: {ITEM.LASTVALUE1}   | <b>min</b> (/Template Module Linux filesystems by Zabbix agent/vfs.fs.inode[{#FSNAME},pfree],5m)<{SVFS.FS.INODE.PFREE.MIN.WARN:"{#FSNAME}"})  | <a href="#">Yes</a> | <a href="#">Yes</a> |      |

Displaying 4 of 4 found

0 selected [Create enabled](#) [Create disabled](#) [Mass update](#) [Delete](#)

Displayed data:

| Column                  | Description   |
|-------------------------|---|
| <b>Severity</b>         | Severity of the trigger is displayed by both name and cell background color.  |
| <b>Name</b>             | Name of the trigger prototype, displayed as a blue link.<br>Clicking on the name opens the trigger prototype <b>configuration form</b> .<br>If the trigger prototype belongs to a linked template, the template name is displayed before the trigger name, as a gray link. Clicking on the template link will open the trigger prototype list on the linked template level. |
| <b>Expression</b>       | Trigger expression is displayed. The template-item part of the expression is displayed as a link, leading to the item configuration form.   |
| <b>Operational data</b> | Format of the operational data of the trigger is displayed, containing arbitrary strings and macros that will resolve dynamically in <i>Monitoring</i> → <i>Problems</i> .  |
| <b>Create enabled</b>   | Create the trigger based on this prototype as:<br><b>Yes</b> - enabled<br><b>No</b> - disabled. You can switch between 'Yes' and 'No' by clicking on them.  |
| <b>Discover</b>         | Discover the trigger based on this prototype:<br><b>Yes</b> - discover<br><b>No</b> - do not discover. You can switch between 'Yes' and 'No' by clicking on them.   |
| <b>Tags</b>             | Tags of the trigger prototype are displayed.  |

To configure a new trigger prototype, click on the *Create trigger prototype* button at the top right corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Create enabled* - create these triggers as *Enabled*
- *Create disabled* - create these triggers as *Disabled*
- *Mass update* - mass update these trigger prototypes
- *Delete* - delete these trigger prototypes

To use these options, mark the checkboxes before the respective trigger prototypes, then click on the required button.

3 Graph prototypes

Overview

In this section the configured graph prototypes of a low-level discovery rule on the template are displayed.

If the template is linked to the host, graph prototypes will become the basis of creating real host **graphs** during low-level discovery.

Graph prototypes

Create graph prototype

All templates / Template Module Linux filesystems... / Discovery list / Mounted filesystem discovery

Item prototypes 4 / Trigger prototypes 4 / Graph prototypes 1 / Host prototypes

| <input type="checkbox"/> Name ▲                      | Width | Height | Graph type | Discover |
|--|-------|--------|------------|----------|
| <input type="checkbox"/> {#FSNAME}: Disk space usage | 600   | 340    | Pie        | Yes      |

0 selected 

Delete

Displaying 1 of 1 found

Displayed data:

| Column   | Description   |
|----------|---|
| Name     | Name of the graph prototype, displayed as a blue link.<br>Clicking on the name opens the graph prototype <b>configuration form</b> .<br>If the graph prototype belongs to a linked template, the template name is displayed before the graph name, as a gray link. Clicking on the template link will open the graph prototype list on the linked template level. |
| Width    | Width of the graph prototype is displayed.  |
| Height   | Height of the graph prototype is displayed.   |
| Type     | Type of the graph prototype is displayed - <i>Normal</i> , <i>Stacked</i> , <i>Pie</i> or <i>Exploded</i> .   |
| Discover | Discover the graph based on this prototype:<br><b>Yes</b> - discover<br><b>No</b> - do not discover. You can switch between 'Yes' and 'No' by clicking on them.   |

To configure a new graph prototype, click on the *Create graph prototype* button at the top right corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Delete* - delete these graph prototypes

To use these options, mark the checkboxes before the respective graph prototypes, then click on the required button.

4 Host prototypes

Overview

In this section the configured host prototypes of a low-level discovery rule on the template are displayed.

If the template is linked to the host, host prototypes will become the basis of creating real **hosts** during low-level discovery.

Host prototypes

Create host prototype

All templates / Template VM VMware / Discovery list / Discover VMware VMs / Item prototypes / Trigger prototypes / Graph prototypes / Host prototypes 1

| <input type="checkbox"/> Name ▲     | Templates                | Create enabled | Discover | Tags |
|-------------------------------------|--------------------------|----------------|----------|------|
| <input type="checkbox"/> {#VM.NAME} | Template VM VMware Guest | Yes            | Yes      |      |

0 selected 

Create enabled

Create disabled

Delete

Displaying 1 of 1 found

Displayed data:

| Column         | Description  |
|----------------|--|
| Name           | Name of the host prototype, displayed as a blue link.<br>Clicking on the name opens the host prototype configuration form.<br>If the host prototype belongs to a linked template, the template name is displayed before the host name, as a gray link. Clicking on the template link will open the host prototype list on the linked template level. |
| Templates      | Templates of the host prototype are displayed.   |
| Create enabled | Create the host based on this prototype as:<br><b>Yes</b> - enabled<br><b>No</b> - disabled. You can switch between 'Yes' and 'No' by clicking on them.  |

| Column          | Description  |
|-----------------|--|
| <i>Discover</i> | Discover the host based on this prototype:<br><b>Yes</b> - discover<br><b>No</b> - do not discover. You can switch between 'Yes' and 'No' by clicking on them. |
| <i>Tags</i>     | Tags of the host prototype are displayed.  |

To configure a new host prototype, click on the *Create host prototype* button at the top right corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Create enabled* - create these hosts as *Enabled*
- *Create disabled* - create these hosts as *Disabled*
- *Delete* - delete these host prototypes

To use these options, mark the checkboxes before the respective host prototypes, then click on the required button.

## 5 Web scenarios

### Overview

The **web scenario** list for a template can be accessed from *Configuration* → *Templates* by clicking on *Web* for the respective template.

A list of existing web scenarios is displayed.

|   |                 |                 |          |          |                |            |         |                            |
|---|-----------------|-----------------|----------|----------|----------------|------------|---------|----------------------------|
| Web monitoring  |                 |                 |          |          |                |            |         | Create web scenario        |
| All templates / Website security Items Triggers Graphs Dashboards Discovery rules Web scenarios 1 |                 |                 |          |          |                |            |         | Filter                     |
| <input type="checkbox"/>  | Name ▲          | Number of steps | Interval | Attempts | Authentication | HTTP proxy | Status  | Tags                       |
| <input type="checkbox"/>  | Zabbix frontend | 1               | 1m       | 1        | None           | No         | Enabled | Application: Zabbix fro... |
| 0 selected  |                 |                 |          |          |                |            |         | Enable Disable Delete      |

Displayed data:

| Column                 | Description   |
|------------------------|---|
| <i>Name</i>            | Name of the web scenario. Clicking on the web scenario name opens the web scenario <b>configuration form</b> .<br>If the web scenario is inherited from another template, the template name is displayed before the web scenario name, as a gray link. Clicking on the template link will open the web scenarios list on that template level. |
| <i>Number of steps</i> | The number of steps the scenario contains.  |
| <i>Update interval</i> | How often the scenario is performed.  |
| <i>Attempts</i>        | How many attempts for executing web scenario steps are performed.   |
| <i>Authentication</i>  | Authentication method is displayed - Basic, NTLM or None.   |
| <i>HTTP proxy</i>      | Displays HTTP proxy or 'No' if not used.  |
| <i>Status</i>          | Web scenario status is displayed - <i>Enabled</i> or <i>Disabled</i> .<br>By clicking on the status you can change it.  |
| <i>Tags</i>            | Web scenario tags are displayed.<br>Up to three tags (name:value pairs) can be displayed. If there are more tags, a "..." link is displayed that allows to see all tags on mouseover.   |

To configure a new web scenario, click on the *Create web scenario* button at the top right corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Enable* - change the scenario status to *Enabled*
- *Disable* - change the scenario status to *Disabled*
- *Delete* - delete the web scenarios

To use these options, mark the checkboxes before the respective web scenarios, then click on the required button.

Using filter

You can use the filter to display only the scenarios you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of web scenarios. If you click on it, a filter becomes available where you can filter scenarios by host group, template, status and tags.

All templates / Website securityItemsTriggersGraphsDashboardsDiscovery rulesWeb scenarios 1Filter

Host groups

type here to search

Select

Tags

And/OrOr

tagContainsvalue

AddRemove

Templates

Website security X

type here to search

Select

Status

allEnabledDisabled

ApplyReset

1 Host groups

Overview

In the *Configuration* → *Host groups* section users can configure and maintain host groups. A host group can contain both templates and hosts.

A listing of existing host groups with their details is displayed. You can search and filter host groups by name.

Host groupsCreate host groupFilter

Name

ApplyReset

| <input type="checkbox"/> | Name                   | Hosts   | Templates    | Members   | Info |
|--------------------------|------------------------|---------|--------------|---|------|
| <input type="checkbox"/> | Discovered hosts       | Hosts   | Templates    |   |      |
| <input type="checkbox"/> | Hypervisors            | Hosts   | Templates    |   |      |
| <input type="checkbox"/> | Linux servers          | Hosts 4 | Templates    | Server1, Server2, Server3, Server4  |      |
| <input type="checkbox"/> | Templates              | Hosts   | Templates    |   |      |
| <input type="checkbox"/> | Templates/Applications | Hosts   | Templates 14 | Template App Apache by HTTP, Template App Apache by Zabbix agent, Template App Apache Tomcat JMX, Template App Generic Java JMX, Template App Nginx by HTTP, Template App Nginx by Zabbix agent, Template App RabbitMQ cluster by HTTP, Template App RabbitMQ cluster by Zabbix agent, Template App RabbitMQ node by HTTP, Template App RabbitMQ node by Zabbix agent, Template App Remote Zabbix proxy, Template App Remote Zabbix server, Template App Zabbix Proxy, Template App Zabbix Server |      |
| <input type="checkbox"/> | Templates/Databases    | Hosts   | Templates 2  | Template DB MySQL, Template DB PostgreSQL   |      |

Displayed data:

| Column    | Description  |
|-----------|--|
| Name      | Name of the host group. Clicking on the group name opens the host group configuration form.  |
| Hosts     | Number of hosts in the group (displayed in gray). Clicking on "Hosts" will, in the whole listing of hosts, filter out those that belong to the group.  |
| Templates | Number of templates in the group (displayed in gray). Clicking on "Templates" will, in the whole listing of templates, filter out those that belong to the group.                                  |
| Members   | Names of group members. Template names are displayed in gray, monitored host names in blue and non-monitored host names in red. Clicking on a name will open the template/host configuration form. |
| Info      | Error information (if any) regarding the host group is displayed.  |

Mass editing options

Buttons below the list offer some mass-editing options:

- *Enable hosts* - change the status of all hosts in the group to "Monitored"
- *Disable hosts* - change the status of all hosts in the group to "Not monitored"
- *Delete* - delete the host groups

To use these options, mark the checkboxes before the respective host groups, then click on the required button.

Using filter

You can use the filter to display only the host groups you are interested in. For better search performance, data is searched with macros unresolved.

2 Templates

Overview

In the *Configuration* → *Templates* section users can configure and maintain templates.

A listing of existing templates with their details is displayed.

≡ Templates

Create templateImport

Filter

| <input type="checkbox"/> Name                              | Hosts   | Items    | Triggers    | Graphs   | Dashboards   | Discovery   | Web | Linked templates   | Linked to templates | Tags |
|--|---------|----------|-------------|----------|--------------|-------------|-----|--|---------------------|------|
| <input type="checkbox"/> Template OS Linux by Prom         | Hosts   | Items 34 | Triggers 12 | Graphs 7 | Dashboards 2 | Discovery 3 | Web |  |                     |      |
| <input type="checkbox"/> Template OS Linux by Zabbix agent | Hosts 1 | Items 42 | Triggers 14 | Graphs 8 | Dashboards 1 | Discovery 3 | Web | Template Module Linux block devices by Zabbix agent, Template Module Linux CPU by Zabbix agent, Template Module Linux filesystems by Zabbix agent, Template Module Linux generic by Zabbix agent, Template Module Linux memory by Zabbix agent, Template Module Linux network interfaces by Zabbix agent, Template Module Zabbix agent |                     |      |

Displayed data:

| Column   | Description   |
|--|---|
| Name   | Name of the template. Clicking on the template name opens the template configuration form.  |
| Hosts  | Number of editable hosts to which the template is linked; read-only hosts are not included. Clicking on Hosts will open the host list with only those hosts filtered that are linked to the template. |
| Entities (Items, Triggers, Graphs, Dashboards, Discovery, Web) | Number of the respective entities in the template (displayed in gray). Clicking on the entity name will, in the whole listing of that entity, filter out those that belong to the template.           |
| Linked templates   | Templates that are linked to the template, in a nested setup where the template will inherit all entities of the linked templates.  |
| Linked to templates  | The templates that the template is linked to ("children" templates that inherit all entities from this template). Since Zabbix 5.0.3, this column no longer includes hosts.                           |
| Tags   | Tags of the template, with macros unresolved.   |

To configure a new template, click on the *Create template* button in the top right-hand corner. To import a template from a YAML, XML, or JSON file, click on the *Import* button in the top right-hand corner.

Using filter

You can use the filter to display only the templates you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available below *Create template* and *Import* buttons. If you click on it, a filter becomes available where you can filter templates by host group, linked templates, name and tags.

Filter

Host groups

type here to search

Select

Linked templates

type here to search

Select

Name

generic snmp

Tags

And/OrOr

tag

Contains

value

Remove

Add

Apply

Reset

| Parameter        | Description  |
|------------------|--|
| Host groups      | Filter by one or more host groups. Specifying a parent host group implicitly selects all nested host groups. |
| Linked templates | Filter by directly linked templates.   |
| Name             | Filter by template name.   |



| Parameter   | Description   |
|-------------|---|
| <i>Tags</i> | <p>Filter by template tag name and value.</p> <p>Filtering is possible only by template-level tags (not inherited ones). It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.</p> <p>There are several operators available for each condition:</p> <p><b>Exists</b> - include the specified tag names</p> <p><b>Equals</b> - include the specified tag names and values (case-sensitive)</p> <p><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p><b>Does not exist</b> - exclude the specified tag names</p> <p><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)</p> <p><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p>There are two calculation types for conditions:</p> <p><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition</p> <p><b>Or</b> - enough if one condition is met</p> |

## Mass editing options

Buttons below the list offer some mass-editing options:

- *Export* - export the template to a YAML, XML or JSON file
- *Mass update* - **update several properties** for a number of templates at once
- *Delete* - delete the template while leaving its linked entities (items, triggers etc.) with the hosts
- *Delete and clear* - delete the template and its linked entities from the hosts

To use these options, mark the checkboxes before the respective templates, then click on the required button.

## 3 Hosts

### Overview

In the *Configuration* → *Hosts* section users can configure and maintain hosts.

A listing of existing hosts with their details is displayed.

Hosts

Create host Import

Filter


| <input type="checkbox"/> | Name          | Items     | Triggers    | Graphs    | Discovery   | Web   | Interface       | Proxy | Templates  | Status  | Availability | Agent encryption | Info | Tags |
|--------------------------|---------------|-----------|-------------|-----------|-------------|-------|-----------------|-------|--|---------|--------------|------------------|------|------|
| <input type="checkbox"/> | Zabbix server | Items 140 | Triggers 64 | Graphs 27 | Discovery 3 | Web 1 | 127.0.0.1:10050 |       | Template App Zabbix Server, Template OS Linux by Zabbix agent (Template Module Linux block devices by Zabbix agent, Template Module Linux CPU by Zabbix agent, Template Module Linux filesystems by Zabbix agent, Template Module Linux generic by Zabbix agent, Template Module Linux memory by Zabbix agent, Template Module Linux network interfaces by Zabbix agent, Template Module Zabbix agent) | Enabled | ZBX          | SNMP             | None |      |

Displaying 1 of 1 found

0 selected
Enable
Disable
Export
Mass update
Delete

Displayed data:

| Column  | Description   |
|---|---|
| <i>Name</i>   | Name of the host. Clicking on the host name opens the host <b>configuration form</b> .  |
| <i>Entities (Items, Triggers, Graphs, Discovery, Web)</i> | Clicking on the entity name will display items, triggers etc. of the host. The number of the respective entities is displayed in gray.  |
| <i>Interface</i>  | The main interface of the host is displayed.  |
| <i>Proxy</i>  | Proxy name is displayed, if the host is monitored by a proxy.   |
| <i>Templates</i>  | <p>This column is only displayed if the <i>Monitored by</i> filter option is set to 'Any' or 'Proxy'.</p> <p>The templates linked to the host are displayed. If other templates are contained in the linked template, those are displayed in parentheses, separated by a comma. Clicking on a template name will open its configuration form.</p> |

| Column                  | Description  |
|-------------------------|--|
| <i>Status</i>           | Host status is displayed - <i>Enabled</i> or <i>Disabled</i> . By clicking on the status you can change it.  |
| <i>Availability</i>     | <p>An orange wrench icon  before the host status indicates that this host is in maintenance. Maintenance details are displayed when the mouse pointer is positioned over the icon.</p> <p>Host <b>availability</b> per configured interface is displayed.</p> <p>Icons represent only those interface types (Zabbix agent, SNMP, IPMI, JMX) that are configured. If you position the mouse on the icon, a popup list of all interfaces of this type appears with each interface details, status and errors.</p> <p>The column is empty for hosts with no interfaces.</p> <p>The current status of all interfaces of one type is displayed by the respective icon color:</p> <p><b>Green</b> - all interfaces available</p> <p><b>Yellow</b> - at least one interface available and at least one unavailable; others can have any value including 'unknown'</p> <p><b>Red</b> - no interfaces available</p> <p><b>Gray</b> - at least one interface unknown (none unavailable)</p> <p>Note that active Zabbix agent items do not affect host availability.</p> |
| <i>Agent encryption</i> | <p>Encryption status for connections to the host is displayed:</p> <p><b>None</b> - no encryption</p> <p><b>PSK</b> - using pre-shared key</p> <p><b>Cert</b> - using certificate</p>  |
| <i>Info</i>             | Error information (if any) regarding the host is displayed.  |
| <i>Tags</i>             | <b>Tags</b> of the host, with macros unresolved.   |

To configure a new host, click on the *Create host* button in the top right-hand corner. To import a host from a YAML, XML, or JSON file, click on the *Import* button in the top right-hand corner.

#### Mass editing options

Buttons below the list offer some mass-editing options:

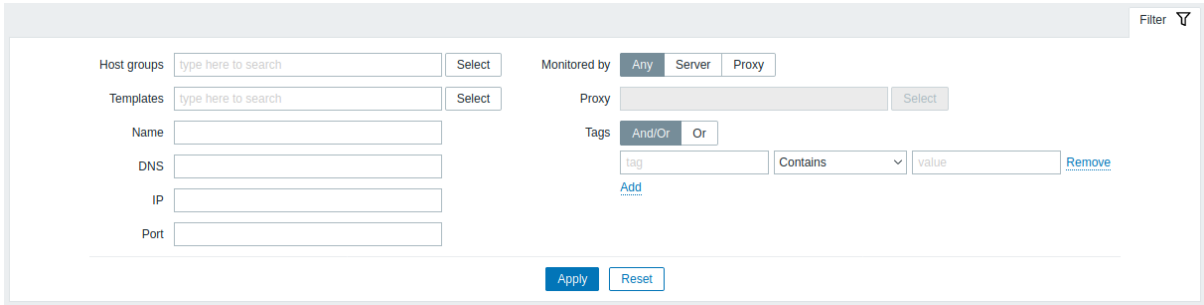
- *Enable* - change host status to *Monitored*
- *Disable* - change host status to *Not monitored*
- *Export* - export the hosts to a YAML, XML or JSON file
- *Mass update* - **update several properties** for a number of hosts at once
- *Delete* - delete the hosts

To use these options, mark the checkboxes before the respective hosts, then click on the required button.

#### Using filter

You can use the filter to display only the hosts you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of hosts. If you click on it, a filter becomes available where you can filter hosts by host group, linked templates, name, DNS, IP, port number, if they are monitored by server or by proxy, proxy name and tags.



| Parameter          | Description   |
|--------------------|---|
| <i>Host groups</i> | Filter by one or more host groups.<br>Specifying a parent host group implicitly selects all nested host groups. |
| <i>Templates</i>   | Filter by linked templates.   |
| <i>Name</i>        | Filter by visible host name.  |
| <i>DNS</i>         | Filter by DNS name.   |
| <i>IP</i>          | Filter by IP address.   |

| Parameter           | Description   |
|---------------------|---|
| <i>Port</i>         | Filter by port number.  |
| <i>Monitored by</i> | Filter hosts that are monitored by server only, proxy only or both.   |
| <i>Proxy</i>        | Filter hosts that are monitored by the proxy specified here.  |
| <i>Tags</i>         | <p>Filter by host tag name and value.</p> <p>It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.</p> <p>There are several operators available for each condition:</p> <p><b>Exists</b> - include the specified tag names</p> <p><b>Equals</b> - include the specified tag names and values (case-sensitive)</p> <p><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p><b>Does not exist</b> - exclude the specified tag names</p> <p><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)</p> <p><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)</p> <p>There are two calculation types for conditions:</p> <p><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition</p> <p><b>Or</b> - enough if one condition is met</p> |

## Reading host availability

Host availability icons reflect the current host interface status on Zabbix server. Therefore, in the frontend:

- If you disable a host, availability icons will not immediately turn gray (unknown status), because the server has to synchronize the configuration changes first;
- If you enable a host, availability icons will not immediately turn green (available), because the server has to synchronize the configuration changes and start polling the host first.

## Unknown interface status

Zabbix server determines an unknown status for the corresponding agent interface (Zabbix, SNMP, IPMI, JMX) if:

- there are no enabled items on the interface (they were removed or disabled);
- there are only active Zabbix agent items;
- there are no pollers for that type of the interface (e.g. StartPollers=0);
- host is disabled;
- host is set to be monitored by proxy, a different proxy or by server if it was monitored by proxy;
- host is monitored by a proxy that appears to be offline (no updates received from the proxy during the maximum heartbeat interval - 1 hour).

Setting interface availability to unknown is done after server configuration cache synchronization. Restoring interface availability (available/unavailable) on hosts monitored by proxies is done after proxy configuration cache synchronization.

See also more details about host interface [unreachability](#).

## 1 Items

## Overview

The item list for a host can be accessed from *Configuration* → *Hosts* by clicking on *Items* for the respective host.

A list of existing items is displayed.

Items

Create item

All hosts / Zabbix server

Enabled

ZBX

SNMP

IPMI

Items 146

Triggers 67

Graphs 27

Discovery rules 3

Web scenarios 1

Filter

| <input type="checkbox"/> | Name   | Triggers   | Key                            | Interval | History | Trends | Type                  | Status  | Tags                       | Info |
|--------------------------|--|------------|--------------------------------|----------|---------|--------|-----------------------|---------|----------------------------|------|
| <input type="checkbox"/> | ... Template Module Zabbix agent: Host name of Zabbix agent running                        |            | agent.hostname                 | 1h       | 7d      |        | Zabbix agent (active) | Enabled | App: 1 App: 2 App: 3       |      |
| <input type="checkbox"/> | ... Template Module Zabbix agent: Zabbix agent ping  |            | agent.ping                     | 1m       | 1d      | 365d   | Zabbix agent          | Enabled | Application: Monitorin...  |      |
| <input type="checkbox"/> | ... Template Module Zabbix agent: Version of Zabbix agent running                          |            | agent.version                  | 1h       | 7d      |        | Zabbix agent          | Enabled | Application: Monitorin...  |      |
| <input type="checkbox"/> | ... Template Module Linux generic by Zabbix agent: Maximum number of open file descriptors | Triggers 1 | kernel.maxfiles                | 1h       | 7d      | 365d   | Zabbix agent          | Enabled | Application: General       |      |
| <input type="checkbox"/> | ... Template Module Linux generic by Zabbix agent: Maximum number of processes             | Triggers 2 | kernel.maxproc                 | 1h       | 7d      | 365d   | Zabbix agent          | Enabled | Application: General       |      |
| <input type="checkbox"/> | ... A Interface \$1: Inbound packets, compressed   |            | net.if.in["enp4s0",compressed] | 3m       | 7d      | 365d   | Zabbix agent          | Enabled | Application: Interface ... |      |
| <input type="checkbox"/> | ... Network interface discovery: Interface enp4s0: Inbound packets discarded               |            | net.if.in["enp4s0",discarded]  | 3m       | 7d      | 365d   | Zabbix agent          | Enabled | Application: Interface ... |      |

Displayed data:

| Column           | Description   |
|------------------|---|
| <i>Item menu</i> | <p>Click on the three-dot icon to open the menu for the specific item with these options:</p> <p><b>Latest data</b> - see latest data of the item</p> <p><b>Create trigger</b> - create a trigger based on this item</p> <p><b>Triggers</b> - click to see a list with links to already-configured trigger of this item</p> <p><b>Create dependent item</b> - create a dependent item for this item</p> <p><b>Create dependent discovery rule</b> - create a dependent discovery rule for this item</p>   |
| <i>Host</i>      | Host of the item.   |
| <i>Name</i>      | <p>This column is displayed only if multiple hosts are selected in the filter.</p> <p>Name of the item displayed as a blue link to item details.</p> <p>Clicking on the item name link opens the item <b>configuration form</b>.</p> <p>If the host item belongs to a template, the template name is displayed before the item name as a gray link. Clicking on the template link will open the item list on the template level.</p> <p>If the item has been created from an item prototype, its name is preceded by the low-level discovery rule name, in orange. Clicking on the discovery rule name will open the item prototype list.</p> |
| <i>Triggers</i>  | <p>Moving the mouse over Triggers will display an infobox displaying the triggers associated with the item.</p> <p>The number of the triggers is displayed in gray.</p>   |
| <i>Key</i>       | Item key is displayed.  |
| <i>Interval</i>  | <p>Frequency of the check is displayed.</p> <p><i>Note</i> that passive items can also be checked immediately by pushing the <i>Execute now</i> button.</p>   |
| <i>History</i>   | How many days item data history will be kept is displayed.  |
| <i>Trends</i>    | How many days item trends history will be kept is displayed.  |
| <i>Type</i>      | Item type is displayed (Zabbix agent, SNMP agent, simple check, etc).   |
| <i>Status</i>    | Item status is displayed - <i>Enabled</i> , <i>Disabled</i> or <i>Not supported</i> . You can change the status by clicking on it - from Enabled to Disabled (and back); from Not supported to Disabled (and back).   |
| <i>Tags</i>      | <p>Item tags are displayed.</p> <p>Up to three tags (name:value pairs) can be displayed. If there are more tags, a "..." link is displayed that allows to see all tags on mouseover.</p>  |
| <i>Info</i>      | If the item is working correctly, no icon is displayed in this column. In case of errors, a square icon with the letter "i" is displayed. Hover over the icon to see a tooltip with the error description.  |

To configure a new item, click on the *Create item* button at the top right corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Enable* - change item status to *Enabled*
- *Disable* - change item status to *Disabled*
- *Execute now* - execute a check for new item values immediately. Supported for **passive** checks only (see **more details**). Note that when checking for values immediately, configuration cache is not updated, thus the values will not reflect very recent changes to item configuration.
- *Clear history and trends* - delete history and trend data for items.
- *Copy* - copy the items to other hosts or templates.
- *Mass update* - **update several properties** for a number of items at once.

- *Delete* - delete the items.

To use these options, mark the checkboxes before the respective items, then click on the required button.

## Using filter

You can use the filter to display only the items you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* icon is available at the top right corner. Clicking on it will open a filter where you can specify the desired filtering criteria.

All hosts / Zabbix server Enabled ZBK Items 121 Triggers 65 Graphs 24 Discovery rules 4 Web scenarios
Filter

Host groups
Select

Hosts
☒

Select

Name

Key

Value mapping
Select

Type
all

Type of information
all

History

Trends

Update interval

Tags
And/Or Or
Contains
Remove

State
all Normal Not supported

Status
all Enabled Disabled

Triggers
all Yes No

Inherited
all Yes No

Discovered
all Yes No

Apply Reset

Subfilter affects only filtered data

TAGS
component: application 1 component: cpu 17 component: data-collector 13 component: environment 2 component: internal-process 20 component: memory 7 component: network 9 component: os 3 component: raw 2 component: storage 15 component: system 35 disk: sda 8 filesystem: / 4 interface: enp0s3 9

TYPES
Calculated 2 Dependent item 8 Zabbix agent 53 Zabbix internal 58

TYPE OF INFORMATION
Character 8 Numeric (float) 79 Numeric (unsigned) 31 Text 3

STATE
Normal 113 Not supported 8

TEMPLATE
Inherited items 99 Not inherited items 22

WITH TRIGGERS
Without triggers 47 With triggers 74

DISCOVERY
Discovered 22 Regular 99

HISTORY
0 2 1w 113 2w 6

TRENDS
0 4 52w 1d 106

INTERVAL
30s 1 1m 93 3m 6 5m 1 15m 3 1h 9

| Parameter                  | Description  |
|----------------------------|--|
| <i>Host groups</i>         | Filter by one or more host groups.<br>Specifying a parent host group implicitly selects all nested host groups.<br>Host groups containing templates only cannot be selected. |
| <i>Hosts</i>               | Filter by one or more hosts.   |
| <i>Name</i>                | Filter by item name.   |
| <i>Key</i>                 | Filter by item key.  |
| <i>Value mapping</i>       | Filter by the value map used.  |
| <i>Type</i>                | This parameter is not displayed if the <i>Hosts</i> option is empty.<br>Filter by item type (Zabbix agent, SNMP agent, etc.).  |
| <i>Type of information</i> | Filter by type of information (Numeric unsigned, float, etc.).   |
| <i>History</i>             | Filter by how long item history is kept.   |
| <i>Trends</i>              | Filter by how long item trends are kept.   |
| <i>Update interval</i>     | Filter by item update interval.  |

| Parameter        | Description   |
|------------------|---|
| <i>Tags</i>      | Specify tags to limit the number of items displayed. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.<br>There are several operators available for each condition:<br><b>Exists</b> - include the specified tag names<br><b>Equals</b> - include the specified tag names and values (case-sensitive)<br><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br><b>Does not exist</b> - exclude the specified tag names<br><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)<br><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br>There are two calculation types for conditions:<br><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition<br><b>Or</b> - enough if one condition is met |
| <i>State</i>     | Filter by item state - <i>Normal</i> or <i>Not supported</i> .  |
| <i>Status</i>    | Filter by item status - <i>Enabled</i> or <i>Disabled</i> .   |
| <i>Triggers</i>  | Filter items with (or without) triggers.  |
| <i>Inherited</i> | Filter items inherited (or not inherited) from a template.  |
| <i>Discovery</i> | Filter items discovered (or not discovered) by low-level discovery.   |

## Using subfilter

The subfilter allows to further modify the filtering from the main filter.

It contains clickable links for a quick access to related items. Items are related by common entity - tag, item type, item state, item update interval, etc. When an entity is clicked, the entity is highlighted with a gray background, and items are immediately filtered (no need to click *Apply* in the main filter). Clicking another entity adds it to the filtered results. Clicking the entity again removes the filtering.

|                                      |  |
|--------------------------------------|--|
| Subfilter affects only filtered data |  |
| TAGS                                 | <a href="#">component: application 1</a> <a href="#">component: cpu 17</a> <a href="#">component: data-collector 15</a> <a href="#">component: environment 1</a> <a href="#">component: internal-process 24</a> <a href="#">component: memory 7</a> <a href="#">component: network 9</a><br><a href="#">disk: sda 8</a> <a href="#">filesystem: / 7</a> <a href="#">filesystem: /var/snap/firefox/common/host-hunspell 7</a> <a href="#">fstype: ext4 14</a> <a href="#">interface: enp0s3 9</a> |
| TYPES                                | <a href="#">Zabbix agent 50</a> <a href="#">Zabbix internal 68</a> <a href="#">Calculated 2</a> <a href="#">Dependent item 22</a>  |
| TYPE OF INFORMATION                  | <a href="#">Numeric (float) 88</a> <a href="#">Character 8</a> <a href="#">Numeric (unsigned) 40</a> <a href="#">Text 6</a>  |
| STATE                                | <a href="#">Normal 131</a> <a href="#">Not supported 11</a>  |
| TEMPLATE                             | <a href="#">Not inherited items 32</a> <a href="#">Inherited items 110</a>   |
| WITH TRIGGERS                        | <a href="#">Without triggers 59</a> <a href="#">With triggers 83</a>   |
| DISCOVERY                            | <a href="#">Regular 110</a> <a href="#">Discovered 32</a>  |
| HISTORY                              | <a href="#">0 4</a> <a href="#">1h 2</a> <a href="#">1w 136</a>  |
| TRENDS                               | <a href="#">0 4</a> <a href="#">52w 1d 124</a>   |
| INTERVAL                             | <a href="#">30s 1</a> <a href="#">1m 100</a> <a href="#">3m 6</a> <a href="#">5m 1</a> <a href="#">15m 3</a> <a href="#">1h 9</a>  |

Subfilters are generated based on the filtered data, which is limited to 1000 records. If you want to see more records in the subfilter, you need to increase the value of *Limit for search and filter results* parameter (in *Administration -> General -> GUI*).

Unlike the main filter, the subfilter is updated with each table refresh request to always have up-to-date information of available filtering options and their counter numbers.

The number of entities displayed is limited to 100 horizontally. If there are more, a three-dot icon is displayed at the end; it is not clickable. A number next to each clickable entity indicates the number of items grouped in it (based on the results of the main filter). When an entity is clicked, the numbers with other available entities are displayed with a plus sign indicating how many items may be added to the current selection. Entities without items are not displayed unless selected in the subfilter before.

## 2 Triggers

### Overview

The trigger list for a host can be accessed from *Configuration* → *Hosts* by clicking on *Triggers* for the respective host.

Triggers

Create trigger

All hosts / Zabbix server Enabled ZBX SNMP IPMI JMX Items 142 Triggers 67 Graphs 27 Discovery rules 3 Web scenarios 1

Filter

| <input type="checkbox"/> | Severity    | Value | Name   | Operational data   | Expression   | Status  | Info | Tags |
|--------------------------|-------------|-------|--|--|--|---------|------|------|
| <input type="checkbox"/> | Average     | OK    | Mounted filesystem discovery: /: Disk space is critically low (used > {SVFS.FS.PUSED.MAX.CRIT:"7"}%)   | Space used: {ITEM.LASTVALUE3} of {ITEM.LASTVALUE2} ({ITEM.LASTVALUE1}) | <code>last(/Zabbix server/vfs.fs.size[/,pused])&gt;{SVFS.FS.PUSED.MAX.CRIT:"7"} and ((last(/Zabbix server/vfs.fs.size[/,total])-last(/Zabbix server/vfs.fs.size[/,used]))&lt;5G or timeleft(/Zabbix server/vfs.fs.size[/,pused],1h,100)&lt;1d)</code>  | Enabled |      |      |
| <input type="checkbox"/> | Warning     | OK    | Mounted filesystem discovery: /: Disk space is low (used > {SVFS.FS.PUSED.MAX.WARN:"7"}%)<br>Depends on:<br>Zabbix server: /: Disk space is critically low (used > {SVFS.FS.PUSED.MAX.CRIT:"7"}%)                        | Space used: {ITEM.LASTVALUE3} of {ITEM.LASTVALUE2} ({ITEM.LASTVALUE1}) | <code>last(/Zabbix server/vfs.fs.size[/,pused])&gt;{SVFS.FS.PUSED.MAX.WARN:"7"} and ((last(/Zabbix server/vfs.fs.size[/,total])-last(/Zabbix server/vfs.fs.size[/,used]))&lt;10G or timeleft(/Zabbix server/vfs.fs.size[/,pused],1h,100)&lt;1d)</code> | Enabled |      |      |
| <input type="checkbox"/> | Average     | OK    | Mounted filesystem discovery: /: Running out of free inodes (free < {SVFS.FS.INODE.PFREE.MIN.CRIT:"7"}%)   | Free inodes: {ITEM.LASTVALUE1}   | <code>min(/Zabbix server/vfs.inode[/,pfree],5m)&lt;{SVFS.FS.INODE.PFREE.MIN.CRIT:"7"}</code>   | Enabled |      |      |
| <input type="checkbox"/> | Warning     | OK    | Mounted filesystem discovery: /: Running out of free inodes (free < {SVFS.FS.INODE.PFREE.MIN.WARN:"7"}%)<br>Depends on:<br>Zabbix server: /: Running out of free inodes (free < {SVFS.FS.INODE.PFREE.MIN.CRIT:"7"}%)     | Free inodes: {ITEM.LASTVALUE1}   | <code>min(/Zabbix server/vfs.inode[/,pfree],5m)&lt;{SVFS.FS.INODE.PFREE.MIN.WARN:"7"}</code>   | Enabled |      |      |
| <input type="checkbox"/> | Information | OK    | Template Module Linux generic by Zabbix agent: /etc/passwd has been changed<br>Depends on:<br>Zabbix server: Operating system description has changed<br>Zabbix server: System name has changed (new name: {ITEM.VALUE}) |  | <code>(last(/Zabbix server/vfs.file.cksum[/etc/passwd],#1)&lt;&gt;last(/Zabbix server/vfs.file.cksum[/etc/passwd],#2))&gt;0</code>   | Enabled |      |      |

Displayed data:

| Column           | Description   |
|------------------|---|
| Severity         | Severity of the trigger is displayed by both name and cell background color.  |
| Value            | Trigger value is displayed:<br><b>OK</b> - the trigger is in the OK state<br><b>PROBLEM</b> - the trigger is in the Problem state   |
| Host             | Host of the trigger.<br>This column is displayed only if multiple hosts are selected in the filter.   |
| Name             | Name of the trigger, displayed as a blue link to trigger details.<br>Clicking on the trigger name link opens the trigger <b>configuration form</b> .<br>If the host trigger belongs to a template, the template name is displayed before the trigger name, as a gray link. Clicking on the template link will open the trigger list on the template level.<br>If the trigger has been created from a trigger prototype, its name is preceded by the low-level discovery rule name, in orange. Clicking on the discovery rule name will open the trigger prototype list. |
| Operational data | Operational data definition of the trigger, containing arbitrary strings and macros that will resolve dynamically in <i>Monitoring</i> → <i>Problems</i> .  |
| Expression       | Trigger expression is displayed. The host-item part of the expression is displayed as a link, leading to the item configuration form.   |
| Status           | Trigger status is displayed - <i>Enabled</i> , <i>Disabled</i> or <i>Unknown</i> . By clicking on the status you can change it - from Enabled to Disabled (and back); from Unknown to Disabled (and back).<br>Problems of a disabled trigger are no longer displayed in the frontend, but are not deleted.  |
| Info             | If everything is working correctly, no icon is displayed in this column. In case of errors, a square icon with the letter "i" is displayed. Hover over the icon to see a tooltip with the error description.  |
| Tags             | If a trigger contains tags, tag name and value are displayed in this column.  |

To configure a new trigger, click on the *Create trigger* button at the top right corner.

### Mass editing options

Buttons below the list offer some mass-editing options:

- *Enable* - change trigger status to *Enabled*.
- *Disable* - change trigger status to *Disabled*.
- *Copy* - copy the triggers to other hosts or templates.
- *Mass update* - update several properties for a number of triggers at once.
- *Delete* - delete the triggers.

To use these options, mark the checkboxes before the respective triggers, then click on the required button.

### Using filter

You can use the filter to display only the triggers you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* icon is available at the top right corner. Clicking on it will open a filter where you can specify the desired filtering criteria.

| Parameter                | Description  |
|--------------------------|--|
| <i>Host groups</i>       | Filter by one or more host groups.<br>Specifying a parent host group implicitly selects all nested host groups.<br>Host groups containing templates only cannot be selected.   |
| <i>Hosts</i>             | Filter by one or more hosts.<br>If host groups are already selected above, host selection is limited to those groups.  |
| <i>Name</i>              | Filter by trigger name.  |
| <i>Severity</i>          | Select to filter by one or several trigger severities.   |
| <i>State</i>             | Filter by trigger state.   |
| <i>Status</i>            | Filter by trigger status.  |
| <i>Value</i>             | Filter by trigger value.   |
| <i>Tags</i>              | Filter by trigger tag name and value. It is possible to include as well as exclude specific tags and tag values. Several conditions can be set. Tag name matching is always case-sensitive.<br>There are several operators available for each condition:<br><b>Exists</b> - include the specified tag names<br><b>Equals</b> - include the specified tag names and values (case-sensitive)<br><b>Contains</b> - include the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br><b>Does not exist</b> - exclude the specified tag names<br><b>Does not equal</b> - exclude the specified tag names and values (case-sensitive)<br><b>Does not contain</b> - exclude the specified tag names where the tag values contain the entered string (substring match, case-insensitive)<br>There are two calculation types for conditions:<br><b>And/Or</b> - all conditions must be met, conditions having the same tag name will be grouped by the Or condition<br><b>Or</b> - enough if one condition is met<br>Macros and <b>macro functions</b> are supported both in tag name and tag value fields. |
| <i>Inherited</i>         | Filter triggers inherited (or not inherited) from a template.  |
| <i>Discovered</i>        | Filter triggers discovered (or not discovered) by low-level discovery.   |
| <i>With dependencies</i> | Filter triggers with (or without) dependencies.  |

## 3 Graphs

### Overview

The custom graph list for a host can be accessed from *Configuration* → *Hosts* by clicking on *Graphs* for the respective host.

A list of existing graphs is displayed.



| All hosts / Zabbix server Enabled ZBX SNMP IPMI JMX Items 151 Triggers 68 Graphs 30 Discovery rules 3 Web scenarios 1 |       |        |            |      | Filter |
|---|-------|--------|------------|------|--------|
| <input type="checkbox"/> Name   | Width | Height | Graph type | Info |        |
| <input type="checkbox"/> Mounted filesystem discovery: /: Disk space usage  | 600   | 340    | Pie        |      |        |
| <input type="checkbox"/> Template Module Linux CPU by Zabbix agent: CPU jumps   | 900   | 200    | Normal     |      |        |
| <input type="checkbox"/> Template Module Linux CPU by Zabbix agent: CPU usage   | 900   | 200    | Stacked    |      |        |
| <input type="checkbox"/> Template Module Linux CPU by Zabbix agent: CPU utilization                                   | 900   | 200    | Normal     |      |        |
| <input type="checkbox"/> Network interface discovery: Interface enp4s0: Network traffic                               | 900   | 200    | Normal     |      |        |
| <input type="checkbox"/> Network interface discovery: Interface ppp0: Network traffic                                 | 900   | 200    | Normal     |      |        |
| <input type="checkbox"/> Network interface discovery: Interface wlp3s0: Network traffic                               | 900   | 200    | Normal     |      |        |
| <input type="checkbox"/> Template Module Linux memory by Zabbix agent: Memory usage                                   | 900   | 200    | Normal     |      |        |
| <input type="checkbox"/> Template Module Linux memory by Zabbix agent: Memory utilization                             | 900   | 200    | Normal     |      |        |
| <input type="checkbox"/> Template Module Linux generic by Zabbix agent: Processes                                     | 900   | 200    | Normal     |      |        |
| <input type="checkbox"/> Block devices discovery: sda: Disk average waiting time                                      | 900   | 200    | Normal     |      |        |
| <input type="checkbox"/> Block devices discovery: sda: Disk read/write rates  | 900   | 200    | Normal     |      |        |

#### Displayed data:

| Column            | Description   |
|-------------------|---|
| <b>Name</b>       | <p>Name of the custom graph, displayed as a blue link to graph details. Clicking on the graph name link opens the graph <b>configuration form</b>.</p> <p>If the host graph belongs to a template, the template name is displayed before the graph name, as a gray link. Clicking on the template link will open the graph list on the template level.</p> <p>If the graph has been created from a graph prototype, its name is preceded by the low-level discovery rule name, in orange. Clicking on the discovery rule name will open the graph prototype list.</p> |
| <b>Width</b>      | Graph width is displayed.   |
| <b>Height</b>     | Graph height is displayed.  |
| <b>Graph type</b> | Graph type is displayed - <i>Normal</i> , <i>Stacked</i> , <i>Pie</i> or <i>Exploded</i> .  |
| <b>Info</b>       | If the graph is working correctly, no icon is displayed in this column. In case of errors, a square icon with the letter "i" is displayed. Hover over the icon to see a tooltip with the error description.   |

To configure a new graph, click on the *Create graph* button at the top right corner.

#### Mass editing options

Buttons below the list offer some mass-editing options:

- *Copy* - copy the graphs to other hosts or templates
- *Delete* - delete the graphs

To use these options, mark the checkboxes before the respective graphs, then click on the required button.

#### Using filter

You can filter graphs by host group and host. For better search performance, data is searched with macros unresolved.

#### 4 Discovery rules

##### Overview

The list of low-level discovery rules for a host can be accessed from *Configuration* → *Hosts* by clicking on *Discovery* for the respective host.

A list of existing low-level discovery rules is displayed. It is also possible to see all discovery rules independently of the host, or all discovery rules of a specific host group by changing the filter settings.

Discovery rules

Create discovery rule

All hosts / Zabbix server

Enabled

ZBX

SNMP

IPMI

JMX

Items 151

Triggers 68

Graphs 30

Discovery rules 3

Web scenarios 1

Filter

| <input type="checkbox"/> | Host          | Name  | Items                             | Triggers                             | Graphs                             | Hosts                           | Key               | Interval | Type           | Status  | Info |
|--------------------------|---------------|---|-----------------------------------|--------------------------------------|------------------------------------|---------------------------------|-------------------|----------|----------------|---------|------|
| <input type="checkbox"/> | Zabbix server | Template Module Linux block devices by Zabbix agent: <a href="#">Get /proc/diskstats: Block devices discovery</a> | <a href="#">Item prototypes 8</a> | <a href="#">Trigger prototypes 1</a> | <a href="#">Graph prototypes 3</a> | <a href="#">Host prototypes</a> | vfs.dev.discovery |          | Dependent item | Enabled |      |
| <input type="checkbox"/> | Zabbix server | Template Module Linux filesystems by Zabbix agent: <a href="#">Mounted filesystem discovery</a>                   | <a href="#">Item prototypes 4</a> | <a href="#">Trigger prototypes 4</a> | <a href="#">Graph prototypes 1</a> | <a href="#">Host prototypes</a> | vfs.fs.discovery  | 1h       | Zabbix agent   | Enabled |      |
| <input type="checkbox"/> | Zabbix server | Template Module Linux network interfaces by Zabbix agent: <a href="#">Network interface discovery</a>             | <a href="#">Item prototypes 8</a> | <a href="#">Trigger prototypes 3</a> | <a href="#">Graph prototypes 1</a> | <a href="#">Host prototypes</a> | net.if.discovery  | 1h       | Zabbix agent   | Enabled |      |

0 selected

Enable

Disable

Execute now

Delete

Displaying 3 of 3 found

Displayed data:

| Column          | Description   |
|-----------------|---|
| <i>Host</i>     | The visible host name is displayed.<br>In the absence of a visible host name, the technical host name is displayed.   |
| <i>Name</i>     | Name of the rule, displayed as a blue link.<br>Clicking on the rule name opens the low-level discovery rule <b>configuration form</b> .<br>If the discovery rule belongs to a template, the template name is displayed before the rule name, as a gray link. Clicking on the template link will open the rule list on the template level. |
| <i>Items</i>    | A link to the list of item prototypes is displayed.<br>The number of existing item prototypes is displayed in gray.   |
| <i>Triggers</i> | A link to the list of trigger prototypes is displayed.<br>The number of existing trigger prototypes is displayed in gray.   |
| <i>Graphs</i>   | A link to the list of graph prototypes is displayed.<br>The number of existing graph prototypes is displayed in gray.   |
| <i>Hosts</i>    | A link to the list of host prototypes is displayed.<br>The number of existing host prototypes is displayed in gray.   |
| <i>Key</i>      | The item key used for discovery is displayed.   |
| <i>Interval</i> | The frequency of performing discovery is displayed.<br><i>Note</i> that discovery can also be performed immediately by pushing the <i>Execute now</i> button below the list.  |
| <i>Type</i>     | The item type used for discovery is displayed (Zabbix agent, SNMP agent, etc).  |
| <i>Status</i>   | Discovery rule status is displayed - <i>Enabled</i> , <i>Disabled</i> or <i>Not supported</i> . By clicking on the status you can change it - from Enabled to Disabled (and back); from Not supported to Disabled (and back).   |
| <i>Info</i>     | If everything is fine, no icon is displayed in this column. In case of errors, a square icon with the letter "i" is displayed. Hover over the icon to see a tooltip with the error description.   |

To configure a new low-level discovery rule, click on the *Create discovery rule* button at the top right corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Enable* - change the low-level discovery rule status to *Enabled*.
- *Disable* - change the low-level discovery rule status to *Disabled*.
- *Execute now* - perform discovery based on the discovery rules immediately. See **more details**. Note that when performing discovery immediately, the configuration cache is not updated, thus the result will not reflect very recent changes to discovery rule configuration.
- *Delete* - delete the low-level discovery rules.

To use these options, mark the checkboxes before the respective discovery rules, then click on the required button.

Using filter

You can use the filter to display only the discovery rules you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of discovery rules. If you click on it, a filter becomes available where you can filter discovery rules by host group, host, name, item key, item type, and other parameters.

All hosts / Zabbix server Enabled ZBX SNMP IPMI JMX Items 151 Triggers 68 Graphs 30 Discovery rules 3 Web scenarios 1
Filter

Host groups
Select

Type

State

Hosts
Select

Update interval

Status

Name

Keep lost resources period

Key

Apply Reset

| Parameter                         | Description   |
|-----------------------------------|---|
| <i>Host groups</i>                | Filter by one or more host groups.<br>Specifying a parent host group implicitly selects all nested host groups. |
| <i>Hosts</i>                      | Filter by one or more hosts.  |
| <i>Name</i>                       | Filter by discovery rule name.  |
| <i>Key</i>                        | Filter by discovery item key.   |
| <i>Type</i>                       | Filter by discovery item type.  |
| <i>Update interval</i>            | Filter by update interval.  |
| <i>Keep lost resources period</i> | Filter by Keep lost resources period.   |
| <i>SNMP OID</i>                   | Filter by SNMP OID.<br>Only available if <i>SNMP agent</i> is selected as type.                                 |
| <i>State</i>                      | Filter by discovery rule state (All/Normal/Not supported).  |
| <i>Status</i>                     | Filter by discovery rule status (All/Enabled/Disabled).   |

## 1 Item prototypes

### Overview

In this section the item prototypes of a low-level discovery rule on the host are displayed. Item prototypes are the basis of real host **items** that are created during low-level discovery.

Item prototypes
Create item prototype

All hosts / Zabbix server Enabled ZBX SNMP IPMI Discovery list / Network interface discovery

Item prototypes 8 Trigger prototypes 3 Graph prototypes 1 Host prototypes

| <input type="checkbox"/> | Name ▲  | Key   | Interval | History | Trends | Type         | Create enabled | Discover | Tags                         |
|--------------------------|---|---|----------|---------|--------|--------------|----------------|----------|------------------------------|
| <input type="checkbox"/> | ... Template Module Linux network interfaces by Zabbix agent: <a href="#">Interface {#IFNAME}: Bits received</a>                | net.if.in["{#IFNAME}"]                                  | 3m       | 7d      | 365d   | Zabbix agent | Yes            | Yes      | Application: Interface (...) |
| <input type="checkbox"/> | ... Template Module Linux network interfaces by Zabbix agent: <a href="#">Interface {#IFNAME}: Bits sent</a>                    | net.if.out["{#IFNAME}"]                                 | 3m       | 7d      | 365d   | Zabbix agent | Yes            | Yes      | Application: Interface (...) |
| <input type="checkbox"/> | ... Template Module Linux network interfaces by Zabbix agent: <a href="#">Interface {#IFNAME}: Inbound packets discarded</a>    | net.if.in["{#IFNAME}",dropped]                          | 3m       | 7d      | 365d   | Zabbix agent | Yes            | Yes      | Application: Interface (...) |
| <input type="checkbox"/> | ... Template Module Linux network interfaces by Zabbix agent: <a href="#">Interface {#IFNAME}: Inbound packets with errors</a>  | net.if.in["{#IFNAME}",errors]                           | 3m       | 7d      | 365d   | Zabbix agent | Yes            | Yes      | Application: Interface (...) |
| <input type="checkbox"/> | ... Template Module Linux network interfaces by Zabbix agent: <a href="#">Interface {#IFNAME}: Interface type</a>               | vfs.file.contents["/sys/class/net/{#IFNAME}/type"]      | 1h       | 7d      | 0d     | Zabbix agent | Yes            | Yes      | Application: Interface (...) |
| <input type="checkbox"/> | ... Template Module Linux network interfaces by Zabbix agent: <a href="#">Interface {#IFNAME}: Operational status</a>           | vfs.file.contents["/sys/class/net/{#IFNAME}/operstate"] | 1m       | 7d      | 0      | Zabbix agent | Yes            | Yes      | Application: Interface (...) |
| <input type="checkbox"/> | ... Template Module Linux network interfaces by Zabbix agent: <a href="#">Interface {#IFNAME}: Outbound packets discarded</a>   | net.if.out["{#IFNAME}",dropped]                         | 3m       | 7d      | 365d   | Zabbix agent | Yes            | Yes      | Application: Interface (...) |
| <input type="checkbox"/> | ... Template Module Linux network interfaces by Zabbix agent: <a href="#">Interface {#IFNAME}: Outbound packets with errors</a> | net.if.out["{#IFNAME}",errors]                          | 3m       | 7d      | 365d   | Zabbix agent | Yes            | Yes      | Application: Interface (...) |

0 selected
Create enabled
Create disabled
Mass update
Delete

Displaying 8 of 8 found

Displayed data:

| Column      | Description  |
|-------------|--|
| <i>Name</i> | Name of the item prototype, displayed as a blue link.<br>Clicking on the name opens the item prototype <b>configuration form</b> .<br>If the item prototype belongs to a template, the template name is displayed before the rule name, as a gray link. Clicking on the template link will open the item prototype list on the template level. |

| Column                | Description  |
|-----------------------|--|
| <i>Key</i>            | Key of the item prototype is displayed.  |
| <i>Interval</i>       | Frequency of the check is displayed.   |
| <i>History</i>        | How many days to keep item data history is displayed.  |
| <i>Trends</i>         | How many days to keep item trends history is displayed.  |
| <i>Type</i>           | Type of the item prototype is displayed (Zabbix agent, SNMP agent, simple check, etc).   |
| <i>Create enabled</i> | Create the item based on this prototype as:<br><b>Yes</b> - enabled<br><b>No</b> - disabled. You can switch between 'Yes' and 'No' by clicking on them.        |
| <i>Discover</i>       | Discover the item based on this prototype:<br><b>Yes</b> - discover<br><b>No</b> - do not discover. You can switch between 'Yes' and 'No' by clicking on them. |
| <i>Tags</i>           | Tags of the item prototype are displayed.  |

To configure a new item prototype, click on the *Create item prototype* button at the top right corner.

## Mass editing options

Buttons below the list offer some mass-editing options:

- *Create enabled* - create these items as *Enabled*
- *Create disabled* - create these items as *Disabled*
- *Mass update* - mass update these item prototypes
- *Delete* - delete these item prototypes

To use these options, mark the checkboxes before the respective item prototypes, then click on the required button.

## 2 Trigger prototypes

### Overview

In this section the trigger prototypes of a low-level discovery rule on the host are displayed. Trigger prototypes are the basis of real host **triggers** that are created during low-level discovery.

Trigger prototypes

Create trigger prototype

All hosts / Zabbix server

Enabled ZBX SNMP IPMI

Discovery list / Network interface discovery

Item prototypes 8

Trigger prototypes 3

Graph prototypes 1

Host prototypes

| <input type="checkbox"/> | Severity    | Name   | Operational data  | Expression  | Create enabled      | Discover            | Tags |
|--------------------------|-------------|--|---|---|---------------------|---------------------|------|
| <input type="checkbox"/> | Information | Template Module Linux network interfaces by Zabbix agent: <u>Interface {#IFNAME}: Ethernet has changed to lower speed than it was before</u><br><b>Depends on:</b><br>Zabbix server: <u>Interface {#IFNAME}: Link down</u>         | Current reported speed: {ITEM.LASTVALUE1}                   | Problem: <code>change(Zabbix server/vfs.file.contents["/sys/class/net/{#IFNAME}/type"]&lt;0 and last(Zabbix server/vfs.file.contents["/sys/class/net/{#IFNAME}/type"]&gt;0 and (last(Zabbix server/vfs.file.contents["/sys/class/net/{#IFNAME}/type"]&gt;6 or last(Zabbix server/vfs.file.contents["/sys/class/net/{#IFNAME}/type"])=1) and (last(Zabbix server/vfs.file.contents["/sys/class/net/{#IFNAME}/operstate"]&lt;2)</code><br>Recovery: <code>(change(Zabbix server/vfs.file.contents["/sys/class/net/{#IFNAME}/type"]&gt;0 and last(Zabbix server/vfs.file.contents["/sys/class/net/{#IFNAME}/type"].#2)&gt;0) or (last(Zabbix server/vfs.file.contents["/sys/class/net/{#IFNAME}/operstate"])=2)</code> | <a href="#">Yes</a> | <a href="#">Yes</a> |      |
| <input type="checkbox"/> | Warning     | Template Module Linux network interfaces by Zabbix agent: <u>Interface {#IFNAME}: High error rate ( &gt; {\${IFERRORS.WARN:"{#IFNAME}"}} for 5m)</u><br><b>Depends on:</b><br>Zabbix server: <u>Interface {#IFNAME}: Link down</u> | errors in: {ITEM.LASTVALUE1}, errors out: {ITEM.LASTVALUE2} | Problem: <code>min(Zabbix server/net.if.in["{#IFNAME}",errors],5m)&gt;{\${IFERRORS.WARN:"{#IFNAME}"}} or min(Zabbix server/net.if.out["{#IFNAME}",errors],5m)&gt;{\${IFERRORS.WARN:"{#IFNAME}"}}</code><br>Recovery: <code>max(Zabbix server/net.if.in["{#IFNAME}",errors],5m)&lt;{\${IFERRORS.WARN:"{#IFNAME}"}}*0.8 and max(Zabbix server/net.if.out["{#IFNAME}",errors],5m)&lt;{\${IFERRORS.WARN:"{#IFNAME}"}}*0.8</code>  | <a href="#">Yes</a> | <a href="#">Yes</a> |      |
| <input type="checkbox"/> | Average     | Template Module Linux network interfaces by Zabbix agent: <u>Interface {#IFNAME}: Link down</u>  | Current state: {ITEM.LASTVALUE1}                            | Problem: <code>{\${IFCONTROL:"{#IFNAME}"}}=1 and (last(Zabbix server/vfs.file.contents["/sys/class/net/{#IFNAME}/operstate"])=2 and (last(Zabbix server/vfs.file.contents["/sys/class/net/{#IFNAME}/operstate"].#1)&lt;last(Zabbix server/vfs.file.contents["/sys/class/net/{#IFNAME}/operstate"].#2)=1)</code><br>Recovery: <code>last(Zabbix server/vfs.file.contents["/sys/class/net/{#IFNAME}/operstate"]&lt;2</code>   | <a href="#">Yes</a> | <a href="#">Yes</a> |      |

0 selected

Create enabled

Create disabled

Mass update

Delete

Displaying 3 of 3 found

Displayed data:

| Column      | Description   |
|-------------|---|
| <i>Name</i> | Name of the trigger prototype, displayed as a blue link.<br>Clicking on the name opens the trigger prototype <b>configuration form</b> .<br>If the trigger prototype belongs to a linked template, the template name is displayed before the trigger name, as a gray link. Clicking on the template link will open the trigger prototype list on the linked template level. |

| Column                  | Description  |
|-------------------------|--|
| <i>Operational data</i> | Format of the operational data of the trigger is displayed, containing arbitrary strings and macros that will resolve dynamically in <i>Monitoring</i> → <i>Problems</i> . |
| <i>Create enabled</i>   | Create the trigger based on this prototype as:<br><b>Yes</b> - enabled<br><b>No</b> - disabled. You can switch between 'Yes' and 'No' by clicking on them.                 |
| <i>Discover</i>         | Discover the trigger based on this prototype:<br><b>Yes</b> - discover<br><b>No</b> - do not discover. You can switch between 'Yes' and 'No' by clicking on them.          |
| <i>Tags</i>             | Tags of the trigger prototype are displayed.   |

To configure a new trigger prototype, click on the *Create trigger prototype* button at the top right corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Create enabled* - create these triggers as *Enabled*
- *Create disabled* - create these triggers as *Disabled*
- *Mass update* - mass update these trigger prototypes
- *Delete* - delete these trigger prototypes

To use these options, mark the checkboxes before the respective trigger prototypes, then click on the required button.

3 Graph prototypes

Overview

In this section the graph prototypes of a low-level discovery rule on the host are displayed. Graph prototypes are the basis of real host **graphs** that are created during low-level discovery.

≡ Graph prototypes

Create graph prototype

All hosts / Zabbix server Enabled **ZBX** SNMP IPMI Discovery list / Network interface discovery  
Item prototypes 8 Trigger prototypes 3 Graph prototypes 1 Host prototypes

| <input type="checkbox"/> Name ▲   | Width | Height | Graph type | Discover   |
|---|-------|--------|------------|------------|
| <input type="checkbox"/> Template Module Linux network interfaces by Zabbix agent: <a href="#">Interface (#IFNAME): Network traffic</a> | 900   | 200    | Normal     | <b>Yes</b> |

Displaying 1 of 1 found

0 selected

Displayed data:

| Column          | Description   |
|-----------------|---|
| <i>Name</i>     | Name of the graph prototype, displayed as a blue link.<br>Clicking on the name opens the graph prototype <b>configuration form</b> .<br>If the graph prototype belongs to a linked template, the template name is displayed before the graph name, as a gray link. Clicking on the template link will open the graph prototype list on the linked template level. |
| <i>Width</i>    | Width of the graph prototype is displayed.  |
| <i>Height</i>   | Height of the graph prototype is displayed.   |
| <i>Type</i>     | Type of the graph prototype is displayed - <i>Normal</i> , <i>Stacked</i> , <i>Pie</i> or <i>Exploded</i> .   |
| <i>Discover</i> | Discover the graph based on this prototype:<br><b>Yes</b> - discover<br><b>No</b> - do not discover. You can switch between 'Yes' and 'No' by clicking on them.   |

To configure a new graph prototype, click on the *Create graph prototype* button at the top right corner.

Mass editing options

Buttons below the list offer some mass-editing options:

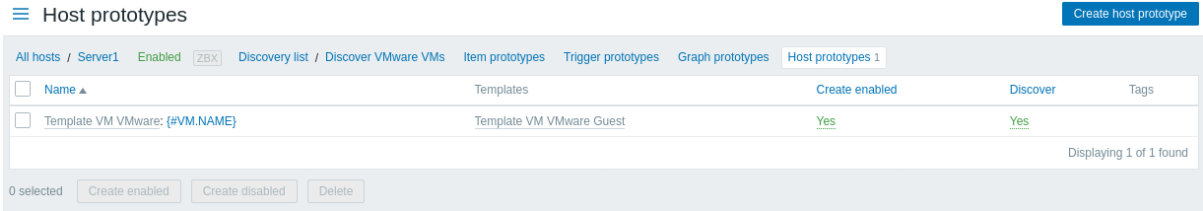
- *Delete* - delete these graph prototypes

To use these options, mark the checkboxes before the respective graph prototypes, then click on the required button.

4 Host prototypes

Overview

In this section the host prototypes of a low-level discovery rule on the host are displayed. Host prototypes are the basis of real **hosts** that are created during low-level discovery.



Displayed data:

| Column         | Description  |
|----------------|--|
| Name           | Name of the host prototype, displayed as a blue link.<br>Clicking on the name opens the host prototype configuration form.<br>If the host prototype belongs to a linked template, the template name is displayed before the host name, as a gray link. Clicking on the template link will open the host prototype list on the linked template level. |
| Templates      | Templates of the host prototype are displayed.   |
| Create enabled | Create the host based on this prototype as:<br><b>Yes</b> - enabled<br><b>No</b> - disabled. You can switch between 'Yes' and 'No' by clicking on them.  |
| Discover       | Discover the host based on this prototype:<br><b>Yes</b> - discover<br><b>No</b> - do not discover. You can switch between 'Yes' and 'No' by clicking on them.   |
| Tags           | Tags of the host prototype are displayed.  |

To configure a new host prototype, click on the *Create host prototype* button at the top right corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Create enabled* - create these hosts as *Enabled*
- *Create disabled* - create these hosts as *Disabled*
- *Delete* - delete these host prototypes

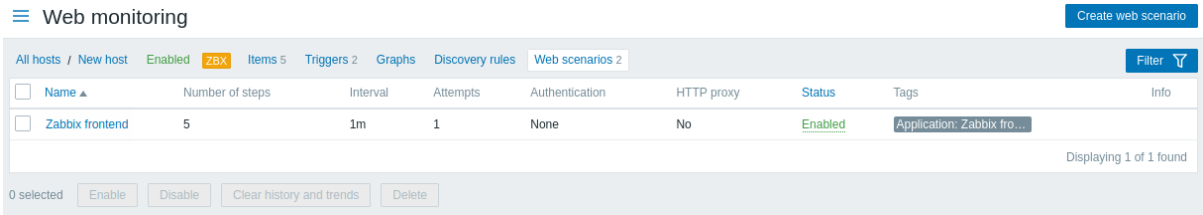
To use these options, mark the checkboxes before the respective host prototypes, then click on the required button.

5 Web scenarios

Overview

The **web scenario** list for a host can be accessed from *Configuration* → *Hosts* by clicking on *Web* for the respective host.

A list of existing web scenarios is displayed.



Displayed data:

| Column                 | Description  |
|------------------------|--|
| <i>Name</i>            | Name of the web scenario. Clicking on the web scenario name opens the web scenario <b>configuration form</b> .<br>If the host web scenario belongs to a template, the template name is displayed before the web scenario name as a gray link. Clicking on the template link will open the web scenario list on the template level. |
| <i>Number of steps</i> | The number of steps the scenario contains.   |
| <i>Update interval</i> | How often the scenario is performed.   |
| <i>Attempts</i>        | How many attempts for executing web scenario steps are performed.  |
| <i>Authentication</i>  | Authentication method is displayed - Basic, NTLM, or None.   |
| <i>HTTP proxy</i>      | Displays HTTP proxy or 'No' if not used.   |
| <i>Status</i>          | Web scenario status is displayed - <i>Enabled</i> or <i>Disabled</i> .<br>By clicking on the status you can change it.   |
| <i>Tags</i>            | Web scenario tags are displayed.<br>Up to three tags (name:value pairs) can be displayed. If there are more tags, a "..." link is displayed that allows to see all tags on mouseover.  |
| <i>Info</i>            | If everything is working correctly, no icon is displayed in this column. In case of errors, a square icon with the letter "i" is displayed. Hover over the icon to see a tooltip with the error description.   |

To configure a new web scenario, click on the *Create web scenario* button at the top right corner.

#### Mass editing options

Buttons below the list offer some mass-editing options:

- *Enable* - change the scenario status to *Enabled*
- *Disable* - change the scenario status to *Disabled*
- *Clear history and trends* - clear history and trend data for the scenarios
- *Delete* - delete the web scenarios

To use these options, mark the checkboxes before the respective web scenarios, then click on the required button.

#### Using filter

You can use the filter to display only the scenarios you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of web scenarios. If you click on it, a filter becomes available where you can filter scenarios by host group, host, status and tags.

## 4 Maintenance

### Overview

In the *Configuration* → *Maintenance* section users can configure and maintain maintenance periods for hosts.

A listing of existing maintenance periods with their details is displayed.

Maintenance periods

Create maintenance period

| <input type="checkbox"/> | Name ▲         | Type                 | Active since     | Active till      | State  | Description                           |
|--------------------------|----------------|----------------------|------------------|------------------|--------|---------------------------------------|
| <input type="checkbox"/> | Server regular | With data collection | 2020-04-17 00:00 | 2021-04-18 00:00 | Active | We break and fix things at this time. |

0 selected
Delete

Displayed data:

| Column              | Description  |
|---------------------|--|
| <i>Name</i>         | Name of the maintenance period. Clicking on the maintenance period name opens the maintenance period <b>configuration form</b> .   |
| <i>Type</i>         | The type of maintenance is displayed: <i>With data collection</i> or <i>No data collection</i>   |
| <i>Active since</i> | The date and time when executing maintenance periods becomes active.<br>Note: This time does not activate a maintenance period; maintenance periods need to be set separately. |
| <i>Active till</i>  | The date and time when executing maintenance periods stops being active.   |
| <i>State</i>        | The state of the maintenance period:<br><b>Approaching</b> - will become active soon<br><b>Active</b> - is active<br><b>Expired</b> - is not active any more                   |
| <i>Description</i>  | Description of the maintenance period is displayed.  |

To configure a new maintenance period, click on the *Create maintenance period* button in the top right-hand corner.

Mass editing options

A button below the list offers one mass-editing option:

- *Delete* - delete the maintenance periods

To use this option, mark the checkboxes before the respective maintenance periods and click on *Delete*.

Using filter

You can use the filter to display only the maintenance periods you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of maintenance periods. If you click on it, a filter becomes available where you can filter maintenance periods by host group, name and state.

## 5 Actions

Overview

In the *Configuration* → *Actions* section users can configure and maintain actions.

The actions displayed are actions assigned to the selected event source (trigger, discovery, autoregistration, internal actions).

To switch to a different event source, click on *Actions* in the *Configuration* menu section. It is also possible to switch between sources by using the title dropdown in the top left corner.

### Note:

Actions for services are maintained in a similar way in *Services* → *Service actions*.

For users without Super admin rights actions are displayed according to permission settings. That means in some cases a user without Super admin rights isn't able to view the complete action list because of certain permission restrictions. An action is displayed to the user without Super admin rights if the following conditions are fulfilled:

- The user has read-write access to host groups, hosts, templates, and triggers in action conditions
- The user has read-write access to host groups, hosts, and templates in action operations, recovery operations, and update operations
- The user has read access to user groups and users in action operations, recovery operations, and update operations



| <input type="checkbox"/> Name ▲                                   | Conditions | Operations   | Status  |
|---|------------|--|---------|
| <input type="checkbox"/> Report problems to Zabbix administrators |            | Send message to user groups: Zabbix administrators via Email<br>Send message to user groups: Managers via SMS<br>Run remote commands on current host | Enabled |

Displayed data:

| Column            | Description  |
|-------------------|--|
| <i>Name</i>       | Name of the action. Clicking on the action name opens the action <b>configuration form</b> .   |
| <i>Conditions</i> | Action conditions are displayed.   |
| <i>Operations</i> | Action operations are displayed.<br>Since Zabbix 2.2, the operation list also displays the media type (e-mail, SMS or script) used for notification as well as the name and surname (in parentheses after the username) of a notification recipient.<br>Action operation can both be a <b>notification</b> or a <b>remote command</b> depending on the selected type of operation. |
| <i>Status</i>     | Action status is displayed - <i>Enabled</i> or <i>Disabled</i> .<br>By clicking on the status you can change it.<br>See the <b>Escalations</b> section for more details as to what happens if an action is disabled during an escalation in progress.  |

To configure a new action, click on the *Create action* button in the top right-hand corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Enable* - change the action status to *Enabled*
- *Disable* - change the action status to *Disabled*
- *Delete* - delete the actions

To use these options, mark the checkboxes before the respective actions, then click on the required button.

Using filter

You can use the filter to display only the actions you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of actions. If you click on it, a filter becomes available where you can filter actions by name and status.

Name 
 Status Any Enabled Disabled

Apply
 Reset

## 6 Event correlation

Overview

In the *Configuration* → *Event correlation* section users can configure and maintain global correlation rules for Zabbix events.

| <input type="checkbox"/> Name ▲          | Conditions   | Operations       | Status  |
|--|--|------------------|---------|
| <input type="checkbox"/> Close old event | Value of new event tag <i>Application</i> equals <i>ABC</i><br>Value of new event tag <i>State</i> equals <i>Up</i><br>Value of old event tag <i>Application</i> equals <i>ABC</i><br>Value of old event tag <i>Application</i> equals value of new event tag <i>Application</i> | Close old events | Enabled |

0 selected
 Enable
 Disable
 Delete

Displaying 1 of 1 found

Displayed data:

| Column            | Description  |
|-------------------|--|
| <i>Name</i>       | Name of the correlation rule. Clicking on the correlation rule name opens the rule <b>configuration form</b> .             |
| <i>Conditions</i> | Correlation rule conditions are displayed.   |
| <i>Operations</i> | Correlation rule operations are displayed.   |
| <i>Status</i>     | Correlation rule status is displayed - <i>Enabled</i> or <i>Disabled</i> .<br>By clicking on the status you can change it. |

To configure a new correlation rule, click on the *Create correlation* button in the top right-hand corner.

Mass editing options

Buttons below the list offer some mass-editing options:

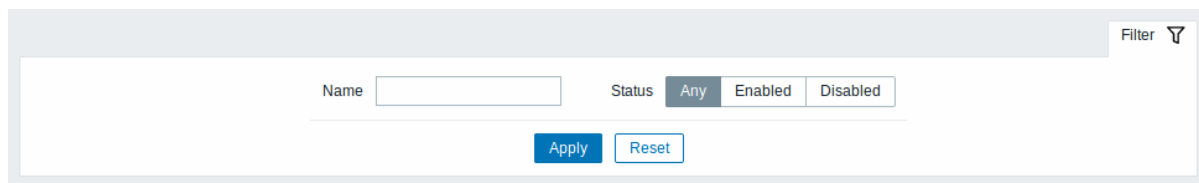
- *Enable* - change the correlation rule status to *Enabled*
- *Disable* - change the correlation rule status to *Disabled*
- *Delete* - delete the correlation rules

To use these options, mark the checkboxes before the respective correlation rules, then click on the required button.

Using filter

You can use the filter to display only the correlation rules you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of correlation rules. If you click on it, a filter becomes available where you can filter correlation rules by name and status.

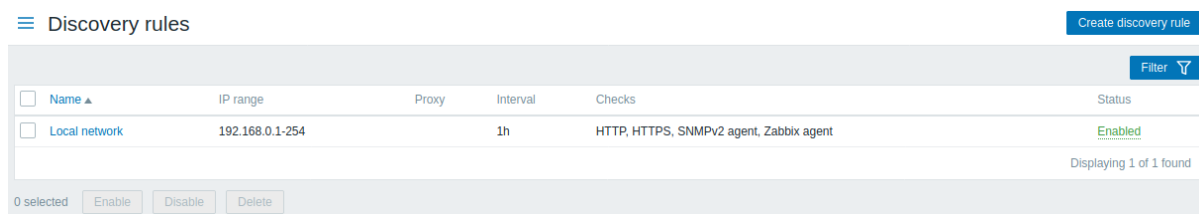


## 7 Discovery

Overview

In the *Configuration* → *Discovery* section users can configure and maintain discovery rules.

A listing of existing discovery rules with their details is displayed.



| Discovery rules          |               |                 |       |          |   | Create discovery rule   |
|--------------------------|---------------|-----------------|-------|----------|---|-------------------------|
| <input type="checkbox"/> | Name ▲        | IP range        | Proxy | Interval | Checks                                  | Status                  |
| <input type="checkbox"/> | Local network | 192.168.0.1-254 |       | 1h       | HTTP, HTTPS, SNMPv2 agent, Zabbix agent | Enabled                 |
|                          |               |                 |       |          |   | Displaying 1 of 1 found |
| 0 selected               |               |                 |       |          |   | Enable Disable Delete   |

Displayed data:

| Column          | Description  |
|-----------------|--|
| <i>Name</i>     | Name of the discovery rule. Clicking on the discovery rule name opens the discovery rule <b>configuration form</b> . |
| <i>IP range</i> | The range of IP addresses to use for network scanning is displayed.  |
| <i>Proxy</i>    | The proxy name is displayed, if discovery is performed by the proxy.   |
| <i>Interval</i> | The frequency of performing discovery displayed.   |
| <i>Checks</i>   | The types of checks used for discovery are displayed.  |
| <i>Status</i>   | Action status is displayed - <i>Enabled</i> or <i>Disabled</i> .<br>By clicking on the status you can change it.     |

To configure a new discovery rule, click on the *Create discovery rule* button in the top right-hand corner.

## Mass editing options

Buttons below the list offer some mass-editing options:

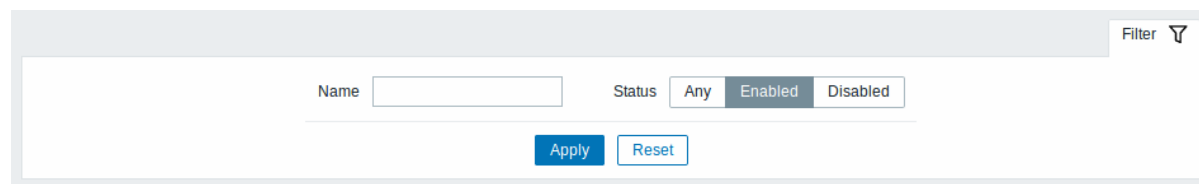
- *Enable* - change the discovery rule status to *Enabled*
- *Disable* - change the discovery rule status to *Disabled*
- *Delete* - delete the discovery rules

To use these options, mark the checkboxes before the respective discovery rules, then click on the required button.

## Using filter

You can use the filter to display only the discovery rules you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of discovery rules. If you click on it, a filter becomes available where you can filter discovery rules by name and status.

The screenshot shows a filter interface for discovery rules. At the top right, there is a 'Filter' link with a funnel icon. Below this, there is a search bar labeled 'Name' with an empty text input field. To the right of the search bar is a 'Status' section with three buttons: 'Any', 'Enabled' (which is highlighted with a dark background), and 'Disabled'. At the bottom of the filter section, there are two buttons: 'Apply' (in blue) and 'Reset' (in white with a blue border).

## 6 Administration

### Overview

The Administration menu is for administrative functions of Zabbix. This menu is available to users of **Super Administrators** type only.

### 1 General

#### Overview

The *Administration* → *General* section contains a number of subsections for setting frontend-related defaults and customizing Zabbix.

The list of available subsections appears upon pressing on *General* in the *Administration* menu section. It is also possible to switch between subsections by using the title dropdown in the top left corner.

#### 1 GUI

This section provides customization of several frontend-related defaults.

Default language

English (en\_US) ▾

Default time zone

(UTC-08:00) America/Los\_Angeles ▾

Default theme

Blue ▾

\* Limit for search and filter results

1000

\* Max number of columns and rows in overview tables

50

\* Max count of elements to show inside table cell

20

Show warning if Zabbix server is down

☒

\* Working time

{WORKING\_HOURS}

Show technical errors

☐

\* Max history display period

24h

\* Time filter default period

1h

\* Max period for time selector

2y

Configuration parameters:

| Parameter   | Description  |
|---|--|
| <i>Default language</i>   | Default language for users who have not specified a language in their profiles and guest users. For more information, see <a href="#">Installation of additional frontend languages</a> .  |
| <i>Default time zone</i>  | Default <b>time zone</b> for users who have not specified a time zone in their profiles and guest users.   |
| <i>Default theme</i>  | Default theme for users who have not specified a theme in their profiles and guest users.  |
| <i>Limit for search and filter results</i>                        | Maximum amount of elements (rows) that will be displayed in a web-interface list, for example, in <i>Configuration &gt; Hosts</i> .<br>Note: If set to, for example, '50', only the first 50 elements will be displayed in all affected frontend lists. If some list contains more than fifty elements, the indication of that will be the '+' sign in <i>"Displaying 1 to 50 of 50+ found"</i> . Also, if filtering is used and still there are more than 50 matches, only the first 50 will be displayed.<br>Note that increasing the value of this parameter may lead to decreased performance and increased memory consumption on the web server side. |
| <i>Max number of columns&lt;br&gt;and rows in overview tables</i> | Maximum number of columns and rows to display in Data overview and Trigger overview dashboard widgets. The same limit applies to both columns and rows. If more rows and/or columns than shown exist, the system will display a warning at the bottom of the table: "Not all results are displayed. Please provide more specific search criteria."   |
| <i>Max count of elements&lt;br&gt;to show inside table cell</i>   | For entries that are displayed in a single table cell, no more than configured here will be shown.   |
| <i>Show warning if Zabbix server is down</i>                      | This parameter enables a warning message to be displayed in a browser window if the Zabbix server cannot be reached (possibly down). The message remains visible even if the user scrolls down the page. When hovered over, the message is temporarily hidden to reveal the contents underneath it.  |
| <i>Working time</i>   | This parameter is supported since Zabbix 2.0.1.<br>This system-wide parameter defines working hours. In graphs, working time is displayed as a white background and non-working time is displayed as gray.<br>See <a href="#">Time period specification</a> page for description of the time format.<br><a href="#">User macros</a> are supported (since Zabbix 3.4.0).  |

| Parameter                           | Description   |
|-------------------------------------|---|
| <i>Show technical errors</i>        | If checked, all registered users will be able to see technical errors (PHP/SQL). If unchecked, the information is only available to <b>Zabbix Super Admins</b> and users belonging to the user groups with enabled <b>debug mode</b> .  |
| <i>Max history display period</i>   | Maximum time period for which to display historical data in <i>Monitoring &gt; Latest data</i> , host <b>web scenario</b> information in <i>Monitoring &gt; Hosts</i> , and in the <i>Data overview</i> dashboard widget.<br>Allowed range: 24 hours (default) - 1 week. <b>Time suffixes</b> , e.g. 1w (one week), 36h (36 hours), are supported.                                |
| <i>Time filter default period</i>   | Time period to be used in graphs and dashboards by default. Allowed range: 1 minute - 10 years (default: 1 hour).<br><b>Time suffixes</b> , e.g. 10m (ten minutes), 5w (five weeks), are supported.<br>Note: when a user changes the time period while viewing a graph, this time period is stored as user preference, replacing the global default or a previous user selection. |
| <i>Max period for time selector</i> | Maximum available time period for graphs and dashboards. Users will not be able to visualize older data. Allowed range: 1 year - 10 years (default: 2 years).<br><b>Time suffixes</b> , e.g. 1y (one year), 365w (365 weeks), are supported.  |

## 2 Autoregistration

In this section, you can configure the encryption level for active agent autoregistration.

Parameters marked with an asterisk are mandatory.

Configuration parameters:

| Parameter               | Description  |
|-------------------------|--|
| <i>Encryption level</i> | Select one or both options for encryption level:<br><b>No encryption</b> - unencrypted connections are allowed<br><b>PSK</b> - TLS encrypted connections with a pre-shared key are allowed   |
| <i>PSK identity</i>     | Enter the pre-shared key identity string.<br>This field is only available if 'PSK' is selected as <i>Encryption level</i> .<br>Do not put sensitive information in the PSK identity, it is transmitted unencrypted over the network to inform a receiver which PSK to use.   |
| <i>PSK</i>              | Enter the pre-shared key (an even number of hexadecimal characters).<br>Maximum length: 512 hex-digits (256-byte PSK) if Zabbix uses GnuTLS or OpenSSL library, 64 hex-digits (32-byte PSK) if Zabbix uses mbed TLS (PolarSSL) library.<br>Example: 1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952<br>This field is only available if 'PSK' is selected as <i>Encryption level</i> . |

See also: [Secure autoregistration](#)

## 3 Housekeeper

The housekeeper is a periodical process, executed by Zabbix server. The process removes outdated information and information deleted by user.

Events and alerts

Enable internal housekeeping

☒

\* Trigger data storage period

365d

\* Service data storage period

1d

\* Internal data storage period

1d

\* Network discovery data storage period

1d

\* Autoregistration data storage period

1d

Services

Enable internal housekeeping

☒

\* Data storage period

365d

Audit

Enable internal housekeeping

☒

\* Data storage period

365d

User sessions

Enable internal housekeeping

☒

\* Data storage period

365d

History

Enable internal housekeeping

☒

Override item history period

☒

\* Data storage period

365d

Trends

Enable internal housekeeping

☒

Override item trend period

☒

\* Data storage period

365d

Update

Reset defaults

In this section housekeeping tasks can be enabled or disabled on a per-task basis separately for: events and alerts/IT services/user sessions/history/trends. Audit housekeeping settings are available in a separate [menu section](#).

If housekeeping is enabled, it is possible to set for how many days data records will be kept before being removed by the housekeeper.

Deleting an item/trigger will also delete problems generated by that item/trigger.

Also, an event will only be deleted by the housekeeper if it is not associated with a problem in any way. This means that if an event is either a problem or recovery event, it will not be deleted until the related problem record is removed. The housekeeper will delete problems first and events after, to avoid potential problems with stale events or problem records.

For history and trends an additional option is available: *Override item history period* and *Override item trend period*. This option allows to globally set for how many days item history/trends will be kept (1 hour to 25 years; or "0"), in this case overriding the values set for individual items in *History storage period/Trend storage period* fields in **item configuration**. Note that the storage period will not be overridden for items that have configuration option *Do not keep history* and/or *Do not keep trends* enabled.

It is possible to override the history/trend storage period even if internal housekeeping is disabled. Thus, when using an external housekeeper, the history storage period could be set using the history *Data storage period* field.

**Attention:**

If using TimescaleDB, in order to take full advantage of TimescaleDB automatic partitioning of history and trends tables, *Override item history period* and *Override item trend period* options must be enabled as well as *Enable internal housekeeping* option for history and trends. Otherwise, data kept in these tables will still be stored in partitions, however, the housekeeper will not drop outdated partitions, and warnings about incorrect configuration will be displayed. When dropping of outdated partitions is enabled, Zabbix server and frontend will no longer keep track of deleted items, and history for deleted items will be cleared when an outdated partition is deleted.

**Time suffixes** are supported in the period fields, e.g. 1d (one day), 1w (one week). The minimum is 1 day (1 hour for history), the maximum - 25 years.

*Reset defaults* button allows to revert any changes made.

4 Audit log

This section allows configuring audit log settings.

Enable audit logging ☒

Enable internal housekeeping ☒

\* Data storage period

365d

Update

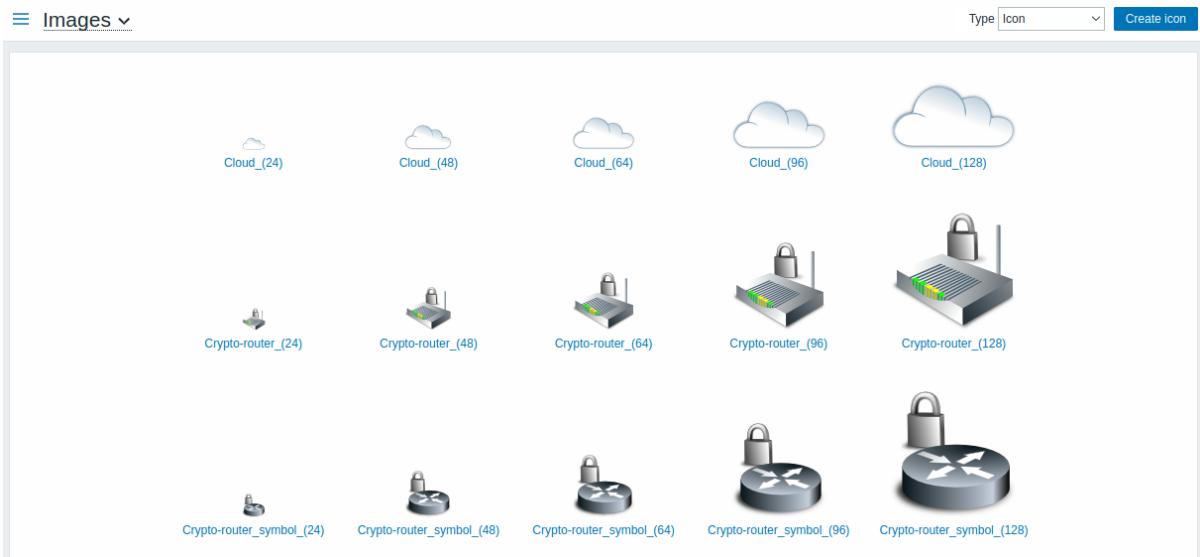
Reset defaults

The following parameters are available:

| Parameter                    | Description   |
|------------------------------|---|
| Enable audit logging         | Enable/disable audit logging. Marked by default.  |
| Enable internal housekeeping | Enable/disable internal housekeeping for audit. Marked by default.  |
| Data storage period          | Amount of days audit records should be kept for before being removed by the housekeeper. Mandatory if housekeeping is enabled. Default: 365 days. |

5 Images

The Images section displays all the images available in Zabbix. Images are stored in the database.



The *Type* dropdown allows you to switch between icon and background images:

- Icons are used to display **network map** elements
- Backgrounds are used as background images of network maps

### Adding image

You can add your own image by clicking on the *Create icon* or *Create background* button in the top right corner.

\* Name

\* Upload

Browse...

No file selected.

Add

Cancel

Image attributes:

| Parameter     | Description   |
|---------------|---|
| <i>Name</i>   | Unique name of an image.  |
| <i>Upload</i> | Select the file (PNG, JPEG, GIF) from a local system to be uploaded to Zabbix.<br>Note that it may be possible to upload other formats that will be converted to PNG during upload.<br>GD library is used for image processing, therefore formats that are supported depend on the library version used (2.0.28 or higher is required by Zabbix). |

Note:

Maximum size of the upload file is limited by the value of ZBX\_MAX\_IMAGE\_SIZE that is 1024x1024 bytes or 1 MB.  
  
The upload of an image may fail if the image size is close to 1 MB and the max\_allowed\_packet MySQL configuration parameter is at a default of 1MB. In this case, increase the max\_allowed\_packet parameter.

### 6 Icon mapping

This section allows creating the mapping of certain hosts with certain icons. Host inventory field information is used to create the mapping.

The mappings can then be used in **network map configuration** to assign appropriate icons to matching hosts automatically.

To create a new icon map, click on *Create icon map* in the top right corner.



\* Name

\* Mappings

|                     | Inventory field | Expression  | Icon             | Action                 |
|---------------------|-----------------|-------------|------------------|------------------------|
| 1:                  | Type            | server      | Server_(96)      | <a href="#">Remove</a> |
| 2:                  | Type            | router      | Router_(96)      | <a href="#">Remove</a> |
| 3:                  | Type            | workstation | Workstation_(96) | <a href="#">Remove</a> |
| <a href="#">Add</a> |                 |             |                  |                        |
| Default             |                 |             | Cloud_(24)       |                        |

Configuration parameters:

| Parameter              | Description   |
|------------------------|---|
| <i>Name</i>            | Unique name of icon map.  |
| <i>Mappings</i>        | A list of mappings. The order of mappings determines which one will have priority. You can move mappings up and down the list with drag-and-drop. |
| <i>Inventory field</i> | Host inventory field that will be looked into to seek a match.  |
| <i>Expression</i>      | Regular expression describing the match.  |
| <i>Icon</i>            | Icon to use if a match for the expression is found.   |
| <i>Default</i>         | Default icon to use.  |

## 7 Regular expressions

This section allows creating custom regular expressions that can be used in several places in the frontend. See [Regular expressions](#) section for details.

## 8 Macros

This section allows to define system-wide [user macros](#) as name-value pairs. Note that macro values can be kept as plain text, secret text or Vault secret. Adding a description is also supported.

| Macro  | Value   |  | Description  |
|--|---|--|--|
| <input type="text" value="{MYSQL_PASSWORD}"/>  | <input type="password" value="*****"/>               |  | <input type="text" value="description"/> |
| <input type="text" value="{MYSQL_USERNAME}"/>  | <input type="password" value="*****"/>               |  | <input type="text" value="description"/> |
| <input type="text" value="{SECRET_PASSWORD}"/> | <input type="text" value="path/to/secret:password"/> |  | <input type="text" value="description"/> |
| <input type="text" value="{SECRET_USERNAME}"/> | <input type="text" value="path/to/secret:username"/> |  | <input type="text" value="description"/> |
| <input type="text" value="{SNMP_COMMUNITY}"/>  | <input type="text" value="public"/>                  |  | <input type="text" value="description"/> |
| <input type="text" value="{WORKING_HOURS}"/>   | <input type="text" value="1-5,09:00-18:00"/>         |  | <input type="text" value="description"/> |
| <a href="#">Add</a>  |   |  |  |

## 9 Trigger displaying options

This section allows customizing how trigger status is displayed in the frontend and [trigger severity](#) names and colors.

Use custom event status colors ☒

\* Unacknowledged PROBLEM events  ☒ blinking

\* Acknowledged PROBLEM events  ☒ blinking

\* Unacknowledged RESOLVED events  ☒ blinking

\* Acknowledged RESOLVED events  ☒ blinking

\* Display OK triggers for

\* On status change triggers blink for

\* Not classified

\* Information

\* Warning

\* Average

\* High

\* Disaster



| Parameter   | Description   |
|---|---|
| <i>Use custom event status colors</i>   | Checking this parameter turns on the customization of colors for acknowledged/unacknowledged problems.  |
| <i>Unacknowledged PROBLEM events, Acknowledged PROBLEM events, Unacknowledged RESOLVED events, Acknowledged RESOLVED events</i> | Enter new color code or click on the color to select a new one from the provided palette. If <i>blinking</i> checkbox is marked, triggers will blink for some time upon the status change to become more visible.   |
| <i>Display OK triggers for</i>  | Time period for displaying OK triggers. Allowed range: 0 - 24 hours. <b>Time suffixes</b> , e.g. 5m, 2h, 1d, are supported.   |
| <i>On status change triggers blink for</i>  | Length of trigger blinking. Allowed range: 0 - 24 hours. <b>Time suffixes</b> , e.g. 5m, 2h, 1d, are supported.   |
| <i>Not classified, Information, Warning, Average, High, Disaster</i>  | Custom severity names and/or colors to display instead of system default. Enter new color code or click on the color to select a new one from the provided palette.<br><br>Note that custom severity names entered here will be used in all locales. If you need to translate them to other languages for certain users, see <a href="#">Customizing trigger severities</a> page. |

This section allows selecting geographical map tile service provider and configuring service provider settings for the Geomap **dashboard widget**. To provide visualization using the geographical maps, Zabbix uses open-source JavaScript interactive maps library Leaflet. Please note that Zabbix has no control over the quality of images provided by third-party tile providers, including the predefined tile providers.

\* Tile provider

\* Tile URL

\* Max zoom level

| Parameter        | Description   |
|------------------|---|
| Tile provider    | Select one of the available tile service providers or select <i>Other</i> to add another tile provider or self-hosted tiles (see <a href="#">Using a custom tile service provider</a> ).  |
| Tile URL         | The URL template for loading and displaying the tile layer on geographical maps. This field is editable only if <i>Tile provider</i> is set to <i>Other</i> .<br><br>The following placeholders are supported:<br>{s} represents one of the available subdomains;<br>{z} represents zoom level parameter in the URL;<br>{x} and {y} represent tile coordinates;<br>{r} can be used to add "@2x" to the URL to load retina tiles.<br><br>Example: https://{s}.example.com/{z}/{x}/{y}{r}.png |
| Attribution text | Tile provider attribution text to be displayed in a small text box on the map. This field is visible only if <i>Tile provider</i> is set to <i>Other</i> .  |
| Max zoom level   | Maximum zoom level of the map. This field is editable only if <i>Tile provider</i> is set to <i>Other</i> .   |

## Using a custom tile service provider

The Geomap widget is capable to load raster tile images from a custom self-hosted or a third-party tile provider service. To use a custom third-party tile provider service or a self-hosted tile folder or server, select *Other* in the *Tile provider* field and specify the custom URL in the *Tile URL* field using proper placeholders.

## 11 Modules

This section allows to administer custom **frontend modules**.

| <input type="checkbox"/> | Name ▲         | Version | Author     | Description                      | Status  |
|--------------------------|----------------|---------|------------|----------------------------------|---------|
| <input type="checkbox"/> | Example module | 1.0     | John Smith | Short description of the module. | Enabled |

0 selected

Displaying 1 of 1 found

Click on *Scan directory* to register/unregister any custom modules. Registered modules will appear in the list, along with their details. Unregistered modules will be removed from the list.

You may filter modules by name or status (enabled/disabled). Click on the module status in the list to enable/disable a module. You may also mass enable/disable modules by selecting them in the list and then clicking on the *Enable/Disable* buttons below the list.

## 12 API tokens

This section allows to create and manage API tokens.

| <input type="checkbox"/> | Name ▲  | User                         | Expires at          | Created at          | Created by user              | Last accessed at | Status  |
|--------------------------|---------|------------------------------|---------------------|---------------------|------------------------------|------------------|---------|
| <input type="checkbox"/> | Token   | Admin (Zabbix Administrator) | 2022-01-26 00:00:00 | 2021-01-22 15:51:02 | Admin (Zabbix Administrator) | Never            | Enabled |
| <input type="checkbox"/> | Token 2 | new_user                     | 2021-01-26 00:00:00 | 2021-01-22 16:13:03 | Admin (Zabbix Administrator) | Never            | Enabled |
| <input type="checkbox"/> | Token 3 | guest1                       | Never               | 2021-01-22 16:08:49 | Admin (Zabbix Administrator) | Never            | Enabled |

To create a new token, press *Create API token* button at the top right corner, then fill out the required fields in the token configuration screen:

\* Name

Token 1

\* User

Admin (Zabbix Administrator) ✕

Select

Description

Set expiration date and time

☒

\* Expires at

2022-01-28 00:00:00

Enabled

☒

Add

Cancel

| Parameter                    | Description   |
|------------------------------|---|
| Name                         | Token's visible name.   |
| User                         | User the token should be assigned to. To quickly select a user, start typing the username, first or last name, then select the required user from the auto-complete list. Alternatively, you can press the Select button and select a user from the full user list. A token can be assigned only to one user. |
| Description                  | Optional token description.   |
| Set expiration date and time | Unmark this checkbox if a token should not have an expiry date.   |
| Expiry date                  | Click on the calendar icon to select token expiry date or enter the date manually in a format YYYY-MM-DD hh:mm:ss   |
| Enabled                      | Unmark this checkbox if you need to create a token in a disabled state.   |

### Warning:

Click on the token name to edit the name, description, expiry date settings, or token status. Note that it is not possible to change to which user the token is assigned. Press *Update* button to save changes. If a token has been lost or exposed, you may press *Regenerate* button to generate new token value. A confirmation dialog box will appear, asking you to confirm this operation since after proceeding the previously generated token will become invalid.

### 13 Other parameters

862

Frontend URL

Example: https://localhost/zabbix/ui/

\* Group for discovered hosts

Discovered hosts x

Select

Default host inventory mode

Disabled

Manual

Automatic

User group for database down message

type here to search

Select

Log unmatched SNMP traps

☒

Authorization

\* Login attempts

5

\* Login blocking interval

30s

Security

Validate URI schemes

☒

http,https,ftp,file,mailto,tel,ssh

\* Use X-Frame-Options HTTP header ?

☒

SAMEORIGIN

Use iframe sandboxing

☒

Iframe sandboxing exceptions

Communication with Zabbix server

\* Network timeout

3s

\* Connection timeout

3s

\* Network timeout for media type test

65s

\* Network timeout for script execution

60s

\* Network timeout for item test

60s

\* Network timeout for scheduled report test

60s

Update

Reset defaults

| Parameter                                   | Description   |
|---|---|
| <i>Frontend URL</i>                         | URL to Zabbix web interface. This parameter is used by Zabbix web service for communication with frontend and should be specified to enable scheduled reports.  |
| <i>Group for discovered hosts</i>           | Hosts discovered by <b>network discovery</b> and <b>agent autoregistration</b> will be automatically placed in the host group, selected here.   |
| <i>Default host inventory mode</i>          | Default <b>mode</b> for host inventory. It will be followed whenever a new host or host prototype is created by server or frontend unless overridden during host discovery/autoregistration by the <i>Set host inventory mode</i> operation.  |
| <i>User group for database down message</i> | User group for sending alarm message or 'None'.<br>Zabbix server depends on the availability of the backend database. It cannot work without a database. If the database is down, selected users can be notified by Zabbix. Notifications will be sent to the user group set here using all configured user media entries. Zabbix server will not stop; it will wait until the database is back again to continue processing.<br>Notification consists of the following content:<br>[MySQL PostgreSQL Oracle] database <DB Name> [on <DB Host>:<DB Port>] is not available: <error message depending on the type of DBMS (database)><br><DB Host> is not added to the message if it is defined as an empty value and <DB Port> is not added if it is the default value ("0"). The alert manager (a special Zabbix server process) tries to establish a new connection to the database every 10 seconds. If the database is still down the alert manager repeats sending alerts, but not more often than every 15 minutes. |
| <i>Log unmatched SNMP traps</i>             | Log <b>SNMP trap</b> if no corresponding SNMP interfaces have been found.   |

## Authorization

| Parameter                      | Description  |
|--------------------------------|--|
| <i>Login attempts</i>          | Number of unsuccessful login attempts before the possibility to log in gets blocked.                 |
| <i>Login blocking interval</i> | Period of time for which logging in will be prohibited when <i>Login attempts</i> limit is exceeded. |

## Security

| Parameter                              | Description  |
|--|--|
| <i>Validate URI schemes</i>            | Unmark this checkbox to disable URI scheme validation (enabled by default).<br>If marked, you can specify a comma-separated list of allowed URI schemes (default: http,https,ftp,file,mailto,tel,ssh). Applies to all fields in the frontend where URIs are used (for example, map element URLs).  |
| <i>Use X-Frame-Options HTTP header</i> | Unmark this checkbox to disable the HTTP X-Frame-options header (not recommended).<br>If marked, you can specify the value of the HTTP X-Frame-options header. Supported values:<br><b>SAMEORIGIN</b> (default) or <b>'self'</b> (must be single-quoted) - the page can only be displayed in a frame on the same origin as the page itself;<br><b>DENY</b> or <b>'none'</b> (must be single-quoted) - the page cannot be displayed in a frame, regardless of the site attempting to do so;<br><b>a string of space-separated hostnames</b> ; adding <b>'self'</b> (must be single-quoted) to the list allows the page to be displayed in a frame on the same origin as the page itself.<br>Note that using <b>'self'</b> or <b>'none'</b> without single quotes will result in them being regarded as hostnames. |
| <i>Use iframe sandboxing</i>           | Unmark this checkbox to disable putting the retrieved URL content into sandbox (not recommended).<br>If marked, you can specify the iframe sandboxing exceptions; unspecified restrictions will still be applied. If this field is empty, all sandbox attribute restrictions apply.<br>For more information, see the description of the <a href="#">sandbox</a> attribute.   |

## Communication with Zabbix server

| Parameter  | Description   |
|--|---|
| <i>Network timeout</i>                           | How many seconds to wait before closing an idle socket (if a connection to Zabbix server has been established earlier, but frontend can not finish read/send data operation during this time, the connection will be dropped). Allowed range: 1 - 300s (default: 3s). |
| <i>Connection timeout</i>                        | How many seconds to wait before stopping an attempt to connect to Zabbix server. Allowed range: 1 - 30s (default: 3s).  |
| <i>Network timeout for media type test</i>       | How many seconds to wait for a response when testing a media type. Allowed range: 1 - 300s (default: 65s).  |
| <i>Network timeout for script execution</i>      | How many seconds to wait for a response when executing a script. Allowed range: 1 - 300s (default: 60s).  |
| <i>Network timeout for item test</i>             | How many seconds to wait for returned data when testing an item. Allowed range: 1 - 300s (default: 60s).  |
| <i>Network timeout for scheduled report test</i> | How many seconds to wait for returned data when testing a scheduled report. Allowed range: 1 - 300s (default: 60s).   |

## 2 Proxies

### Overview

In the *Administration* → *Proxies* section proxies for **distributed monitoring** can be configured in the Zabbix frontend.

### Proxies

A listing of existing proxies with their details is displayed.

| <input type="checkbox"/> Name         | Mode   | Encryption | Compression | Last seen (age) | Host count | Item count | Required performance (vps) | Hosts    |
|---------------------------------------|--------|------------|-------------|-----------------|------------|------------|----------------------------|----------|
| <input type="checkbox"/> Remote proxy | Active | NONE       | ON          | 21h 15m 15s     |            |            |                            | New host |
| <input type="checkbox"/> New proxy    | Active | NONE       | OFF         | Never           |            |            |                            |          |

Displaying 2 of 2 found

Displayed data:

| Column                            | Description   |
|-----------------------------------|---|
| <i>Name</i>                       | Name of the proxy. Clicking on the proxy name opens the proxy <b>configuration form</b> .   |
| <i>Mode</i>                       | Proxy mode is displayed - <i>Active</i> or <i>Passive</i> .   |
| <i>Encryption</i>                 | Encryption status for connections from the proxy is displayed:<br><b>None</b> - no encryption<br><b>PSK</b> - using pre-shared key<br><b>Cert</b> - using certificate |
| <i>Compression</i>                | Compression status for connections from the proxy is displayed:<br><b>On</b> - compression is enabled<br><b>Off</b> - compression is disabled                         |
| <i>Last seen (age)</i>            | The time when the proxy was last seen by the server is displayed.   |
| <i>Host count</i>                 | The number of enabled hosts assigned to the proxy is displayed.   |
| <i>Item count</i>                 | The number of enabled items on enabled hosts assigned to the proxy is displayed.  |
| <i>Required performance (vps)</i> | Required proxy performance is displayed (the number of values that need to be collected per second).  |
| <i>Hosts</i>                      | All hosts monitored by the proxy are listed. Clicking on the host name opens the host configuration form.   |

To configure a new proxy, click on the *Create proxy* button in the top right-hand corner.

Mass editing options

Buttons below the list offer some mass-editing options:

- *Enable hosts* - change the status of hosts monitored by the proxy to *Monitored*
- *Disable hosts* - change the status of hosts monitored by the proxy to *Not monitored*
- *Delete* - delete the proxies

To use these options, mark the checkboxes before the respective proxies, then click on the required button.

Using filter

You can use the filter to display only the proxies you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of proxies. If you click on it, a filter becomes available where you can filter proxies by name and mode.

Filter

Name

Mode Any Active Passive

Apply

Reset

### 3 Authentication

#### Overview

The *Administration* → *Authentication* section allows to specify the global user authentication method to Zabbix and internal password requirements. The available methods are internal, HTTP, LDAP, and SAML authentication.

#### Default authentication

By default, Zabbix uses internal Zabbix authentication for all users. It is possible to change the default method to **LDAP** system-wide or enable LDAP authentication only for specific user groups.

To set LDAP as default authentication method for all users, navigate to the *LDAP* tab and configure authentication parameters, then return to the *Authentication* tab and switch *Default authentication* selector to LDAP.

Note that the authentication method can be fine-tuned on the **user group** level. Even if LDAP authentication is set globally, some user groups can still be authenticated by Zabbix. These groups must have **frontend access** set to Internal. Vice versa, if internal authentication is used globally, LDAP authentication details can be specified and used for specific user groups whose **frontend access** is set to LDAP. If a user is included into at least one user group with LDAP authentication, this user will not be able to use internal authentication method.

**HTTP** and **SAML 2.0** authentication methods can be used in addition to the default authentication method.

Internal authentication

The *Authentication* tab allows defining custom password complexity requirements for internal Zabbix users.

## Authentication

Authentication

HTTP settings

LDAP settings

SAML settings

Default authentication

Internal

LDAP

Password policy

Minimum password length

8

Password must contain ?

☐ an uppercase and a lowercase Latin letter

☐ a digit

☐ a special character

Avoid easy-to-guess passwords ?

☒

Update

The following password policy options can be configured:

| Parameter                      | Description   |
|--------------------------------|---|
| <i>Minimum password length</i> | By default, the minimum password length is set to 8. Supported range: 1-70. Note that passwords longer than 72 characters will be truncated.  |
| <i>Password must contain</i>   | Mark one or several checkboxes to require usage of specified characters in a password:<br>-an uppercase and a lowercase Latin letter<br>-a digit<br>-a special character<br><br>Hover over the question mark to see a hint with the list of characters for each option. |



| Parameter                            | Description   |
|--------------------------------------|---|
| <i>Avoid easy-to-guess passwords</i> | <p>If marked, a password will be checked against the following requirements:</p> <ul style="list-style-type: none"> <li>- must not contain user's name, surname, or username</li> <li>- must not be one of the common or context-specific passwords.</li> </ul> <p>The list of common and context-specific passwords is generated automatically from the list of NCSC "Top 100k passwords", the list of SecLists "Top 1M passwords" and the list of Zabbix context-specific passwords. Internal users will not be allowed to set passwords included in this list as such passwords are considered weak due to their common use.</p> |

Changes in password complexity requirements will not affect existing user passwords, but if an existing user chooses to change a password, the new password will have to meet current requirements. A hint with the list of requirements will be displayed next to the *Password* field in the *user profile* and in the *user configuration form* accessible from the *Administration→Users* menu.

#### HTTP authentication

HTTP or web server-based authentication (for example: Basic Authentication, NTLM/Kerberos) can be used to check user names and passwords. Note that a user must exist in Zabbix as well, however its Zabbix password will not be used.

#### Attention:

Be careful! Make sure that web server authentication is configured and works properly before switching it on.

Authentication
HTTP settings
LDAP settings
SAML settings

Enable HTTP authentication ? ☒


Default login form HTTP login form

Remove domain name comp, any

Case-sensitive login ☒

Update

#### Configuration parameters:

| Parameter                         | Description   |
|-----------------------------------|---|
| <i>Enable HTTP authentication</i> | <p>Mark the checkbox to enable HTTP authentication. Hovering the mouse over  will bring up a hint box warning that in the case of web server authentication, all users (even with <b>frontend access</b> set to LDAP/Internal) will be authenticated by the web server, not by Zabbix.</p>   |
| <i>Default login form</i>         | <p>Specify whether to direct non-authenticated users to:</p> <p><b>Zabbix login form</b> - standard Zabbix login page.</p> <p><b>HTTP login form</b> - HTTP login page.</p> <p>It is recommended to enable web-server based authentication for the <code>index_http.php</code> page only. If <i>Default login form</i> is set to 'HTTP login page' the user will be logged in automatically if web server authentication module will set valid user login in the <code>\$_SERVER</code> variable. Supported <code>\$_SERVER</code> keys are <code>PHP_AUTH_USER</code>, <code>REMOTE_USER</code>, <code>AUTH_USER</code>.</p> |
| <i>Remove domain name</i>         | <p>A comma-delimited list of domain names that should be removed from the username. E.g. <code>comp,any</code> - if username is 'Admin@any', 'comp\Admin', user will be logged in as 'Admin'; if username is 'notacompany\Admin', login will be denied.</p>   |
| <i>Case sensitive login</i>       | <p>Unmark the checkbox to disable case-sensitive login for usernames (enabled by default). Disabling case-sensitive login allows, for example, to log in as "admin" even if the Zabbix user is "Admin" or "ADMIN".</p> <p>Please note that if case-sensitive login is disabled and there are multiple Zabbix users with similar usernames (e.g., Admin and admin), the login for those users will always be denied with the following error message: "Authentication failed: supplied credentials are not unique."</p>  |

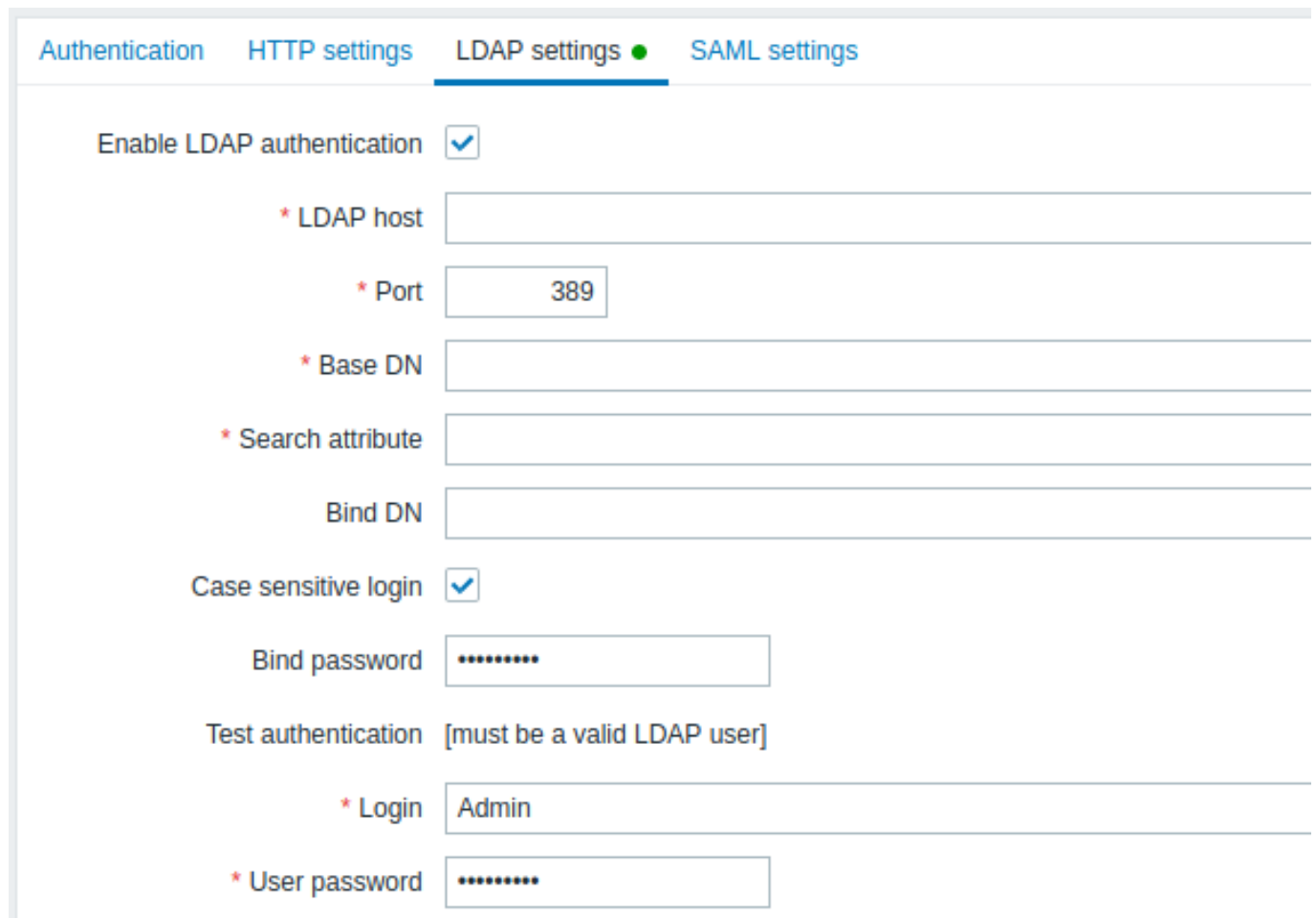
**Note:**

For internal users who are unable to log in using HTTP credentials (with HTTP login form set as default) leading to the 401 error, you may want to add a `ErrorDocument 401 /index.php?form=default` line to basic authentication directives, which will redirect to the regular Zabbix login form.

## LDAP authentication

External LDAP authentication can be used to check user names and passwords. Note that a user must exist in Zabbix as well, however its Zabbix password will not be used.

Zabbix LDAP authentication works at least with Microsoft Active Directory and OpenLDAP.



Configuration parameters:

| Parameter                         | Description   |
|-----------------------------------|---|
| <i>Enable LDAP authentication</i> | Mark the checkbox to enable LDAP authentication.  |
| <i>LDAP host</i>                  | Name of LDAP server. For example: <code>ldap://ldap.zabbix.com</code><br>For secure LDAP server use <i>ldaps</i> protocol.<br><code>ldaps://ldap.zabbix.com</code><br>With OpenLDAP 2.x.x and later, a full LDAP URI of the form <code>ldap://hostname:port</code> or <code>ldaps://hostname:port</code> may be used. |
| <i>Port</i>                       | Port of LDAP server. Default is 389.<br>For secure LDAP connection port number is normally 636.   |
| <i>Base DN</i>                    | Not used when using full LDAP URIs.<br>Base path to search accounts:<br><code>ou=Users,ou=system</code> (for OpenLDAP),<br><code>DC=company,DC=com</code> (for Microsoft Active Directory)  |
| <i>Search attribute</i>           | LDAP account attribute used for search:<br><code>uid</code> (for OpenLDAP),<br><code>sAMAccountName</code> (for Microsoft Active Directory)   |

| Parameter                   | Description   |
|-----------------------------|---|
| <i>Bind DN</i>              | LDAP account for binding and searching over the LDAP server, examples:<br>uid=ldap_search,ou=system (for OpenLDAP),<br>CN=ldap_search,OU=user_group,DC=company,DC=com (for Microsoft Active Directory)<br>Anonymous binding is also supported. Note that anonymous binding potentially opens up domain configuration to unauthorized users (information about users, computers, servers, groups, services, etc.). For security reasons, disable anonymous binds on LDAP hosts and use authenticated access instead. |
| <i>Case sensitive login</i> | Unmark the checkbox to disable case-sensitive login for usernames (enabled by default).<br>Disabling case-sensitive login allows, for example, to log in as "admin" even if the Zabbix user is "Admin" or "ADMIN".<br>Please note that if case-sensitive login is disabled and there are multiple Zabbix users with similar usernames (e.g., Admin and admin), the login for those users will always be denied with the following error message: "Authentication failed: supplied credentials are not unique."      |
| <i>Bind password</i>        | LDAP password of the account for binding and searching over the LDAP server.  |
| <i>Test authentication</i>  | Header of a section for testing   |
| <i>Login</i>                | Name of a test user (which is currently logged in the Zabbix frontend). This user name must exist in the LDAP server.<br>Zabbix will not activate LDAP authentication if it is unable to authenticate the test user.  |
| <i>User password</i>        | LDAP password of the test user.   |

#### Warning:

In case of trouble with certificates, to make a secure LDAP connection (ldaps) work you may need to add a `TLS_REQCERT allow` line to the `/etc/openldap/ldap.conf` configuration file. It may decrease the security of connection to the LDAP catalog.

#### Note:

It is recommended to create a separate LDAP account (*Bind DN*) to perform binding and searching over the LDAP server with minimal privileges in the LDAP instead of using real user accounts (used for logging in the Zabbix frontend). Such an approach provides more security and does not require changing the *Bind password* when the user changes his own password in the LDAP server.  
In the table above it's *ldap\_search* account name.

## SAML authentication

SAML 2.0 authentication can be used to sign in to Zabbix. Note that a user must exist in Zabbix, however, its Zabbix password will not be used. If authentication is successful, then Zabbix will match a local username with the username attribute returned by SAML.

#### Note:

If SAML authentication is enabled, users will be able to choose between logging in locally or via SAML Single Sign-On.

## Setting up the identity provider

In order to work with Zabbix, a SAML identity provider ([onelogin.com](https://onelogin.com), [auth0.com](https://auth0.com), [okta.com](https://okta.com), etc.) needs to be configured in the following way:

- *Assertion Consumer URL* should be set to `<path_to_zabbix_ui>/index_sso.php?acs`
- *Single Logout URL* should be set to `<path_to_zabbix_ui>/index_sso.php?sls`

`<path_to_zabbix_ui>` examples: `<https://example.com/zabbix/ui>`, `<http://another.example.com/zabbix>`, `<http://><any_public_ip_address>/zabbix`

## Setting up Zabbix

#### Attention:

It is required to install php-openssl if you want to use SAML authentication in the frontend.

To use SAML authentication Zabbix should be configured in the following way:

1. Private key and certificate should be stored in the `ui/conf/certs/`, unless custom paths are provided in `zabbix.conf.php`.

By default, Zabbix will look in the following locations:

- `ui/conf/certs/sp.key` - SP private key file

- ui/conf/certs/sp.crt - SP cert file
- ui/conf/certs/idp.crt - IDP cert file

2. All of the most important settings can be configured in the Zabbix frontend. However, it is possible to specify additional settings in the [configuration file](#).

Authentication
HTTP settings
LDAP settings
SAML settings

Enable SAML authentication
☒

\* IdP entity ID

\* SSO service URL

SLO service URL

\* Username attribute

\* SP entity ID

SP name ID format

Sign
☐ Messages
☐ Assertions
☒ AuthN requests
☐ Logout requests
☐ Logout responses

Encrypt
☐ Name ID
☐ Assertions

Case sensitive login
☒

Configuration parameters, available in the Zabbix frontend:

| Parameter                         | Description  |
|-----------------------------------|--|
| <i>Enable SAML authentication</i> | Mark the checkbox to enable SAML authentication.   |
| <i>IDP entity ID</i>              | The unique identifier of SAML identity provider.   |
| <i>SSO service URL</i>            | The URL users will be redirected to when logging in.   |
| <i>SLO Service URL</i>            | The URL users will be redirected to when logging out. If left empty, the SLO service will not be used.   |
| <i>Username attribute</i>         | SAML attribute to be used as a username when logging into Zabbix.<br>List of supported values is determined by the identity provider.<br><br>Examples:<br>uid<br>userprincipalname<br>samaccountname<br>username<br>userusername<br>urn:oid:0.9.2342.19200300.100.1.1<br>urn:oid:1.3.6.1.4.1.5923.1.1.1.13<br>urn:oid:0.9.2342.19200300.100.1.44 |

| Parameter                   | Description  |
|-----------------------------|--|
| <i>SP entity ID</i>         | The unique identifier of SAML service provider.  |
| <i>SP name ID format</i>    | Request a particular name ID format in the response.<br><br>Examples:<br><code>urn:oasis:names:tc:SAML:2.0:nameid-format:persistent</code><br><code>urn:oasis:names:tc:SAML:2.0:nameid-format:unspecified</code><br><code>urn:oasis:names:tc:SAML:2.0:nameid-format:transient</code>   |
| <i>Sign</i>                 | Mark the checkboxes to select entities for which SAML signature should be enabled:<br><i>Messages</i><br><i>Assertions</i><br><i>AuthN requests</i><br><i>Logout requests</i><br><i>Logout responses</i>   |
| <i>Encrypt</i>              | Mark the checkboxes to select entities for which SAML encryption should be enabled:<br><i>Assertions</i><br><i>Name ID</i>   |
| <i>Case sensitive login</i> | Unmark the checkbox to disable case-sensitive login for usernames (enabled by default).<br>Disabling case-sensitive login allows, for example, to log in as "admin" even if the Zabbix user is "Admin" or "ADMIN".<br>Please note that if case-sensitive login is disabled and there are multiple Zabbix users with similar usernames (e.g., Admin and admin), the login for those users will always be denied with the following error message: "Authentication failed: supplied credentials are not unique." |

#### Advanced settings

Additional SAML parameters can be configured in the Zabbix frontend configuration file (*zabbix.conf.php*):

- `$SSO['SP_KEY'] = '<path to the SP private key file>';`
- `$SSO['SP_CERT'] = '<path to the SP cert file>';`
- `$SSO['IDP_CERT'] = '<path to the IDP cert file>';`
- `$SSO['SETTINGS']`

#### Note:

Zabbix uses [OneLogin's SAML PHP Toolkit](#) library (version 3.4.1). The structure of `$SSO['SETTINGS']` section should be similar to the structure used by the library. For the description of configuration options, see official library [documentation](#).

Only the following options can be set as part of `$SSO['SETTINGS']`:

- *strict*
- *baseurl*
- *compress*
- *contactPerson*
- *organization*
- *sp* (only options specified in this list)
  - *attributeConsumingService*
  - *x509certNew*
- *idp* (only options specified in this list)
  - *singleLogoutService* (only one option)
    - \* *responseUrl*
  - *certFingerprint*
  - *certFingerprintAlgorithm*
  - *x509certMulti*
- *security* (only options specified in this list)
  - *signMetadata*
  - *wantNameId*
  - *requestedAuthnContext*
  - *requestedAuthnContextComparison*
  - *wantXMLValidation*
  - *relaxDestinationValidation*
  - *destinationStrictlyMatches*
  - *rejectUnsolicitedResponsesWithInResponseTo*
  - *signatureAlgorithm*

- *digestAlgorithm*
- *lowercaseUrlencoding*

All other options will be taken from the database and cannot be overridden. The *debug* option will be ignored.

In addition, if Zabbix UI is behind a proxy or a load balancer, the custom *use\_proxy\_headers* option can be used:

- *false* (default) - ignore the option;
- *true* - use X-Forwarded-\* HTTP headers for building the base URL.

If using a load balancer to connect to Zabbix instance, where the load balancer uses TLS/SSL and Zabbix does not, you must indicate 'baseurl', 'strict' and 'use\_proxy\_headers' parameters as follows:

```
$SSO['SETTINGS'] = [
    'strict' => false,
    'baseurl' => 'https://zabbix.example.com/zabbix/',
    'use_proxy_headers' => true
];
```

#### Configuration example:

```
$SSO['SETTINGS'] = [
    'security' => [
        'signatureAlgorithm' => 'http://www.w3.org/2001/04/xmldsig-more#rsa-sha384'
        'digestAlgorithm' => 'http://www.w3.org/2001/04/xmldsig-more#sha384',
        // ...
    ],
    // ...
];
```

#### Frontend configuration with Kerberos/ADFS

The Zabbix frontend configuration file (*zabbix.conf.php*) can be used to configure SSO with Kerberos authentication and ADFS:

```
$SSO['SETTINGS'] = [
    'security' => [
        'requestedAuthnContext' => [
            'urn:oasis:names:tc:SAML:2.0:ac:classes:Kerberos',
        ],
        'requestedAuthnContextComparison' => 'exact'
    ]
];
```

In this case, in the SAML configuration *SP name ID* field set:

urn:oasis:names:tc:SAML:1.1:nameid-format:unspecified

## 4 User groups

### Overview

In the *Administration* → *User groups* section user groups of the system are maintained.

### User groups

A listing of existing user groups with their details is displayed.

≡

User groups

Create user group

| <input type="checkbox"/> | Name ▲                    | #       | Members                      | Frontend access | Debug mode | Status   |
|--------------------------|---------------------------|---------|------------------------------|-----------------|------------|----------|
| <input type="checkbox"/> | Disabled                  | Users 1 | guest                        | System default  | Disabled   | Disabled |
| <input type="checkbox"/> | Enabled debug mode        | Users   |                              | System default  | Enabled    | Enabled  |
| <input type="checkbox"/> | Guests                    | Users 1 | guest                        | Internal        | Disabled   | Enabled  |
| <input type="checkbox"/> | No access to the frontend | Users   |                              | Disabled        | Disabled   | Enabled  |
| <input type="checkbox"/> | Zabbix administrators     | Users 1 | Admin (Zabbix Administrator) | System default  | Disabled   | Enabled  |

0 selected

Enable

Disable

Enable debug mode

Disable debug mode

Delete

Filter

Displaying 5 of 5 found

Displayed data:

| Column                 | Description  |
|------------------------|--|
| <i>Name</i>            | Name of the user group. Clicking on the user group name opens the user group <b>configuration form</b> .   |
| <i>#</i>               | The number of users in the group. Clicking on <i>Users</i> will display the respective users filtered out in the user list.  |
| <i>Members</i>         | Username of individual users in the user group (with name and surname in parentheses). Clicking on the username will open the user configuration form. Users from disabled groups are displayed in red.  |
| <i>Frontend access</i> | Frontend access level is displayed:<br><b>System default</b> - users are authenticated by Zabbix, LDAP or HTTP (depending on the <b>authentication</b> method set globally);<br><b>Internal</b> - users are authenticated by Zabbix; ignored if HTTP authentication is the global default;<br><b>LDAP</b> - users are authenticated by LDAP; ignored if HTTP authentication is the global default;<br><b>Disabled</b> - access to Zabbix frontend is forbidden for this group.<br>By clicking on the current level, you can change it. |
| <i>Debug mode</i>      | <b>Debug mode</b> status is displayed - <i>Enabled</i> or <i>Disabled</i> . By clicking on the status you can change it.   |
| <i>Status</i>          | User group status is displayed - <i>Enabled</i> or <i>Disabled</i> . By clicking on the status you can change it.  |

To configure a new user group, click on the *Create user group* button in the top right-hand corner.

#### Mass editing options

Buttons below the list offer some mass-editing options:

- *Enable* - change the user group status to *Enabled*
- *Disable* - change the user group status to *Disabled*
- *Enable debug mode* - enable debug mode for the user groups
- *Disable debug mode* - disable debug mode for the user groups
- *Delete* - delete the user groups

To use these options, mark the checkboxes before the respective user groups, then click on the required button.

#### Using filter

You can use the filter to display only the user groups you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of user groups. If you click on it, a filter becomes available where you can filter user groups by name and status.

## 5 User roles

### Overview

In the *Administration* → *User roles* section roles that can be assigned to system users and specific permissions for each role are maintained.

#### Default user roles

By default, Zabbix is configured with four user roles, which have a pre-defined set of permissions:

- Admin role
- Guest role
- Super admin role
- User role

| <input type="checkbox"/> Name ▲           | #       | Users   |
|---|---------|---|
| <input type="checkbox"/> Admin role       | Users 1 | <a href="#">db_manager (Database manager)</a>   |
| <input type="checkbox"/> Guest role       | Users   |   |
| <input type="checkbox"/> Super admin role | Users 2 | <a href="#">Admin (Zabbix Administrator)</a> , <a href="#">ljohnson (Lewis Johnson)</a>   |
| <input type="checkbox"/> User role        | Users 4 | <a href="#">gslone (George Slone)</a> , <a href="#">guest (John Snow)</a> , <a href="#">test_admin</a> , <a href="#">test_guest</a> |

The list of all users assigned the respective role is displayed. The users included in disabled groups are stated in red.

**Note:**

Default *Super admin role* cannot be modified or deleted, because at least one Super admin user with unlimited privileges must exist in Zabbix.

Zabbix users with type Super admins and proper permissions can modify or delete existing roles or create new custom roles.

To create a new role, click on the *Create user role* button at the top right corner. To update an existing role, press on the role name to open the configuration form.

\* Name

User type

Access to UI elements

|                |   |  |   |
|----------------|---|--|---|
| Monitoring     | <input checked="" type="checkbox"/> Dashboard           | <input checked="" type="checkbox"/> Hosts            | <input checked="" type="checkbox"/> Maps          |
|                | <input checked="" type="checkbox"/> Problems            | <input checked="" type="checkbox"/> Latest data      | <input checked="" type="checkbox"/> Discovery     |
| Services       | <input checked="" type="checkbox"/> Services            | <input checked="" type="checkbox"/> SLA              |   |
|                | <input checked="" type="checkbox"/> Service actions     | <input checked="" type="checkbox"/> SLA report       |   |
| Inventory      | <input checked="" type="checkbox"/> Overview            | <input checked="" type="checkbox"/> Hosts            |   |
| Reports        | <input type="checkbox"/> System information             | <input checked="" type="checkbox"/> Triggers top 100 | <input checked="" type="checkbox"/> Notifications |
|                | <input checked="" type="checkbox"/> Scheduled reports   | <input type="checkbox"/> Audit                       |   |
|                | <input checked="" type="checkbox"/> Availability report | <input type="checkbox"/> Action log                  |   |
| Configuration  | <input checked="" type="checkbox"/> Host groups         | <input checked="" type="checkbox"/> Maintenance      | <input checked="" type="checkbox"/> Discovery     |
|                | <input checked="" type="checkbox"/> Templates           | <input checked="" type="checkbox"/> Actions          |   |
|                | <input checked="" type="checkbox"/> Hosts               | <input type="checkbox"/> Event correlation           |   |
| Administration | <input type="checkbox"/> General                        | <input type="checkbox"/> User groups                 | <input type="checkbox"/> Media types              |
|                | <input type="checkbox"/> Proxies                        | <input type="checkbox"/> User roles                  | <input type="checkbox"/> Scripts                  |
|                | <input type="checkbox"/> Authentication                 | <input type="checkbox"/> Users                       | <input type="checkbox"/> Queue                    |

\* At least one UI element must be checked.

Available permission options along with default permission sets for pre-configured user roles in Zabbix are described below.

| Parameter | Description | Default user roles |            |           |            |
|-----------|-------------|--------------------|------------|-----------|------------|
|           |             | Super admin role   | Admin role | User role | Guest role |



| User type                    | Selected user type determines the list of available permissions.<br>Upon selecting a user type, all available permissions for this user type are granted by default.<br>Uncheck the checkbox(es) to revoke certain permissions for the user role.<br>Checkboxes for permissions not available for this user type are grayed out. | Super admin | Admin | User | User |
|------------------------------|--|-------------|-------|------|------|
| <b>Access to UI elements</b> |  |             |       |      |      |
| <i>Monitoring</i>            |  |             |       |      |      |
| Dashboard                    | Enable/disable access to a specific Monitoring menu section and underlying pages.  | Yes         | Yes   | Yes  | Yes  |
| Problems                     |  |             |       |      |      |
| Hosts                        |  |             |       |      |      |
| Latest data                  |  |             |       |      |      |
| Maps                         |  |             |       |      |      |
| Discovery                    |  |             |       | No   | No   |
| <i>Services</i>              |  |             |       |      |      |
| Services                     | Enable/disable access to a specific Services menu section and underlying pages.  | Yes         | Yes   | Yes  | Yes  |
| Service actions              |  |             |       | No   | No   |
| SLA                          |  |             |       |      |      |
| SLA report                   |  |             |       | Yes  | Yes  |
| <i>Inventory</i>             |  |             |       |      |      |
| Overview                     | Enable/disable access to a specific Inventory menu section and underlying pages.   | Yes         | Yes   | Yes  | Yes  |
| Hosts                        |  |             |       |      |      |
| <i>Reports</i>               |  |             |       |      |      |
| System information           | Enable/disable access to a specific Reports menu section and underlying pages.   | Yes         | No    | No   | No   |
| Availability report          |  |             | Yes   | Yes  | Yes  |
| Triggers top 100             |  |             |       |      |      |
| Audit                        |  |             | No    | No   | No   |
| Action log                   |  |             |       |      |      |
| Notifications                |  |             | Yes   |      |      |
| Scheduled reports            |  |             |       |      |      |
| <i>Configuration</i>         |  |             |       |      |      |
| Host groups                  | Enable/disable access to a specific <i>Configuration</i> menu section and underlying pages.  | Yes         | Yes   | No   | No   |
| Templates                    |  |             |       |      |      |
| Hosts                        |  |             |       |      |      |
| Maintenance                  |  |             |       |      |      |
| Actions                      |  |             |       |      |      |
| Event correlation            |  |             | No    |      |      |
| Discovery                    |  |             | Yes   |      |      |
| <i>Administration</i>        |  |             |       |      |      |
| General                      | Enable/disable access to a specific <i>Administration</i> menu section and underlying pages.   | Yes         | No    | No   | No   |
| Proxies                      |  |             |       |      |      |
| Authentication               |  |             |       |      |      |
| User groups                  |  |             |       |      |      |
| User roles                   |  |             |       |      |      |
| Users                        |  |             |       |      |      |

|  |   |     |     |      |      |
|--|---|-----|-----|------|------|
| Media types                            |   |     |     |      |      |
| Scripts                                |   |     |     |      |      |
| Queue                                  |   |     |     |      |      |
| Default access to new UI elements      | This option specifies how new menu sections will be accessible after a Zabbix upgrade. Existing menu sections of modules remain unaffected.   | Yes | Yes | Yes  | Yes  |
| <b>Access to services</b>              |   |     |     |      |      |
| Read-write access to services          | <p>Select read-write access to services:</p> <p><b>None</b> - no access at all</p> <p><b>All</b> - access to all services is read-write</p> <p><b>Service list</b> - select services for read-write access</p> <p>The read-write access, if granted, takes precedence over the read-only access settings and is dynamically inherited by the child services.</p>                            | All | All | None | None |
| Read-write access to services with tag | <p>Specify tag name and, optionally, value to additionally grant read-write access to services matching the tag.</p> <p>This option is available if 'Service list' is selected in the <i>Read-write access to services</i> parameter.</p> <p>The read-write access, if granted, takes precedence over the read-only access settings and is dynamically inherited by the child services.</p> |     |     |      |      |
| Read-only access to services           | <p>Select read-only access to services:</p> <p><b>None</b> - no access at all</p> <p><b>All</b> - access to all services is read-only</p> <p><b>Service list</b> - select services for read-only access</p> <p>The read-only access does not take precedence over the read-write access and is dynamically inherited by the child services.</p>   |     |     | All  | All  |
| Read-only access to services with tag  | <p>Specify tag name and, optionally, value to additionally grant read-only access to services matching the tag.</p> <p>This option is available if 'Service list' is selected in the <i>Read-only access to services</i> parameter.</p> <p>The read-only access does not take precedence over the read-write access and is dynamically inherited by the child services.</p>                 |     |     |      |      |
| <b>Access to modules</b>               |   |     |     |      |      |
| <Module name>                          | Allow/deny access to a specific module. Only enabled modules are shown in this section. It is not possible to grant or restrict access to a module that is currently disabled.  | Yes | Yes | Yes  | Yes  |
| Default access to new modules          | This option specifies how new modules and widgets will be accessible after a Zabbix upgrade. It also applies to modules and widgets added in the <i>Administration &gt; General &gt; Modules</i> section.   |     |     |      |      |
| <b>Access to API</b>                   |   |     |     |      |      |
| Enabled                                | Enable/disable access to API.   | Yes | Yes | Yes  | No   |

|                               |  |     |     |     |     |  |
|-------------------------------|--|-----|-----|-----|-----|--|
| API methods                   | Select <i>Allow list</i> to allow only specified API methods or <i>Deny list</i> to restrict only specified API methods.   |     |     |     |     |  |
|                               | In the search field, start typing the method name, then select the method from the auto-complete list. You can also press the Select button and select methods from the full list available for this user type. Note that if certain action from the Access to actions block is unchecked, users will not be able to use API methods related to this action. |     |     |     |     |  |
|                               | Wildcards are supported. Examples: <code>dashboard.*</code> (all methods of 'dashboard.' API service) <code>* (any method)</code> , <code>*.export</code> (methods with '.export' name from all API services).   |     |     |     |     |  |
|                               | If no methods have been specified the Allow/Deny list rule will be ignored.  |     |     |     |     |  |
|                               |  |     |     |     |     |  |
| Access to actions             |  |     |     |     |     |  |
| Create and edit dashboards    | Clearing this checkbox will also revoke the rights to use <code>.create</code> , <code>.update</code> and <code>.delete</code> API methods for the corresponding elements.   | Yes | Yes | Yes | No  |  |
| Create and edit maps          |  |     |     |     |     |  |
| Create and edit maintenance   |  |     |     |     | No  |  |
| Add problem comments          | Clearing this checkbox will also revoke the rights to perform corresponding action via event <code>.acknowledge</code> API method.   |     |     | Yes |     |  |
| Change severity               |  |     |     |     |     |  |
| Acknowledge problems          |  |     |     |     |     |  |
| Close problems                |  |     |     |     |     |  |
| Execute scripts               | Clearing this checkbox will also revoke the rights to use the <code>script.execute</code> API method.  |     |     |     |     |  |
| Manage API tokens             | Clearing this checkbox will also revoke the rights to use all <code>token.</code> API methods.   |     |     |     |     |  |
| Manage scheduled reports      | Clearing this checkbox will also revoke the rights to use all <code>report.</code> API methods.  |     |     |     | No  |  |
| Manage SLA                    | Enable/disable the rights to manage <b>SLA</b> .   |     |     |     |     |  |
| Default access to new actions | This option specifies how new actions will be accessible after a Zabbix upgrade.   |     |     |     | Yes |  |

#### Notes:

- Each user may have only one role assigned.
- If an element is restricted, users will not be able to access it even by entering a direct URL to this element into the browser.
- Users of type *User* or *Admin* cannot change their own role settings.
- Users of type *Super admin* can modify settings of their own role (not available for the default *Super admin role*), but not the user type.
- Users of all levels cannot change their own user type.

#### See also:

- [Configuring a user](#)

## 6 Users

## Overview

In the *Administration* → *Users* section users of the system are maintained.

## Users

A listing of existing users with their details is displayed.

≡ Users

User group 

All

Create user

Filter

| <input type="checkbox"/> | Username ▲       | Name   | Last name     | User role        | Groups                | Is online?                   | Login | Frontend access | API access | Debug mode | Status   |
|--------------------------|------------------|--------|---------------|------------------|-----------------------|------------------------------|-------|-----------------|------------|------------|----------|
| <input type="checkbox"/> | Admin            | Zabbix | Administrator | Super admin role | Zabbix administrators | Yes (03/02/2021 02:35:19 PM) | Ok    | System default  | Enabled    | Disabled   | Enabled  |
| <input type="checkbox"/> | Database manager | James  | Hughes        | Admin role       | DB administrators     | No                           | Ok    | System default  | Enabled    | Disabled   | Enabled  |
| <input type="checkbox"/> | guest            |        |               | User role        | Disabled, Guests      | No                           | Ok    | Internal        | Enabled    | Disabled   | Disabled |

0 selected 

Unblock

Delete

Displaying 3 of 3 found

From the dropdown to the right in the *Users* bar you can choose whether to display all users or those belonging to one particular group.

Displayed data:

| Column                 | Description  |
|------------------------|--|
| <i>Username</i>        | Username for logging into Zabbix. Clicking on the username opens the user <b>configuration form</b> .  |
| <i>Name</i>            | First name of the user.  |
| <i>Last name</i>       | Second name of the user.   |
| <i>User role</i>       | <b>User role</b> is displayed.   |
| <i>Groups</i>          | Groups that the user is a member of are listed. Clicking on the user group name opens the user group configuration form. Disabled groups are displayed in red.   |
| <i>Is online?</i>      | The on-line status of the user is displayed - <i>Yes</i> or <i>No</i> . The time of last user activity is displayed in parentheses.  |
| <i>Login</i>           | The login status of the user is displayed - <i>Ok</i> or <i>Blocked</i> . A user can become temporarily blocked upon exceeding the number of unsuccessful login attempts set in the <b>Administration→General</b> section (five by default). By clicking on <i>Blocked</i> you can unblock the user. |
| <i>Frontend access</i> | Frontend access level is displayed - <i>System default</i> , <i>Internal</i> , <i>LDAP</i> , or <i>Disabled</i> , depending on the one set for the whole user group.   |
| <i>API access</i>      | API access status is displayed - <i>Enabled</i> or <i>Disabled</i> , depending on the one set for the user role.   |
| <i>Debug mode</i>      | Debug mode status is displayed - <i>Enabled</i> or <i>Disabled</i> , depending on the one set for the whole user group.  |
| <i>Status</i>          | User status is displayed - <i>Enabled</i> or <i>Disabled</i> , depending on the one set for the whole user group.  |

To configure a new user, click on the *Create user* button in the top right-hand corner.

## Mass editing options

Buttons below the list offer some mass-editing options:

- *Unblock* - re-enable system access to blocked users
- *Delete* - delete the users

To use these options, mark the check-boxes before the respective users, then click on the required button.

## Using filter

You can use the filter to display only the users you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of users. If you click on it, a filter becomes available where you can filter users by username, name, last name and user role.

Filter

Username

Name

Last name

User roles

Select

Apply

Reset

7 Media types

Overview

In the *Administration* → *Media types* section users can configure and maintain media type information.

Media type information contains general instructions for using a medium as delivery channel for notifications. Specific details, such as the individual e-mail addresses to send a notification to are kept with individual users.

A listing of existing media types with their details is displayed.

Media types

Create media typeImport

Filter

| <input type="checkbox"/> | Name ▲              | Type    | Status  | Used in actions | Details   | Action |
|--------------------------|---------------------|---------|---------|-----------------|---|--------|
| <input type="checkbox"/> | Email               | Email   | Enabled |                 | SMTP server: "mail.zabbix.com", SMTP helo: "zabbix.com", SMTP email: "zabbix-info@zabbix.com" | Test   |
| <input type="checkbox"/> | Email (HTML)        | Email   | Enabled |                 | SMTP server: "mail.example.com", SMTP helo: "example.com", SMTP email: "zabbix@example.com"   | Test   |
| <input type="checkbox"/> | Mattermost          | Webhook | Enabled |                 |   | Test   |
| <input type="checkbox"/> | Notification script | Script  | Enabled |                 | Script name: "notification.sh"  | Test   |
| <input type="checkbox"/> | Opsgenie            | Webhook | Enabled |                 |   | Test   |
| <input type="checkbox"/> | PagerDuty           | Webhook | Enabled |                 |   | Test   |
| <input type="checkbox"/> | Pushover            | Webhook | Enabled |                 |   | Test   |
| <input type="checkbox"/> | SMS                 | SMS     | Enabled |                 | GSM modem: "/dev/ttyS0"   | Test   |

0 selectedEnableDisableExportDelete

Displaying 8 of 8 found

Displayed data:

| Column          | Description  |
|-----------------|--|
| Name            | Name of the media type. Clicking on the name opens the media type configuration form.  |
| Type            | Type of the media (e-mail, SMS, etc) is displayed.   |
| Status          | Media type status is displayed - <i>Enabled</i> or <i>Disabled</i> .<br>By clicking on the status you can change it.   |
| Used in actions | All actions where the media type is used directly (selected in the <i>Send only to</i> dropdown) are displayed. Clicking on the action name opens the action configuration form.   |
| Details         | Detailed information of the media type is displayed.   |
| Actions         | The following action is available:<br><b>Test</b> - click to open a testing form where you can enter media type parameters (e.g. a recipient address with test subject and body) and send a test message to verify that the configured media type works. See also: <b>Media type testing</b> . |

To configure a new media type, click on the *Create media type* button in the top right-hand corner.

To import a media type, click on the *Import* button in the top right-hand corner.

Mass editing options

Buttons below the list offer some mass-editing options:


- *Enable* - change the media type status to *Enabled*
- *Disable* - change the media type status to *Disabled*
- *Export* - export the media types to a YAML, XML or JSON file
- *Delete* - delete the media types

To use these options, mark the checkboxes before the respective media types, then click on the required button.

Using filter

You can use the filter to display only the media types you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of media types. If you click on it, a filter becomes available where you can filter media types by name and status.

Filter 

Name 
Status Any Enabled Disabled

Apply Reset

## 8 Scripts

### Overview

In the *Administration* → *Scripts* section user-defined global scripts can be configured and maintained.

Global scripts, depending on the configured scope and also user permissions, are available for execution:

- from the **host menu** in various frontend locations (*Dashboard*, *Problems*, *Latest data*, *Maps*, etc.)
- from the **event menu**
- can be run as an action operation

The scripts are executed on Zabbix agent, Zabbix server (proxy) or Zabbix server only. See also **Command execution**.

Both on Zabbix agent and Zabbix proxy, remote scripts are disabled by default. They can be enabled as follows:

- For remote commands executed on Zabbix agent
  - by adding an `AllowKey=system.run[<command>,*]` parameter for each allowed command in agent configuration, \* stands for wait and nowait mode.
- For remote commands executed on Zabbix proxy
  - **Warning: It is not required to enable remote commands on Zabbix proxy if remote commands are executed on Zabbix agent that is monitored by Zabbix proxy.** If, however, it is required to execute remote commands on Zabbix proxy, set `EnableRemoteCommands` parameter to '1' in the proxy configuration.

A listing of existing scripts with their details is displayed.

Scripts
Create script

| Name                    | Scope              | Used in actions | Type   | Execute on     | Commands                          | User group            | Host group | Host access |
|-------------------------|--------------------|-----------------|--------|----------------|-----------------------------------|-----------------------|------------|-------------|
| Traceroute              | Manual host action |                 | Script | Server (proxy) | /usr/bin/traceroute {HOST.CONN}   | All                   | All        | Read        |
| Restart webserver       | Action operation   |                 | Script | Agent          | sudo /etc/init.d/apache2 restart  | All                   | All        | Read        |
| Detect operating system | Manual host action |                 | Script | Server (proxy) | sudo /usr/bin/nmap -O {HOST.CONN} | Zabbix administrators | All        | Read        |

Displaying 3 of 3 found

Displayed data:

| Column                 | Description  |
|------------------------|--|
| <i>Name</i>            | Name of the script. Clicking on the script name opens the script <b>configuration form</b> .   |
| <i>Scope</i>           | Scope of the script - action operation, manual host action or manual event action. This setting determines where the script is available.                                    |
| <i>Used in actions</i> | Actions where the script is used are displayed.  |
| <i>Type</i>            | Script type is displayed - <i>Webhook</i> , <i>Script</i> , <i>SSH</i> , <i>Telnet</i> or <i>IPMI</i> command.   |
| <i>Execute on</i>      | It is displayed whether the script will be executed on Zabbix agent, Zabbix server (proxy) or Zabbix server only.  |
| <i>Commands</i>        | All commands to be executed within the script are displayed.<br>Nothing is displayed here for webhooks.  |
| <i>User group</i>      | The user group that the script is available to is displayed (or <i>All</i> for all user groups).   |
| <i>Host group</i>      | The host group that the script is available for is displayed (or <i>All</i> for all host groups).  |
| <i>Host access</i>     | The permission level for the host group is displayed - <i>Read</i> or <i>Write</i> . Only users with the required permission level will have access to executing the script. |

To configure a new script, click on the *Create script* button in the top right-hand corner.

Mass editing options

A button below the list offers one mass-editing option:


- *Delete* - delete the scripts

To use this option, mark the checkboxes before the respective scripts and click on *Delete*.

#### Using filter

You can use the filter to display only the scripts you are interested in. For better search performance, data is searched with macros unresolved.

The *Filter* link is available above the list of scripts. If you click on it, a filter becomes available where you can filter scripts by name and scope.

Filter 

Name

Scope 

Any Action operation Manual host action Manual event action

Apply

Reset

#### Configuring a global script

\* Name

Scope 

Action operation Manual host action Manual event action

Menu path

Type 

Webhook Script SSH Telnet IPMI

Execute on 

Zabbix agent Zabbix server (proxy) Zabbix server

\* Commands 

sudo /etc/init.d/apache2 restart

Description

Host group 

All

User group 

All

Required host permissions 

Read Write

Enable confirmation ☐

Confirmation text

Add

Cancel

#### Script attributes:

| Parameter   | Description   |
|-------------|---|
| <i>Name</i> | Unique name of the script.<br>E.g., Clear /tmp filesystem |

| Parameter             | Description   |
|-----------------------|---|
| Scope                 | <p>Scope of the script - action operation, manual host action or manual event action. This setting determines where the script can be used - in remote commands of action operations, from the <b>host menu</b> or from the <b>event menu</b> respectively.</p> <p>Setting the scope to 'Action operation' makes the script available for all users with access to <i>Configuration → Actions</i>.</p> <p>If a script is actually used in an action, its scope cannot be changed away from 'action operation'.</p> <p><b>Macro support</b></p> <p>The scope affects the range of available macros. For example, user-related macros ({USER.*}) are supported in scripts to allow passing information about the user that launched the script. However, they are not supported if the script scope is an action operation, as action operations are executed automatically.</p> <p>To find out which macros are supported, do a search for 'Trigger-based notifications and commands/Trigger-based commands', 'Manual host action scripts' and 'Manual event action scripts' in the <b>supported macro</b> table. Note that if a macro may resolve to a value with spaces (for example, host name), don't forget to quote as needed.</p> |
| Menu path             | <p>The desired menu path to the script. For example, Default or Default/, will display the script in the respective directory. Menus can be nested, e.g., Main menu/Sub menu1/Sub menu2. When accessing scripts through the host/event menu in monitoring sections, they will be organized according to the given directories.</p> <p>This field is displayed only if 'Manual host action' or 'Manual event action' is selected as <i>Scope</i>.</p>  |
| Type                  | <p>Click the respective button to select the script type:</p> <p><b>Webhook, Script, SSH, Telnet</b> or <b>IPMI</b> command.</p>  |
| Script type: Webhook  |   |
| Parameters            | <p>Specify the webhook variables as attribute-value pairs.</p> <p>See also: <b>Webhook</b> media configuration.</p> <p>Macros and custom <b>user macros</b> are supported in parameter values. Macro support depends on the scope of the script (see <i>Scope</i> above).</p>   |
| Script                | <p>Enter the JavaScript code in the block that appears when clicking in the parameter field (or on the view/edit button next to it).</p> <p>Macro support depends on the scope of the script (see <i>Scope</i> above).</p> <p>See also: <b>Webhook</b> media configuration, <b>Additional JavaScript objects</b>.</p>   |
| Timeout               | <p>JavaScript execution timeout (1-60s, default 30s).</p> <p>Time suffixes are supported, e.g., 30s, 1m.</p>  |
| Script type: Script   |   |
| Execute on            | <p>Click the respective button to execute the shell script on:</p> <p><b>Zabbix agent</b> - the script will be executed by Zabbix agent (if the system.run item is <b>allowed</b>) on the host</p> <p><b>Zabbix server (proxy)</b> - the script will be executed by Zabbix server or proxy (if enabled by <b>EnableRemoteCommands</b>) - depending on whether the host is monitored by server or proxy</p> <p><b>Zabbix server</b> - the script will be executed by Zabbix server only</p>  |
| Commands              | <p>Enter full path to the commands to be executed within the script.</p> <p>Macro support depends on the scope of the script (see <i>Scope</i> above). Custom <b>user macros</b> are supported.</p>   |
| Script type: SSH      |   |
| Authentication method | Select authentication method - password or public key.  |
| Username              | Enter the username.   |
| Password              | Enter the password.   |
| Public key file       | <p>This field is available if 'Password' is selected as the authentication method.</p> <p>Enter the path to the public key file.</p>  |
| Private key file      | <p>This field is available if 'Public key' is selected as the authentication method.</p> <p>Enter the path to the private key file.</p>   |
| Passphrase            | <p>This field is available if 'Public key' is selected as the authentication method.</p> <p>Enter the passphrase.</p>   |
| Port                  | <p>This field is available if 'Public key' is selected as the authentication method.</p> <p>Enter the port.</p>   |
| Commands              | <p>Enter the commands.</p> <p>Macro support depends on the scope of the script (see <i>Scope</i> above). Custom <b>user macros</b> are supported.</p>   |
| Script type: Telnet   |   |



| Parameter                        | Description  |
|----------------------------------|--|
| <i>Username</i>                  | Enter the username.  |
| <i>Password</i>                  | Enter the password.  |
| <i>Port</i>                      | Enter the port.  |
| <i>Commands</i>                  | Enter the commands.<br>Macro support depends on the scope of the script (see <i>Scope</i> above). Custom <b>user macros</b> are supported.   |
| Script type: IPMI                |  |
| <i>Command</i>                   | Enter the IPMI command.<br>Macro support depends on the scope of the script (see <i>Scope</i> above). Custom <b>user macros</b> are supported.   |
| <i>Description</i>               | Enter a description for the script.  |
| <i>Host group</i>                | Select the host group that the script will be available for (or <i>All</i> for all host groups).<br>It is <b>not recommended</b> to use discovered groups in this field. When discovered groups will be undiscovered and deleted, the script scope will be reset to <i>All</i> .   |
| <i>User group</i>                | Select the user group that the script will be available to (or <i>All</i> for all user groups).<br>This field is displayed only if 'Manual host action' or 'Manual event action' is selected as <i>Scope</i> .   |
| <i>Required host permissions</i> | Select the permission level for the host group - <i>Read</i> or <i>Write</i> . Only users with the required permission level will have access to executing the script.<br>This field is displayed only if 'Manual host action' or 'Manual event action' is selected as <i>Scope</i> .  |
| <i>Enable confirmation</i>       | Mark the checkbox to display a confirmation message before executing the script. This feature might be especially useful with potentially dangerous operations (like a reboot script) or ones that might take a long time.<br>This option is displayed only if 'Manual host action' or 'Manual event action' is selected as <i>Scope</i> .   |
| <i>Confirmation text</i>         | Enter a custom confirmation text for the confirmation popup enabled with the checkbox above (for example, <i>Remote system will be rebooted. Are you sure?</i> ). To see how the text will look like, click on <i>Test confirmation</i> next to the field.<br>{HOST.*} and {USER.*} macros are supported. Custom <b>user macros</b> are supported.<br><i>Note:</i> the macros will not be expanded when testing the confirmation message.<br>This field is displayed only if 'Manual host action' or 'Manual event action' is selected as <i>Scope</i> . |

## Script execution and result

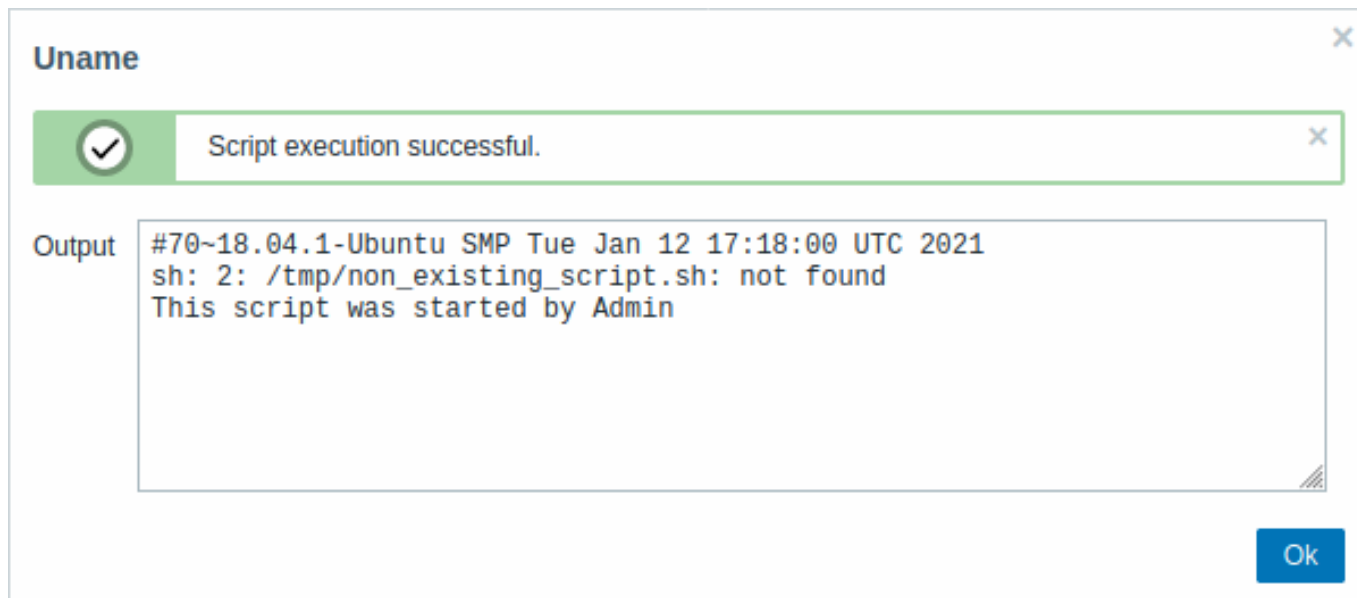
Scripts run by Zabbix server are executed in the order described in the [Command execution](#) page (including exit code checking). The script result will be displayed in a pop-up window that will appear after the script is run.

The return value of the script is a standard output together with a standard error.

The return value is limited to 16MB (including trailing whitespace that is truncated); **database limits** also apply. When data has to pass through Zabbix proxy, it must be stored in the database, thus subjecting it to the same **database limits**.

See an example of a script and the result window below:

```
uname -v
/tmp/non_existing_script.sh
echo "This script was started by {USER.USERNAME}"
```



The script result does not display the script itself.

Script timeout

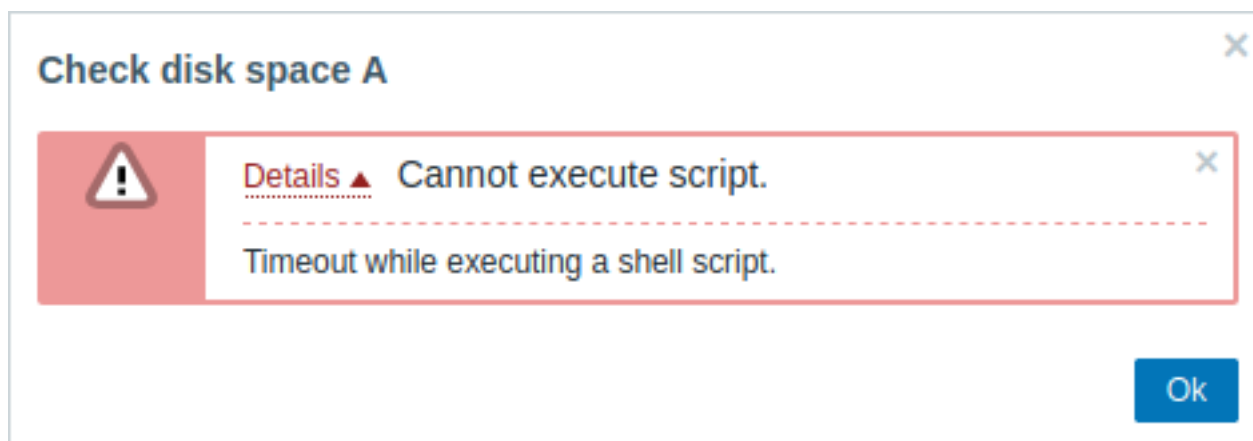
Zabbix agent

You may encounter a situation when a timeout occurs while executing a script.

See an example of a script running on Zabbix agent and the result window below:

```
sleep 5
```

```
df -h
```



The error message, in this case, is the following:

Timeout while executing a shell script.

In order to avoid such a situation, it is advised to optimize the script itself (instead of adjusting Timeout parameter to a corresponding value (in our case, > '5') by modifying the [Zabbix agent configuration](#) and [Zabbix server configuration](#)).

In case the Timeout parameter is changed in [Zabbix agent configuration](#), the following error message will appear:

Get value from agent failed: ZBX\_TCP\_READ() timed out.

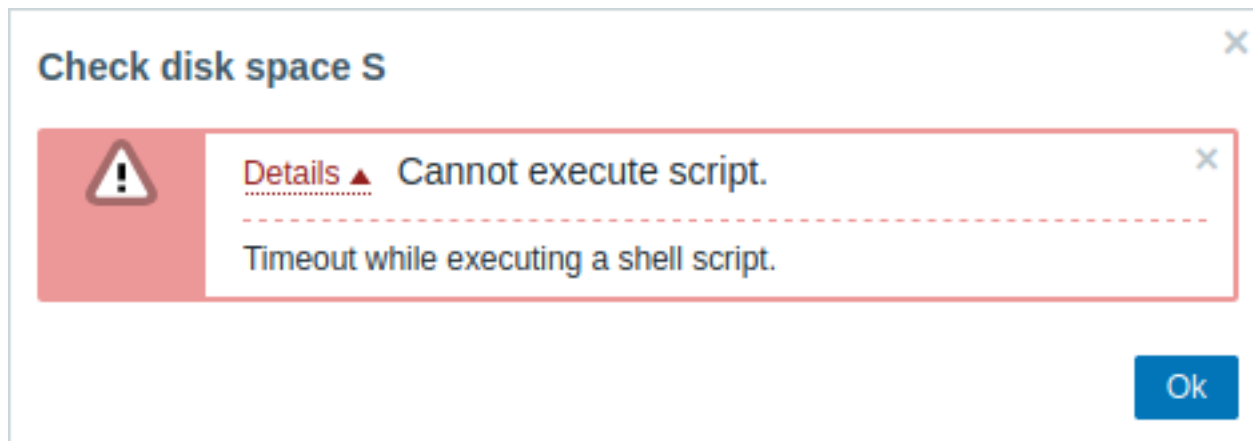
It means that modification was made in [Zabbix agent configuration](#) and it is also required to modify Timeout setting in [Zabbix server configuration](#).

Zabbix server/proxy

See an example of a script running on Zabbix server and the result window below:

```
sleep 11
```

```
df -h
```



It is also advised to optimize the script itself (instead of adjusting TrapperTimeout parameter to a corresponding value (in our case, > '11') by modifying the [Zabbix server configuration](#)).

## 9 Queue

### Overview

In the *Administration* → *Queue* section items that are waiting to be updated are displayed.

Ideally, when you open this section it should all be "green" meaning no items in the queue. If all items are updated without delay, there are none waiting. However, due to lacking server performance, some items may get delayed and the information is displayed in this section. For more details, see the [Queue](#) section.

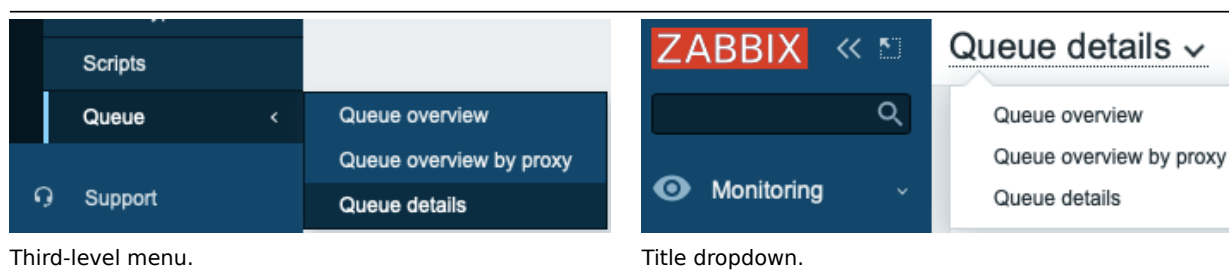
#### Note:

The queue is available only if Zabbix server is running. Items are not counted in the queue if the item interface becomes unavailable due to connection problems or agent not working properly.

The *Administration* → *Queue* section contains the following pages:

- Queue overview — displays queue by item type;
- Queue overview by proxy — displays queue by proxy;
- Queue details — displays a list of delayed items.

The list of available pages appears upon pressing on *Queue* in the *Administration* menu section. It is also possible to switch between pages by using a title dropdown in the top left corner.



### Overview by item type

In this screen it is easy to locate if the problem is related to one or several item types.

### Queue overview

| Items                 | 5 seconds | 10 seconds | 30 seconds | 1 minute | 5 minutes | More than 10 minutes |
|-----------------------|-----------|------------|------------|----------|-----------|----------------------|
| Zabbix agent          | 1         | 11         | 1          | 0        | 0         | 0                    |
| Zabbix agent (active) | 0         | 0          | 0          | 0        | 0         | 0                    |
| Simple check          | 0         | 0          | 0          | 0        | 0         | 0                    |
| SNMPv1 agent          | 0         | 0          | 0          | 0        | 0         | 0                    |
| SNMPv2 agent          | 0         | 0          | 0          | 0        | 0         | 0                    |
| SNMPv3 agent          | 0         | 0          | 0          | 0        | 0         | 0                    |
| Zabbix internal       | 0         | 0          | 0          | 0        | 0         | 0                    |
| Zabbix aggregate      | 0         | 0          | 0          | 0        | 0         | 0                    |
| External check        | 0         | 0          | 0          | 0        | 0         | 0                    |
| Database monitor      | 0         | 0          | 0          | 0        | 0         | 0                    |
| HTTP agent            | 0         | 0          | 0          | 0        | 0         | 0                    |

Each line contains an item type. Each column shows the number of waiting items - waiting for 5-10 seconds/10-30 seconds/30-60 seconds/1-5 minutes/5-10 minutes or over 10 minutes respectively.

### Overview by proxy

In this screen it is easy to locate if the problem is related to one of the proxies or the server.

### Queue overview by proxy

| Proxy        | 5 seconds | 10 seconds | 30 seconds | 1 minute | 5 minutes | More than 10 minutes |
|--------------|-----------|------------|------------|----------|-----------|----------------------|
| Remote proxy | 0         | 8          | 11         | 0        | 0         | 0                    |
| Server       | 0         | 0          | 0          | 0        | 0         | 0                    |

Total: 2

Each line contains a proxy, with the server last in the list. Each column shows the number of waiting items - waiting for 5-10 seconds/10-30 seconds/30-60 seconds/1-5 minutes/5-10 minutes or over 10 minutes respectively.

### List of waiting items

In this screen, each waiting item is listed.

### Queue details

| Scheduled check     | Delayed by | Host    | Name               | Proxy        |
|---------------------|------------|---------|--------------------|--------------|
| 2019-09-02 11:46:40 | 58s        | My host | CPU idle time      | Remote proxy |
| 2019-09-02 11:46:41 | 57s        | My host | CPU interrupt time | Remote proxy |
| 2019-09-02 11:46:42 | 56s        | My host | CPU iowait time    | Remote proxy |
| 2019-09-02 11:46:43 | 55s        | My host | CPU nice time      | Remote proxy |
| 2019-09-02 11:46:44 | 54s        | My host | CPU softirq time   | Remote proxy |
| 2019-09-02 11:46:45 | 53s        | My host | CPU steal time     | Remote proxy |
| 2019-09-02 11:46:46 | 52s        | My host | CPU system time    | Remote proxy |

Displayed data:

| Column                 | Description   |
|------------------------|---|
| <i>Scheduled check</i> | The time when the check was due is displayed.                   |
| <i>Delayed by</i>      | The length of the delay is displayed.                           |
| <i>Host</i>            | Host of the item is displayed.                                  |
| <i>Name</i>            | Name of the waiting item is displayed.                          |
| <i>Proxy</i>           | The proxy name is displayed, if the host is monitored by proxy. |

### Possible error messages

You may encounter a situation when no data is displayed and the following error message appears:

Details

Cannot display item queue.

Permission denied.

Error message in this case is the following:

Cannot display item queue. Permission denied

This happens when the PHP configuration parameters in the *zabbix.conf.php* file - `$ZBX_SERVER` or both `$ZBX_SERVER` and `$ZBX_SERVER_PORT` - point to an existing Zabbix server that uses a different database.

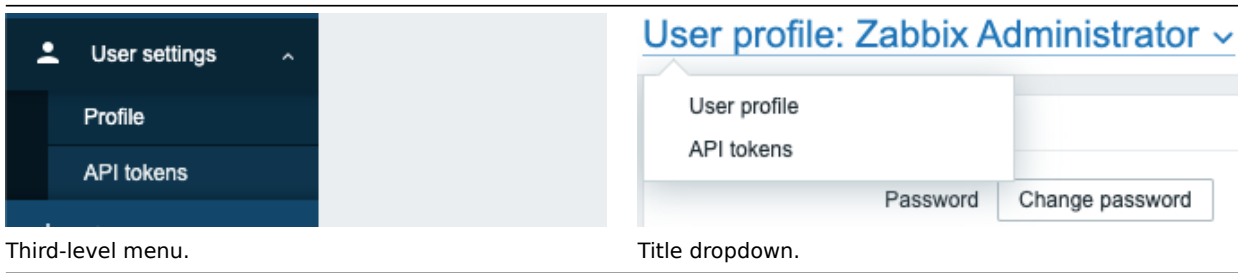
3 User settings

Overview

Depending on user role permissions, the *User settings* section may contain the following pages:

- *User profile* - for customizing certain Zabbix frontend features;
- *API tokens* - for managing API tokens assigned to the current user.

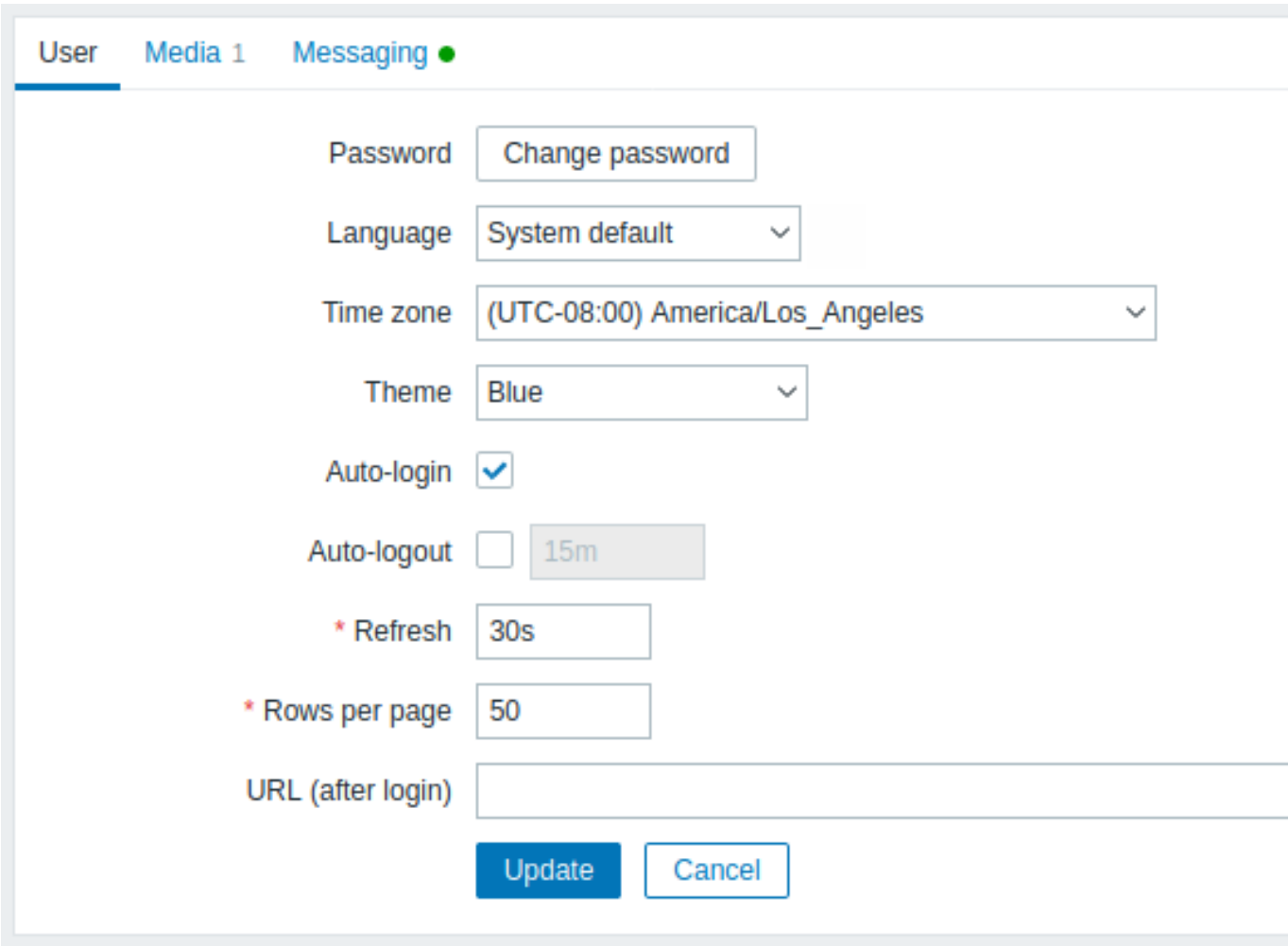
The list of available pages appears upon pressing on the  user icon near the bottom of the Zabbix menu (not available for a guest user). It is also possible to switch between pages by using a title dropdown in the top left corner.



1 User profile

The **User profile** section provides options to set custom interface language, color theme, number of rows displayed in the lists, etc. The changes made here will be applied to the current user only.

The **User** tab allows you to set various user preferences.

The image shows the 'User' tab of the Zabbix user profile settings. It includes fields for 'Password' (with a 'Change password' button), 'Language' (set to 'System default'), 'Time zone' (set to '(UTC-08:00) America/Los\_Angeles'), 'Theme' (set to 'Blue'), 'Auto-login' (checked), 'Auto-logout' (unchecked with a '15m' timer), '\* Refresh' (set to '30s'), '\* Rows per page' (set to '50'), and a 'URL (after login)' field. At the bottom are 'Update' and 'Cancel' buttons.

| Parameter                | Description  |
|--------------------------|--|
| <i>Password</i>          | Click on the link to display two fields for entering a new password.   |
| <i>Language</i>          | Select the interface language of your choice or select <b>System default</b> to use default system settings.<br>For more information, see <a href="#">Installation of additional frontend languages</a> .  |
| <i>Time zone</i>         | Select the time zone to override global <b>time zone</b> on user level or select <b>System default</b> to use global time zone settings.   |
| <i>Theme</i>             | Select a color theme specifically for your profile:<br><b>System default</b> - use default system settings<br><b>Blue</b> - standard blue theme<br><b>Dark</b> - alternative dark theme<br><b>High-contrast light</b> - light theme with high contrast<br><b>High-contrast dark</b> - dark theme with high contrast  |
| <i>Auto-login</i>        | Mark this checkbox to make Zabbix remember you and log you in automatically for 30 days. Browser cookies are used for this.  |
| <i>Auto-logout</i>       | With this checkbox marked you will be logged out automatically, after the set amount of seconds (minimum 90 seconds, maximum 1 day).<br><b>Time suffixes</b> are supported, e.g. 90s, 5m, 2h, 1d.<br>Note that this option will not work:<br>* When Monitoring menu pages perform background information refreshes. In case pages refreshing data in a specific time interval (dashboards, graphs, latest data, etc.) are left open session lifetime is extended, respectively disabling auto-logout feature;<br>* If logging in with the <i>Remember me for 30 days</i> option checked.<br>Auto-logout can accept 0, meaning that Auto-logout becomes disabled after profile settings update. |
| <i>Refresh</i>           | Set how often the information on the <b>Monitoring</b> menu pages will be refreshed (minimum 0 seconds, maximum 1 hour), except for <b>Dashboard</b> , which uses its own refresh parameters for every widget.<br><b>Time suffixes</b> are supported, e.g. 30s, 90s, 1m, 1h.   |
| <i>Rows per page</i>     | You can set how many rows will be displayed per page in the lists. Fewer rows (and fewer records to display) mean faster loading times.  |
| <i>URL (after login)</i> | You can set a specific URL to be displayed after the login. Instead of the default <i>Monitoring</i> → <i>Dashboard</i> it can be, for example, the URL of <i>Monitoring</i> → <i>Triggers</i> .   |

The **Media** tab allows you to specify the **media details** for the user, such as the types, the addresses to use and when to use them to deliver notifications.

User

Media 1

Messaging ●

Media

| Type  | Send to          | When active     | Use if severity |
|-------|------------------|-----------------|-----------------|
| Email | user@company.com | 1-7,00:00-24:00 | N I W A H D     |
| Add   |                  |                 |                 |

**Note:**  
Only **admin level** users (Admin and Super admin) can change their own media details.

The **Messaging** tab allows you to set **global notifications**.

## 2 API tokens

API tokens section allows to view tokens assigned to the user, edit token details and **create new tokens**. This section is only available to a user if *Manage API tokens* action is allowed in the **user role** settings.

API tokens ▾ Create API token

Filter ▾

| <input type="checkbox"/> | Name ▲  | Expires at          | Created at          | Last accessed at | Status  |
|--------------------------|---------|---------------------|---------------------|------------------|---------|
| <input type="checkbox"/> | Token 1 | Never               | 2021-01-22 18:58:11 | Never            | Enabled |
| <input type="checkbox"/> | Token 2 | 2021-01-26 00:00:00 | 2021-01-22 16:13:03 | Never            | Enabled |

Displaying 2 of 2 found

You may filter API tokens by name, expiry date, or status (enabled/disabled). Click on the token status in the list to quickly enable/disable a token. You may also mass enable/disable tokens by selecting them in the list and then clicking on the Enable/Disable buttons below the list.

**Attention:**  
Users cannot view *Auth token* value of the tokens assigned to them in Zabbix. *Auth token* value is displayed only once - immediately after creating a token. If it has been lost, the token has to be regenerated.

1 Global notifications

Overview

Global notifications are a way of displaying issues that are currently happening right on the screen you’re at in Zabbix frontend. Without global notifications, working in some other location than *Problems* or the *Dashboard* would not show any information regarding issues that are currently happening. Global notifications will display this information regardless of where you are.

Global notifications involve both showing a message and **playing a sound**.

**Attention:**  
The auto play of sounds may be disabled in recent browser versions by default. In this case, you need to change this setting manually.

Configuration

Global notifications can be enabled per user in the *Messaging* tab of **profile configuration**.

UserMedia 1Messaging ●

Frontend messaging☒

Message timeout60

Play soundOnce

Trigger severity

☒ Recoveryalarm\_okPlayStop

☒ Not classifiedno\_soundPlayStop

☒ Informationalarm\_informationPlayStop

☒ Warningalarm\_warningPlayStop

☒ Averagealarm\_averagePlayStop

☒ Highalarm\_highPlayStop

☒ Disasteralarm\_disasterPlayStop

Show suppressed problems☐

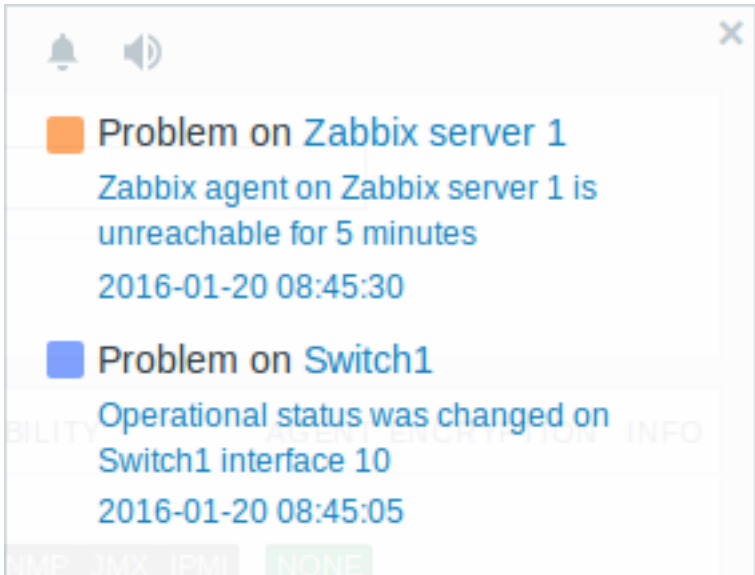
Update

Cancel



| Parameter                       | Description   |
|---------------------------------|---|
| <i>Frontend messaging</i>       | Mark the checkbox to enable global notifications.   |
| <i>Message timeout</i>          | You can set for how long the message will be displayed. By default, messages will stay on screen for 60 seconds.<br><b>Time suffixes</b> are supported, e.g. 30s, 5m, 2h, 1d.   |
| <i>Play sound</i>               | You can set how long the sound will be played.<br><b>Once</b> - sound is played once and fully.<br><b>10 seconds</b> - sound is repeated for 10 seconds.<br><b>Message timeout</b> - sound is repeated while the message is visible.  |
| <i>Trigger severity</i>         | You can set the trigger severities that global notifications and sounds will be activated for. You can also select the sounds appropriate for various severities.<br>If no severity is marked then no messages will be displayed at all.<br>Also, recovery messages will only be displayed for those severities that are marked. So if you mark <i>Recovery</i> and <i>Disaster</i> , global notifications will be displayed for the problems and the recoveries of disaster severity triggers. |
| <i>Show suppressed problems</i> | Mark the checkbox to display notifications for problems which would otherwise be suppressed (not shown) because of host maintenance.  |

### Global messages displayed

As the messages arrive, they are displayed in a floating section on the right hand side. This section can be repositioned freely by dragging the section header.



For this section, several controls are available:



-  **Snooze** button silences the currently active alarm sound;
-  **Mute/Unmute** button switches between playing and not playing the alarm sounds at all.

## 2 Sound in browsers

### Overview

Sound is used in **global notifications**.

For the sounds to be played in Zabbix frontend, *Frontend messaging* must be enabled in the user profile *Messaging* tab, with all trigger severities checked, and sounds should also be enabled in the global notification pop-up window.

If for some reasons audio cannot be played on the device, the  button in the global notification pop-up window will permanently remain in the "mute" state and the message "Cannot support notification audio for this device." will be displayed upon hovering over the  button.

Sounds, including the default audio clips, are supported in MP3 format only.



The sounds of Zabbix frontend have been successfully tested in recent Firefox/Opera browsers on Linux and in Chrome, Firefox, Microsoft Edge, and Opera browsers on Windows.

**Attention:**

The auto play of sounds may be disabled in recent browser versions by default. In this case, you need to change this setting manually.

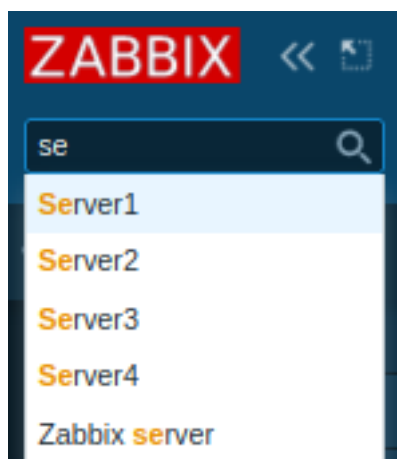
## 4 Global search

It is possible to search Zabbix frontend for hosts, host groups and templates.

The search input box is located below the Zabbix logo in the menu. The search can be started by pressing *Enter* or clicking on the



search icon.



If there is a host that contains the entered string in any part of the name, a dropdown will appear, listing all such hosts (with the matching part highlighted in orange). The dropdown will also list a host if that host's visible name is a match to the technical name entered as a search string; the matching host will be listed, but without any highlighting.

### Searchable attributes

Hosts can be searched by the following properties:

- Host name
- Visible name
- IP address
- DNS name

Host groups can be searched by name. Specifying a parent host group implicitly selects all nested host groups.

Templates can be searched by name or visible name. If you search by a name that is different from the visible name (of a template/host), in the search results it is displayed below the visible name in parentheses.

### Search results

Search results consist of three separate blocks for hosts, host groups and templates.

Hosts

Host

IP

DNS

Monitoring

Configuration

Zabbix server

127.0.0.1

Latest data

Problems

Graphs

Dashboards

Web

Items 141

Triggers 64

Graphs 27

Discovery 3

Web 1

Displaying 1 of 1 found

Host groups

Host group

Monitoring

Configuration

Zabbix servers

Latest data

Problems

Web

Hosts 1

Templates

Displaying 1 of 1 found

Templates

Template

Configuration

Template App Remote Zabbix server

Items 47

Triggers 34

Graphs 6

Dashboards 1

Discovery

Web

Template App Zabbix Server

Items 46

Triggers 34

Graphs 6

Dashboards 1

Discovery

Web

Displaying 2 of 2 found

It is possible to collapse/expand each individual block. The entry count is displayed at the bottom of each block, for example, *Displaying 13 of 13 found*. Total entries displayed within one block are limited to 100.

Each entry provides links to monitoring and configuration data. See the [full list](#) of links.

For all configuration data (such as items, triggers, graphs) the amount of entities found is displayed by a number next to the entity name, in gray. **Note** that if there are zero entities, no number is displayed.

Enabled hosts are displayed in blue, disabled hosts in red.

Links available

For each entry the following links are available:

- Hosts
  - Monitoring
    - \* Latest data
    - \* Problems
    - \* Graphs
    - \* Host dashboards
    - \* Web scenarios
  - Configuration
    - \* Items
    - \* Triggers
    - \* Graphs
    - \* Discovery rules
    - \* Web scenarios
- Host groups
  - Monitoring
    - \* Latest data
    - \* Problems
    - \* Web scenarios
  - Configuration
    - \* Hosts
    - \* Templates
- Templates
  - Configuration
    - \* Items
    - \* Triggers
    - \* Graphs
    - \* Template dashboards
    - \* Discovery rules
    - \* Web scenarios

## 5 Frontend maintenance mode

Overview

Zabbix web frontend can be temporarily disabled in order to prohibit access to it. This can be useful for protecting the Zabbix database from any changes initiated by users, thus protecting the integrity of database.

Zabbix database can be stopped and maintenance tasks can be performed while Zabbix frontend is in maintenance mode.

Users from defined IP addresses will be able to work with the frontend normally during maintenance mode.

Configuration

In order to enable maintenance mode, the `maintenance.inc.php` file (located in `/conf` of Zabbix HTML document directory on the web server) must be modified to uncomment the following lines:

```
// Maintenance mode.
define('ZBX_DENY_GUI_ACCESS', 1);

// Array of IP addresses, which are allowed to connect to frontend (optional).
$ZBX_GUI_ACCESS_IP_RANGE = array('127.0.0.1');

// Message shown on warning screen (optional).
$ZBX_GUI_ACCESS_MESSAGE = 'We are upgrading MySQL database till 15:00. Stay tuned...';
```

**Note:**

Mostly the `maintenance.inc.php` file is located in `/conf` of Zabbix HTML document directory on the web server. However, the location of the directory may differ depending on the operating system and a web server it uses.

For example, the location for:

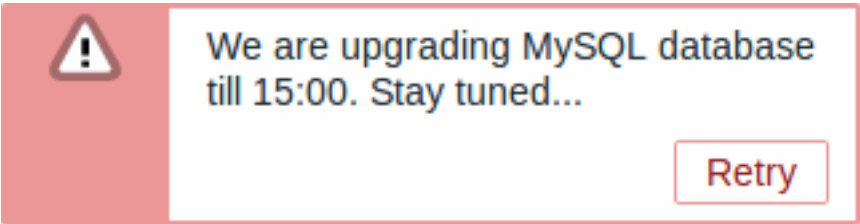
- SUSE and RedHat is `/etc/zabbix/web/maintenance.inc.php`.
- Debian-based systems is `/usr/share/zabbix/conf/`.

See also [Copying PHP files](#).

| Parameter                      | Details   |
|--------------------------------|---|
| <b>ZBX_DENY_GUI_ACCESS</b>     | Enable maintenance mode:<br>1 - maintenance mode is enabled, disabled otherwise   |
| <b>ZBX_GUI_ACCESS_IP_RANGE</b> | Array of IP addresses, which are allowed to connect to frontend (optional).<br>For example:<br><code>array('192.168.1.1', '192.168.1.2')</code> |
| <b>ZBX_GUI_ACCESS_MESSAGE</b>  | Message you can enter to inform users about the maintenance (optional).   |

Display

The following screen will be displayed when trying to access the Zabbix frontend while in maintenance mode. The screen is refreshed every 30 seconds in order to return to a normal state without user intervention when the maintenance is over.



IP addresses defined in `ZBX_GUI_ACCESS_IP_RANGE` will be able to access the frontend as always.

6 Page parameters

Overview

Most Zabbix web interface pages support various HTTP GET parameters that control what will be displayed. They may be passed by specifying `parameter=value` pairs after the URL, separated from the URL by a question mark (?) and from each other by ampersands (&).

Monitoring → Problems

The following parameters are supported:

- `show` - filter option "Show": 1 - recent problems, 2 - all, 3 - in problem state

- `name` - filter option "Problem": freeform string
- `severities` - filter option "Severity": array of selected severities in a format 'severities[\*]=\*' (replace \* with severity level): 0 - not classified, 1 - information, 2 - warning, 3 - average, 4 - high, 5 - disaster
- `inventory` - filter option "Host inventory": array of inventory fields: [field], [value]
- `evaltype` - filter option "Tags", tag filtering strategy: 0 - And/Or, 2 - Or
- `tags` - filter option "Tags": array of defined tags: [tag], [operator], [value]
- `show_tags` - filter option "Show tags": 0 - none, 1 - one, 2 - two, 3 - three
- `tag_name_format` - filter option "Tag name": 0 - full name, 1 - shortened, 2 - none
- `tag_priority` - filter option "Tag display priority": comma-separated string of tag display priority
- `show_suppressed` - filter option "Show suppressed problems": should be 'show\_suppressed=1' to show
- `unacknowledged` - filter option "Show unacknowledged only": should be 'unacknowledged=1' to show
- `compact_view` - filter option "Compact view": should be 'compact\_view=1' to show
- `highlight_row` - filter option "Highlight whole row" (use problem color as background color for every problem row): should be '1' to highlight; can be set only when 'compact\_view' is set
- `filter_name` - filter properties option "Name": freeform string
- `filter_show_counter` - filter properties option "Show number of records": 1 - show, 0 - do not show
- `filter_custom_time` - filter properties option "Set custom time period": 1 - set, 0 - do not set
- `sort` - sort column: clock, host, severity, name
- `sortorder` - sort order or results: DESC - descending, ASC - ascending
- `age_state` - filter option "Age less than": should be 'age\_state=1' to enable 'age'. Is used only when 'show' equals 3.
- `age` - filter option "Age less than": days
- `groupids` - filter option "Host groups": array of host groups IDs
- `hostids` - filter option "Hosts": array of host IDs
- `triggerids` - filter option "Triggers": array of trigger IDs
- `show_timeline` - filter option "Show timeline": should be 'show\_timeline=1' to show
- `details` - filter option "Show details": should be 'details=1' to show
- `from` - date range start, can be 'relative' (e.g.: now-1m). Is used only when 'filter\_custom\_time' equals 1.
- `to` - date range end, can be 'relative' (e.g.: now-1m). Is used only when 'filter\_custom\_time' equals 1.

#### Kiosk mode

The kiosk mode in supported frontend pages can be activated using URL parameters. For example, in dashboards:

- `/zabbix.php?action=dashboard.view&kiosk=1` - activate kiosk mode
- `/zabbix.php?action=dashboard.view&kiosk=0` - activate normal mode

#### Slideshow

It is possible to activate a slideshow in the dashboard:

- `/zabbix.php?action=dashboard.view&slideshow=1` - activate slideshow

## 7 Definitions

### Overview

While many things in the frontend can be configured using the frontend itself, some customisations are currently only possible by editing a definitions file.

This file is `defines.inc.php` located in `/include` of the Zabbix HTML document directory.

### Parameters

Parameters in this file that could be of interest to users:

- `ZBX_MIN_PERIOD`

Minimum graph period, in seconds. One minute by default.

- `GRAPH_YAXIS_SIDE_DEFAULT`

Default location of Y axis in simple graphs and default value for drop down box when adding items to custom graphs. Possible values: 0 - left, 1 - right.

Default: 0

- `ZBX_SESSION_NAME` (available since 4.0.0)

String used as the name of the Zabbix frontend session cookie.

Default: `zbx_sessionid`

- `ZBX_DATA_CACHE_TTL` (available since 5.2.0)

TTL timeout in seconds used to invalidate data cache of **Vault response**. Set 0 to disable Vault response caching.

Default: 60

- `SUBFILTER_VALUES_PER_GROUP` (available since 6.0.5)

Number of subfilter values per group (For example, in the **latest data** subfilter).

Default: 1000

## 8 Creating your own theme

### Overview

By default, Zabbix provides a number of predefined themes. You may follow the step-by-step procedure provided here in order to create your own. Feel free to share the result of your work with Zabbix community if you created something nice.

#### Step 1

To define your own theme you'll need to create a CSS file and save it in the `assets/styles/` folder (for example, *custom-theme.css*). You can either copy the files from a different theme and create your theme based on it or start from scratch.

#### Step 2

Add your theme to the list of themes returned by the `APP::getThemes()` method. You can do this by overriding the `ZBase::getThemes()` method in the `APP` class. This can be done by adding the following code before the closing brace in `include/classes/core/APP.php`:

```
public static function getThemes() {
    return array_merge(parent::getThemes(), [
        'custom-theme' => _('Custom theme')
    ]);
}
```

#### Attention:

Note that the name you specify within the first pair of quotes must match the name of the theme file without extension.

To add multiple themes, just list them under the first theme, for example:

```
public static function getThemes() {
    return array_merge(parent::getThemes(), [
        'custom-theme' => _('Custom theme'),
        'anothertheme' => _('Another theme'),
        'onemoretheme' => _('One more theme')
    ]);
}
```

Note that every theme except the last one must have a trailing comma.

#### Note:

To change graph colors, the entry must be added in the *graph\_theme* database table.

#### Step 3

Activate the new theme.

In Zabbix frontend, you may either set this theme to be the default one or change your theme in the user profile.

Enjoy the new look and feel!

9 Debug mode

Overview

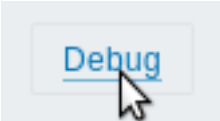
Debug mode may be used to diagnose performance problems with frontend pages.

Configuration

Debug mode can be activated for individual users who belong to a user group:

- when configuring a **user group**;
- when viewing configured **user groups**.

When *Debug mode* is enabled for a user group, its users will see a *Debug* button in the lower right corner of the browser window:



Clicking on the *Debug* button opens a new window below the page contents which contains the SQL statistics of the page, along with a list of API calls and individual SQL statements:

```
***** Script profiler *****
Total time: 0.249825
Total SQL time: 0.139814
SQL count: 143 (selects: 117 | executes: 26)
Peak memory usage: 6M
Memory limit: 128M

1. hostgroup.get [latest.php:124]

Parameters:      Result:
Array            Array
(
  [output] => Array (
    [0] => groupid
  )
  [4] => Array (
    [groupid] => 4
  )
)
```

Hide debug

In case of performance problems with the page, this window may be used to search for the root cause of the problem.

**Warning:**  
Enabled *Debug mode* negatively affects frontend performance.

10 Cookies used by Zabbix

Overview

This page provides a list of cookies used by Zabbix.

| Name            | Description  | Values | Expires/Max-Age                                  | HttpOnly <sup>1</sup> | Secure <sup>2</sup>                          |
|-----------------|--|--------|--|-----------------------|--|
| ZBX_SESSIONNAME | Zabbix frontend session data, stored as JSON encoded by base64 |        | Session (expires when the browsing session ends) | +                     | + (only if HTTPS is enabled on a web server) |

| Name                 | Description   | Values             | Expires/Max-Age   | HttpOnly <sup>1</sup> | Secure <sup>2</sup> |
|----------------------|---|--------------------|---|-----------------------|---------------------|
| tab                  | Active tab number; this cookie is only used on pages with multiple tabs (e.g. <i>Host</i> , <i>Trigger</i> or <i>Action</i> configuration page) and is created, when a user navigates from a primary tab to another tab (such as <i>Tags</i> or <i>Dependencies</i> tab). | Example:<br>1      | Session (expires when the browsing session ends)                                | -                     | -                   |
| browserwarningignore | Whether a warning about using an outdated browser should be ignored.  | yes                | Session (expires when the browsing session ends)                                | -                     | -                   |
| system-message-ok    | A message to show as soon as page is reloaded.  | Plain text message | Session (expires when the browsing session ends) or as soon as page is reloaded | +                     | -                   |
| system-message-error | An error message to show as soon as page is reloaded.   | Plain text message | Session (expires when the browsing session ends) or as soon as page is reloaded | +                     | -                   |

**Note:**

Forcing 'HttpOnly' flag on Zabbix cookies by a webserver directive is not supported.

Footnotes

<sup>1</sup> When HttpOnly is 'true' the cookie will be made accessible only through the HTTP protocol. This means that the cookie won't be accessible by scripting languages, such as JavaScript. This setting can effectively help to reduce identity theft through XSS attacks (although it is not supported by all browsers).

<sup>2</sup> Secure indicates that the cookie should only be transmitted over a secure HTTPS connection from the client. When set to 'true', the cookie will only be set if a secure connection exists.

## 11 Time zones

### Overview

The frontend time zone can be set globally in the frontend and adjusted for individual users.

If *System* is selected, the web server time zone will be used for the frontend (including the value of 'date.timezone' of php.ini, if set), while Zabbix server will use the time zone of the machine it is running on.

#### Note:

Zabbix server will only use the specified global/user time zone when expanding macros in notifications (e.g. {EVENT.TIME} can expand to a different time zone per user) and for the time limit when notifications are sent (see "When active" setting in user [media configuration](#)).

## Configuration

The global time zone:

- can be set manually when [installing](#) the frontend
- can be modified in *Administration* → *General* → *GUI*

User-level time zone:

- can be set when [configuring/updating](#) a user
- can be set by each user in their [user profile](#)

**See also:** Aligning time zones when using [scheduling intervals](#).

## 12 Resetting password

**Overview** This section describes the steps for resetting user passwords in Zabbix.

**Steps** Turn to your Zabbix administrator if you have forgotten your Zabbix password and cannot log in.

A Super administrator user can change passwords for all users in the user [configuration form](#).

If a Super administrator has forgotten their password and cannot log in, the following SQL query must be run to apply the default password to the Super admin user (replace 'Admin' with the appropriate Super admin username):

```
UPDATE users SET passwd = '$2a$10$ZXIvHAEP2ZM.dLXTm6uPHOMVlARXX7cqjbhM6Fn0cANzkCQBWpMrS' WHERE username =
```

After running this query, the user password will be set to *zabbix*. Make sure to change the default password on the first login.



## 19 API

**Overview** Zabbix API allows you to programmatically retrieve and modify the configuration of Zabbix and provides access to historical data. It is widely used to:

- Create new applications to work with Zabbix;
- Integrate Zabbix with third-party software;
- Automate routine tasks.

The Zabbix API is a web based API and is shipped as part of the web frontend. It uses the JSON-RPC 2.0 protocol which means two things:

- The API consists of a set of separate methods;
- Requests and responses between the clients and the API are encoded using the JSON format.

More info about the protocol and JSON can be found in the [JSON-RPC 2.0 specification](#) and the [JSON format homepage](#).

For more information about integrating Zabbix functionality into your Python applications, see the [zabbix\\_utils](#) Python library for Zabbix API.

**Structure** The API consists of a number of methods that are nominally grouped into separate APIs. Each of the methods performs one specific task. For example, the `host.create` method belongs to the `host` API and is used to create new hosts. Historically, APIs are sometimes referred to as "classes".

**Note:**

Most APIs contain at least four methods: `get`, `create`, `update` and `delete` for retrieving, creating, updating and deleting data respectively, but some of the APIs may provide a totally different set of methods.

**Performing requests** Once you've set up the frontend, you can use remote HTTP requests to call the API. To do that you need to send HTTP POST requests to the `api_jsonrpc.php` file located in the frontend directory. For example, if your Zabbix frontend is installed under `http://example.com/zabbix`, the HTTP request to call the `apiinfo.version` method may look like this:

```
POST http://example.com/zabbix/api_jsonrpc.php HTTP/1.1
Content-Type: application/json-rpc
```

```
{
  "jsonrpc": "2.0",
  "method": "apiinfo.version",
  "id": 1,
  "auth": null,
  "params": {}
}
```

The request must have the `Content-Type` header set to one of these values: `application/json-rpc`, `application/json` or `application/jsonrequest`.

**Example workflow** The following section will walk you through some usage examples in more detail.

**Authentication** To access any data in Zabbix, you need to either:

- use an existing **API token** (created in Zabbix frontend or using the **Token API**);
- use an authentication token obtained with the **user.login** method.

For example, if you wanted to obtain a new authentication token by logging in as a standard *Admin* user, then a JSON request would look like this:

```
{
  "jsonrpc": "2.0",
  "method": "user.login",
  "params": {
    "username": "Admin",
    "password": "zabbix"
  },
  "id": 1,
```

```
    "auth": null
}
```

Let's take a closer look at the request object. It has the following properties:

- `jsonrpc` - the version of the JSON-RPC protocol used by the API; the Zabbix API implements JSON-RPC version 2.0;
- `method` - the API method being called;
- `params` - parameters that will be passed to the API method;
- `id` - an arbitrary identifier of the request;
- `auth` - a user authentication token; since we don't have one yet, it's set to `null`.

If you provided the credentials correctly, the response returned by the API will contain the user authentication token:

```
{
  "jsonrpc": "2.0",
  "result": "0424bd59b807674191e7d77572075f33",
  "id": 1
}
```

The response object in turn contains the following properties:

- `jsonrpc` - again, the version of the JSON-RPC protocol;
- `result` - the data returned by the method;
- `id` - identifier of the corresponding request.

**Retrieving hosts** We now have a valid user authentication token that can be used to access the data in Zabbix. For example, let's use the `host.get` method to retrieve the IDs, host names and interfaces of all configured **hosts**:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": [
      "hostid",
      "host"
    ],
    "selectInterfaces": [
      "interfaceid",
      "ip"
    ]
  },
  "id": 2,
  "auth": "0424bd59b807674191e7d77572075f33"
}
```

**Attention:**

Note that the `auth` property is now set to the authentication token we've obtained by calling `user.login`.

The response object will contain the requested data about the hosts:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10084",
      "host": "Zabbix server",
      "interfaces": [
        {
          "interfaceid": "1",
          "ip": "127.0.0.1"
        }
      ]
    }
  ],
  "id": 2
}
```

**Note:**

For performance reasons we recommend to always list the object properties you want to retrieve and avoid retrieving everything.

**Creating a new item** Let's create a new **item** on "Zabbix server" using the data we've obtained from the previous `host.get` request. This can be done by using the `item.create` method:

```
{
  "jsonrpc": "2.0",
  "method": "item.create",
  "params": {
    "name": "Free disk space on /home/joe/",
    "key_": "vfs.fs.size[/home/joe/,free]",
    "hostid": "10084",
    "type": 0,
    "value_type": 3,
    "interfaceid": "1",
    "delay": 30
  },
  "auth": "0424bd59b807674191e7d77572075f33",
  "id": 3
}
```

A successful response will contain the ID of the newly created item, which can be used to reference the item in the following requests:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "24759"
    ]
  },
  "id": 3
}
```

**Note:**

The `item.create` method as well as other create methods can also accept arrays of objects and create multiple items with one API call.

**Creating multiple triggers** So if create methods accept arrays, we can add multiple **triggers** like so:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.create",
  "params": [
    {
      "description": "Processor load is too high on {HOST.NAME}",
      "expression": "last(/Linux server/system.cpu.load[percpu,avg1])>5",
    },
    {
      "description": "Too many processes on {HOST.NAME}",
      "expression": "avg(/Linux server/proc.num[],5m)>300",
    }
  ],
  "auth": "0424bd59b807674191e7d77572075f33",
  "id": 4
}
```

A successful response will contain the IDs of the newly created triggers:

```
{
  "jsonrpc": "2.0",
```

```

    "result": {
      "triggerids": [
        "17369",
        "17370"
      ]
    },
    "id": 4
  }
}

```

**Updating an item** Enable an item, that is, set its status to "0":

```

{
  "jsonrpc": "2.0",
  "method": "item.update",
  "params": {
    "itemid": "10092",
    "status": 0
  },
  "auth": "0424bd59b807674191e7d77572075f33",
  "id": 5
}

```

A successful response will contain the ID of the updated item:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "10092"
    ]
  },
  "id": 5
}

```

**Note:**

The `item.update` method as well as other update methods can also accept arrays of objects and update multiple items with one API call.

**Updating multiple triggers** Enable multiple triggers, that is, set their status to 0:

```

{
  "jsonrpc": "2.0",
  "method": "trigger.update",
  "params": [
    {
      "triggerid": "13938",
      "status": 0
    },
    {
      "triggerid": "13939",
      "status": 0
    }
  ],
  "auth": "0424bd59b807674191e7d77572075f33",
  "id": 6
}

```

A successful response will contain the IDs of the updated triggers:

```

{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "13938",

```

```

    "13939"
  ],
  },
  "id": 6
}

```

**Note:**

This is the preferred method of updating. Some API methods like `host.massupdate` allow to write more simple code, but it's not recommended to use those methods, since they will be removed in the future releases.

**Error handling** Up to that point everything we've tried has worked fine. But what happens if we try to make an incorrect call to the API? Let's try to create another host by calling `host.create` but omitting the mandatory `groups` parameter.

```

{
  "jsonrpc": "2.0",
  "method": "host.create",
  "params": {
    "host": "Linux server",
    "interfaces": [
      {
        "type": 1,
        "main": 1,
        "useip": 1,
        "ip": "192.168.3.1",
        "dns": "",
        "port": "10050"
      }
    ]
  },
  "id": 7,
  "auth": "0424bd59b807674191e7d77572075f33"
}

```

The response will then contain an error message:

```

{
  "jsonrpc": "2.0",
  "error": {
    "code": -32602,
    "message": "Invalid params.",
    "data": "No groups for host \"Linux server\"."
  },
  "id": 7
}

```

If an error occurred, instead of the `result` property, the response object will contain an `error` property with the following data:

- `code` - an error code;
- `message` - a short error summary;
- `data` - a more detailed error message.

Errors can occur in different cases, such as, using incorrect input values, a session timeout or trying to access unexisting objects. Your application should be able to gracefully handle these kinds of errors.

**API versions** To simplify API versioning, since Zabbix 2.0.4, the version of the API matches the version of Zabbix itself. You can use the `apiinfo.version` method to find out the version of the API you're working with. This can be useful for adjusting your application to use version-specific features.

We guarantee feature backward compatibility inside of a major version. When making backward incompatible changes between major releases, we usually leave the old features as deprecated in the next release, and only remove them in the release after that. Occasionally, we may remove features between major releases without providing any backward compatibility. It is important that you never rely on any deprecated features and migrate to newer alternatives as soon as possible.

**Note:**

You can follow all of the changes made to the API in the [API changelog](#).

**Further reading** You now know enough to start working with the Zabbix API, but don't stop here. For further reading we suggest you have a look at the [list of available APIs](#).

**Method reference**

This section provides an overview of the functions provided by the Zabbix API and will help you find your way around the available classes and methods.

**Monitoring** The Zabbix API allows you to access history and other data gathered during monitoring.

High availability cluster

Retrieve a list of server nodes and their status.

[High availability cluster API](#)

History

Retrieve historical values gathered by Zabbix monitoring processes for presentation or further processing.

[History API](#)

Trends

Retrieve trend values calculated by Zabbix server for presentation or further processing.

[Trend API](#)

Events

Retrieve events generated by triggers, network discovery and other Zabbix systems for more flexible situation management or third-party tool integration.

[Event API](#)

Problems

Retrieve problems according to the given parameters.

[Problem API](#)

Service monitoring

Create a hierarchy representation of monitored IT infrastructure/business services data.

[Service API](#)

Service Level Agreement

Define Service Level Objectives (SLO), retrieve detailed Service Level Indicators (SLI) information about service performance.

[SLA API](#)

Tasks

Interact with Zabbix server task manager, creating tasks and retrieving response.

[Task API](#)

**Configuration** The Zabbix API allows you to manage the configuration of your monitoring system.

Hosts and host groups

Manage host groups, hosts and everything related to them, including host interfaces, host macros and maintenance periods.

[Host API](#) | [Host group API](#) | [Host interface API](#) | [User macro API](#) | [Value map API](#) | [Maintenance API](#)

Items

Define items to monitor.

## Item API

### Triggers

Configure triggers to notify you about problems in your system. Manage trigger dependencies.

## Trigger API

### Graphs

Edit graphs or separate graph items for better presentation of the gathered data.

## Graph API | Graph item API

### Templates

Manage templates and link them to hosts or other templates.

## Template API | Value map API

### Export and import

Export and import Zabbix configuration data for configuration backups, migration or large-scale configuration updates.

## Configuration API

### Low-level discovery

Configure low-level discovery rules as well as item, trigger and graph prototypes to monitor dynamic entities.

## LLD rule API | Item prototype API | Trigger prototype API | Graph prototype API | Host prototype API

### Event correlation

Create custom event correlation rules.

## Correlation API

### Actions and alerts

Define actions and operations to notify users about certain events or automatically execute remote commands. Gain access to information about generated alerts and their receivers.

## Action API | Alert API

### Services

Manage services for service-level monitoring and retrieve detailed SLA information about any service.

## Service API

### Dashboards

Manage dashboards and make scheduled reports based on them.

## Dashboard API | Template dashboard API | Report API

### Maps

Configure maps to create detailed dynamic representations of your IT infrastructure.

## Map API

### Web monitoring

Configure web scenarios to monitor your web applications and services.

## Web scenario API

### Network discovery

Manage network-level discovery rules to automatically find and monitor new hosts. Gain full access to information about discovered services and hosts.

## Discovery rule API | Discovery check API | Discovered host API | Discovered service API

**Administration** With the Zabbix API you can change administration settings of your monitoring system.

#### Users

Add users that will have access to Zabbix, assign them to user groups and grant permissions. Make roles for granular management of user rights. Track configuration changes each user has done. Configure media types and multiple ways users will receive alerts.

[User API](#) | [User group API](#) | [User role API](#) | [Media type API](#) | [Audit log API](#)

#### General

Change certain global configuration options.

[Autoregistration API](#) | [Icon map API](#) | [Image API](#) | [User macro API](#) | [Settings API](#) | [Housekeeping API](#)

#### Regular expressions

Manage global regular expressions.

[Regular expression API](#)

#### Proxies

Manage the proxies used in your distributed monitoring setup.

[Proxy API](#)

#### Authentication

Change authentication configuration options.

[Authentication API](#)

#### API Tokens

Manage authorization tokens.

[Token API](#)

#### Scripts

Configure and execute scripts to help you with your daily tasks.

[Script API](#)

**API information** Retrieve the version of the Zabbix API so that your application could use version-specific features.

[API info API](#)

## Action

This class is designed to work with actions.

Object references:

- [Action](#)
- [Action condition](#)
- [Action operation](#)

Available methods:

- [action.create](#) - create new actions
- [action.delete](#) - delete actions
- [action.get](#) - retrieve actions
- [action.update](#) - update actions

### > Action object

The following objects are directly related to the `action` API.

#### Action

The action object has the following properties.



| Property                         | Type    | Description  |
|----------------------------------|---------|--|
| actionid                         | string  | ( <i>readonly</i> ) ID of the action.  |
| <b>esc_period</b><br>(required)  | string  | Default operation step duration. Must be at least 60 seconds. Accepts seconds, time unit with suffix and user macro.   |
| <b>eventsource</b><br>(required) | integer | Note that escalations are supported only for trigger, internal and service actions, and only in normal operations.<br>( <i>constant</i> ) Type of events that the action will handle.                            |
| <b>name</b><br>(required)        | string  | Refer to the <b>event "source" property</b> for a list of supported event types.<br>Name of the action.  |
| status                           | integer | Whether the action is enabled or disabled.   |
| pause_suppressed                 | integer | Possible values:<br>0 - ( <i>default</i> ) enabled;<br>1 - disabled.<br>Whether to pause escalation during maintenance periods or not.   |
| notify_if_canceled               | integer | Possible values:<br>0 - Don't pause escalation;<br>1 - ( <i>default</i> ) Pause escalation.<br><br>Note that this parameter is valid for trigger actions only.<br>Whether to notify when escalation is canceled. |
|                                  |         | Possible values:<br>0 - Don't notify when escalation is canceled;<br>1 - ( <i>default</i> ) Notify when escalation is canceled.<br><br>Note that this parameter is valid for trigger actions only.               |

Note that for some methods (update, delete) the required/optional parameter combination is different.

#### Action operation

The action operation object defines an operation that will be performed when an action is executed. It has the following properties.

| Property                           | Type    | Description   |
|------------------------------------|---------|---|
| operationid                        | string  | ( <i>readonly</i> ) ID of the action operation.   |
| <b>operationtype</b><br>(required) | integer | Type of operation.<br><br>Possible values:<br>0 - send message;<br>1 - global script;<br>2 - add host;<br>3 - remove host;<br>4 - add to host group;<br>5 - remove from host group;<br>6 - link to template;<br>7 - unlink from template;<br>8 - enable host;<br>9 - disable host;<br>10 - set host inventory mode. |
| actionid                           | string  | Note that only types '0' and '1' are supported for trigger and service actions, only '0' is supported for internal actions. All types are supported for discovery and autoregistration actions.<br>( <i>readonly</i> ) ID of the action that the operation belongs to.  |

| Property      | Type    | Description   |
|---------------|---------|---|
| esc_period    | string  | <p>Duration of an escalation step in seconds. Must be greater than 60 seconds. Accepts seconds, time unit with suffix and user macro. If set to 0 or 0s, the default action escalation period will be used.</p> <p>Default: 0s.</p>   |
| esc_step_from | integer | <p>Note that escalations are supported only for trigger, internal and service actions, and only in normal operations.</p> <p>Step to start escalation from.</p> <p>Default: 1.</p>  |
| esc_step_to   | integer | <p>Note that escalations are supported only for trigger, internal and service actions, and only in normal operations.</p> <p>Step to end escalation at.</p> <p>Default: 1.</p>  |
| evaltype      | integer | <p>Note that escalations are supported only for trigger, internal and service actions, and only in normal operations.</p> <p>Operation condition evaluation method.</p> <p>Possible values:<br/> 0 - (default) AND / OR;<br/> 1 - AND;<br/> 2 - OR.</p>   |
| opcommand     | object  | <p>Object containing data on global script run by the operation.</p> <p>Each object has one following property: <code>scriptid</code> - (string) ID of the script.</p>  |
| opcommand_grp | array   | <p>Required for global script operations.</p> <p>Host groups to run global scripts on.</p> <p>Each object has the following properties:<br/> <code>opcommand_grpid</code> - (string, readonly) ID of the object;<br/> <code>operationid</code> - (string, readonly) ID of the operation;<br/> <code>groupid</code> - (string) ID of the host group.</p>   |
| opcommand_hst | array   | <p>Required for global script operations if <code>opcommand_hst</code> is not set.</p> <p>Host to run global scripts on.</p> <p>Each object has the following properties:<br/> <code>opcommand_hstid</code> - (string, readonly) ID of the object;<br/> <code>operationid</code> - (string, readonly) ID of the operation;<br/> <code>hostid</code> - (string) ID of the host; if set to 0 the command will be run on the current host.</p> |
| opconditions  | array   | <p>Required for global script operations if <code>opcommand_grp</code> is not set.</p> <p>Operation conditions used for trigger actions.</p>  |
| opgroup       | array   | <p>The operation condition object is <a href="#">described in detail below</a>.</p> <p>Host groups to add hosts to.</p> <p>Each object has the following properties:<br/> <code>operationid</code> - (string, readonly) ID of the operation;<br/> <code>groupid</code> - (string) ID of the host group.</p> <p>Required for "add to host group" and "remove from host group" operations.</p>  |

| Property      | Type   | Description   |
|---------------|--------|---|
| opmessage     | object | Object containing the data about the message sent by the operation.<br><br>The operation message object is <a href="#">described in detail below</a> .  |
| opmessage_grp | array  | Required for message operations.<br>User groups to send messages to.<br><br>Each object has the following properties:<br>operationid - ( <i>string, readonly</i> ) ID of the operation;<br>usrgrpuid - ( <i>string</i> ) ID of the user group.  |
| opmessage_usr | array  | Required for message operations if opmessage_usr is not set.<br>Users to send messages to.<br><br>Each object has the following properties:<br>operationid - ( <i>string, readonly</i> ) ID of the operation;<br>userid - ( <i>string</i> ) ID of the user.   |
| optemplate    | array  | Required for message operations if opmessage_grp is not set.<br>Templates to link the hosts to.<br><br>Each object has the following properties:<br>operationid - ( <i>string, readonly</i> ) ID of the operation;<br>templateid - ( <i>string</i> ) ID of the template.  |
| opinventory   | object | Required for "link to template" and "unlink from template" operations.<br>Inventory mode set host to.<br><br>Object has the following properties:<br>operationid - ( <i>string, readonly</i> ) ID of the operation;<br>inventory_mode - ( <i>string</i> ) Inventory mode.<br><br>Required for "Set host inventory mode" operations. |

#### Action operation message

The operation message object contains data about the message that will be sent by the operation.

| Property    | Type    | Description   |
|-------------|---------|---|
| default_msg | integer | Whether to use the default action message text and subject.<br><br>Possible values:<br>0 - use the data from the operation;<br>1 - ( <i>default</i> ) use the data from the media type. |
| mediatypeid | string  | ID of the media type that will be used to send the message.   |
| message     | string  | Operation message text.   |
| subject     | string  | Operation message subject.  |

#### Action operation condition

The action operation condition object defines a condition that must be met to perform the current operation. It has the following properties.

| Property                           | Type    | Description  |
|------------------------------------|---------|--|
| opconditionid                      | string  | ( <i>readonly</i> ) ID of the action operation condition               |
| <b>conditiontype</b><br>(required) | integer | Type of condition.<br><br>Possible values:<br>14 - event acknowledged. |

| Property                   | Type    | Description  |
|----------------------------|---------|--|
| <b>value</b><br>(required) | string  | Value to compare with.   |
| operationid                | string  | ( <i>readonly</i> ) ID of the operation.                                 |
| operator                   | integer | Condition operator.<br><br>Possible values:<br>0 - ( <i>default</i> ) =. |

The following operators and values are supported for each operation condition type.

| Condition | Condition name     | Supported operators | Expected value   |
|-----------|--------------------|---------------------|--|
| 14        | Event acknowledged | =                   | Whether the event is acknowledged.<br><br>Possible values:<br>0 - not acknowledged;<br>1 - acknowledged. |

#### Action recovery operation

The action recovery operation object defines an operation that will be performed when a problem is resolved. Recovery operations are possible for trigger, internal and service actions. It has the following properties.

| Property                           | Type    | Description  |
|------------------------------------|---------|--|
| operationid                        | string  | ( <i>readonly</i> ) ID of the action operation.  |
| <b>operationtype</b><br>(required) | integer | Type of operation.<br><br>Possible values for trigger and service actions:<br>0 - send message;<br>1 - global script;<br>11 - notify all involved.<br><br>Possible values for internal actions:<br>0 - send message;<br>11 - notify all involved.  |
| actionid                           | string  | ( <i>readonly</i> ) ID of the action that the recovery operation belongs to.   |
| opcommand                          | object  | Object containing data on global action type script run by the operation.<br><br>Each object has one following property: <i>scriptid</i> - ( <i>string</i> ) ID of the action type script.   |
| opcommand_grp                      | array   | Required for global script operations.<br>Host groups to run global scripts on.<br><br>Each object has the following properties:<br><i>opcommand_grpid</i> - ( <i>string, readonly</i> ) ID of the object;<br><i>operationid</i> - ( <i>string, readonly</i> ) ID of the operation;<br><i>groupid</i> - ( <i>string</i> ) ID of the host group.<br><br>Required for global script operations if <i>opcommand_hst</i> is not set. |

| Property      | Type   | Description   |
|---------------|--------|---|
| opcommand_hst | array  | Host to run global scripts on.<br><br>Each object has the following properties:<br>opcommand_hstid - <i>(string, readonly)</i> ID of the object;<br>operationid - <i>(string, readonly)</i> ID of the operation;<br>hostid - <i>(string)</i> ID of the host; if set to 0 the command will be run on the current host.       |
| opmessage     | object | Required for global script operations if opcommand_grp is not set.<br>Object containing the data about the message sent by the recovery operation.<br><br>The operation message object is <b>described in detail above</b> .  |
| opmessage_grp | array  | Required for message operations.<br>User groups to send messages to.<br><br>Each object has the following properties:<br>operationid - <i>(string, readonly)</i> ID of the operation;<br>usrgrp - <i>(string)</i> ID of the user group.   |
| opmessage_usr | array  | Required for message operations if opmessage_usr is not set.<br>Users to send messages to.<br><br>Each object has the following properties:<br>operationid - <i>(string, readonly)</i> ID of the operation;<br>userid - <i>(string)</i> ID of the user.<br><br>Required for message operations if opmessage_grp is not set. |

#### Action update operation

The action update operation object defines an operation that will be performed when a problem is updated (commented upon, acknowledged, severity changed, or manually closed). Update operations are possible for trigger and service actions. It has the following properties.

| Property                           | Type    | Description   |
|------------------------------------|---------|---|
| operationid                        | string  | <i>(readonly)</i> ID of the action operation.   |
| <b>operationtype</b><br>(required) | integer | Type of operation.<br><br>Possible values for trigger and service actions:<br>0 - send message;<br>1 - global script;<br>12 - notify all involved.  |
| opcommand                          | object  | Object containing data on global action type script run by the operation.<br><br>Each object has one following property: scriptid - <i>(string)</i> ID of the action type script.   |
| opcommand_grp                      | array   | Required for global script operations.<br>Host groups to run global scripts on.<br><br>Each object has the following properties:<br>groupid - <i>(string)</i> ID of the host group.<br><br>Required for global script operations if opcommand_hst is not set. |

| Property      | Type   | Description   |
|---------------|--------|---|
| opcommand_hst | array  | Host to run global scripts on.<br><br>Each object has the following properties:<br>hostid - <i>(string)</i> ID of the host; if set to 0 the command will be run on the current host.  |
| opmessage     | object | Required for global script operations if opcommand_grp is not set. Object containing the data about the message sent by the update operation.   |
| opmessage_grp | array  | The operation message object is <b>described in detail above</b> .<br>User groups to send messages to.<br><br>Each object has the following properties:<br>usrgrp_id - <i>(string)</i> ID of the user group.  |
| opmessage_usr | array  | Required only for send message operations if opmessage_usr is not set.<br>Is ignored for send update message operations.<br>Users to send messages to.<br><br>Each object has the following properties:<br>userid - <i>(string)</i> ID of the user.<br><br>Required only for send message operations if opmessage_grp is not set.<br>Is ignored for send update message operations. |

#### Action filter

The action filter object defines a set of conditions that must be met to perform the configured action operations. It has the following properties.

| Property                        | Type    | Description  |
|---------------------------------|---------|--|
| <b>conditions</b><br>(required) | array   | Set of filter conditions to use for filtering results.   |
| <b>evaltype</b><br>(required)   | integer | Filter condition evaluation method.<br><br>Possible values:<br>0 - and/or;<br>1 - and;<br>2 - or;<br>3 - custom expression.  |
| eval_formula                    | string  | <i>(readonly)</i> Generated expression that will be used for evaluating filter conditions. The expression contains IDs that reference specific filter conditions by its formulaid. The value of eval_formula is equal to the value of formula for filters with a custom expression.  |
| formula                         | string  | User-defined expression to be used for evaluating conditions of filters with a custom expression. The expression must contain IDs that reference specific filter conditions by its formulaid. The IDs used in the expression must exactly match the ones defined in the filter conditions: no condition can remain unused or omitted.<br><br>Required for custom expression filters. |

#### Action filter condition

The action filter condition object defines a specific condition that must be checked before running the action operations.

| Property                           | Type    | Description  |
|------------------------------------|---------|--|
| conditionid                        | string  | ( <i>readonly</i> ) ID of the action condition.  |
| <b>conditiontype</b><br>(required) | integer | Type of condition.<br><br>Possible values for trigger actions:<br>0 - host group;<br>1 - host;<br>2 - trigger;<br>3 - event name;<br>4 - trigger severity;<br>6 - time period;<br>13 - host template;<br>16 - problem is suppressed;<br>25 - event tag;<br>26 - event tag value.<br><br>Possible values for discovery actions:<br>7 - host IP;<br>8 - discovered service type;<br>9 - discovered service port;<br>10 - discovery status;<br>11 - uptime or downtime duration;<br>12 - received value;<br>18 - discovery rule;<br>19 - discovery check;<br>20 - proxy;<br>21 - discovery object.<br><br>Possible values for autoregistration actions:<br>20 - proxy;<br>22 - host name;<br>24 - host metadata.<br><br>Possible values for internal actions:<br>0 - host group;<br>1 - host;<br>13 - host template;<br>23 - event type;<br>25 - event tag;<br>26 - event tag value.<br><br>Possible values for service actions:<br>25 - event tag;<br>26 - event tag value;<br>27 - service;<br>28 - service name. |
| <b>value</b><br>(required)         | string  | Value to compare with.   |
| value2                             | string  | Secondary value to compare with. Required for trigger, internal and service actions when condition type is 26.   |
| actionid                           | string  | ( <i>readonly</i> ) ID of the action that the condition belongs to.  |
| formulaid                          | string  | Arbitrary unique ID that is used to reference the condition from a custom expression. Can only contain capital-case letters. The ID must be defined by the user when modifying filter conditions, but will be generated anew when requesting them afterward.   |

| Property | Type    | Description  |
|----------|---------|--|
| operator | integer | Condition operator.<br><br>Possible values:<br>0 - (default) equals;<br>1 - does not equal;<br>2 - contains;<br>3 - does not contain;<br>4 - in;<br>5 - is greater than or equals;<br>6 - is less than or equals;<br>7 - not in;<br>8 - matches;<br>9 - does not match;<br>10 - Yes;<br>11 - No. |

**Note:**

To better understand how to use filters with various types of expressions, see examples on the [action.get](#) and [action.create](#) method pages.

The following operators and values are supported for each condition type.

| Condition | Condition name          | Supported operators  | Expected value  |
|-----------|-------------------------|--|---|
| 0         | Host group              | equals,<br>does not equal  | Host group ID.  |
| 1         | Host                    | equals,<br>does not equal  | Host ID.  |
| 2         | Trigger                 | equals,<br>does not equal  | Trigger ID.   |
| 3         | Event name              | contains,<br>does not contain  | Event name.   |
| 4         | Trigger severity        | equals,<br>does not equal,<br>is greater than or<br>equals,<br>is less than or<br>equals | Trigger severity. Refer to the <a href="#">trigger "severity" property</a> for a list of supported trigger severities.  |
| 5         | Trigger value           | equals   | Trigger value. Refer to the <a href="#">trigger "value" property</a> for a list of supported trigger values.  |
| 6         | Time period             | in, not in   | Time when the event was triggered as a <a href="#">time period</a> .  |
| 7         | Host IP                 | equals,<br>does not equal  | One or several IP ranges to check separated by commas.<br>Refer to the <a href="#">network discovery configuration</a> section for more information on supported formats of IP ranges.                          |
| 8         | Discovered service type | equals,<br>does not equal  | Type of discovered service. The type of service matches the type of the discovery check used to detect the service. Refer to the <a href="#">discovery check "type" property</a> for a list of supported types. |
| 9         | Discovered service port | equals,<br>does not equal  | One or several port ranges separated by commas.   |
| 10        | Discovery status        | equals   | Status of a discovered object.<br><br>Possible values:<br>0 - host or service up;<br>1 - host or service down;<br>2 - host or service discovered;<br>3 - host or service lost.                                  |



| Condition | Condition name              | Supported operators  | Expected value  |
|-----------|-----------------------------|--|---|
| 11        | Uptime or downtime duration | is greater than or equals,<br>is less than or equals   | Time indicating how long has the discovered object been in the current status in seconds.   |
| 12        | Received values             | equals,<br>does not equal,<br>is greater than or equals,<br>is less than or equals,<br>contains,<br>does not contain | Value returned when performing a Zabbix agent, SNMPv1, SNMPv2 or SNMPv3 discovery check.  |
| 13        | Host template               | equals,<br>does not equal  | Linked template ID.   |
| 16        | Problem is suppressed       | Yes, No  | No value required: using the "Yes" operator means that problem must be suppressed, "No" - not suppressed.   |
| 18        | Discovery rule              | equals,<br>does not equal  | ID of the discovery rule.   |
| 19        | Discovery check             | equals,<br>does not equal  | ID of the discovery check.  |
| 20        | Proxy                       | equals,<br>does not equal  | ID of the proxy.  |
| 21        | Discovery object            | equals   | Type of object that triggered the discovery event.<br><br>Possible values:<br>1 - discovered host;<br>2 - discovered service.   |
| 22        | Host name                   | contains,<br>does not contain,<br>matches,<br>does not match   | Host name.<br>Using a regular expression is supported for operators <i>matches</i> and <i>does not match</i> in autoregistration conditions.  |
| 23        | Event type                  | equals   | Specific internal event.<br><br>Possible values:<br>0 - item in "not supported" state;<br>1 - item in "normal" state;<br>2 - LLD rule in "not supported" state;<br>3 - LLD rule in "normal" state;<br>4 - trigger in "unknown" state;<br>5 - trigger in "normal" state. |
| 24        | Host metadata               | contains,<br>does not contain,<br>matches,<br>does not match   | Metadata of the auto-registered host.<br>Using a regular expression is supported for operators <i>matches</i> and <i>does not match</i> .   |
| 25        | Tag                         | equals,<br>does not equal,<br>contains,<br>does not contain  | Event tag.  |
| 26        | Tag value                   | equals,<br>does not equal,<br>contains,<br>does not contain  | Event tag value.  |
| 27        | Service                     | equals,<br>does not equal  | Service ID.   |
| 28        | Service name                | equals,<br>does not equal  | Service name.   |

## action.create

Description

`object action.create(object/array actions)`

This method allows to create new actions.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Actions to create.

Additionally to the [standard action properties](#), the method accepts the following parameters.

| Parameter           | Type   | Description  |
|---------------------|--------|--|
| filter              | object | Action <a href="#">filter</a> object for the action.                 |
| operations          | array  | Action <a href="#">operations</a> to create for the action.          |
| recovery_operations | array  | Action <a href="#">recovery operations</a> to create for the action. |
| update_operations   | array  | Action <a href="#">update operations</a> to create for the action.   |

Return values

(object) Returns an object containing the IDs of the created actions under the `actionids` property. The order of the returned IDs matches the order of the passed actions.

Examples

Create a trigger action

Create a trigger action that will begin once a trigger (with the word "memory" in its name) from host "10084" goes into a PROBLEM state. The action will have 4 configured operations. The first and immediate operation will send a message to all users in user group "7" via media type "1". If the event is not resolved in 30 minutes, the second operation will run [script "5"](#) (script with scope "Action operation") on all hosts in group "2". If the event is resolved, a recovery operation will notify all users who received any messages regarding the problem. If the event is updated, an acknowledge/update operation will notify (with a custom subject and message) all users who received any messages regarding the problem.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.create",
  "params": {
    "name": "Trigger action",
    "eventsources": 0,
    "esc_period": "30m",
    "filter": {
      "evaltype": 0,
      "conditions": [
        {
          "conditiontype": 1,
          "operator": 0,
          "value": "10084"
        },
        {
          "conditiontype": 3,
          "operator": 2,
          "value": "memory"
        }
      ]
    },
    "operations": [
      {
        "operationtype": 0,
        "esc_step_from": 1,
        "esc_step_to": 1,
        "opmessage_grp": [
```



```
}
```

Create a discovery action

Create a discovery action that will link discovered hosts to template "10001".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.create",
  "params": {
    "name": "Discovery action",
    "eventsources": 1,
    "filter": {
      "evaltype": 0,
      "conditions": [
        {
          "conditiontype": 21,
          "operator": 0,
          "value": "1"
        },
        {
          "conditiontype": 10,
          "operator": 0,
          "value": "2"
        }
      ]
    },
    "operations": [
      {
        "operationtype": 6,
        "optemplate": [
          {
            "templateid": "10001"
          }
        ]
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "actionids": [
      "18"
    ]
  },
  "id": 1
}
```

Using a custom expression filter

Create a trigger action that uses a custom expression - "A and (B or C)" - for evaluating action conditions. Once a trigger with a severity higher or equal to "Warning" from host "10084" or host "10106" goes into a PROBLEM state, the action will send a message to all users in user group "7" via media type "1". The formula IDs "A", "B" and "C" have been chosen arbitrarily.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.create",
```

```

"params": {
  "name": "Trigger action",
  "eventsourcesource": 0,
  "esc_period": "15m",
  "filter": {
    "evaltype": 3,
    "formula": "A and (B or C)",
    "conditions": [
      {
        "conditiontype": 4,
        "operator": 5,
        "value": "2",
        "formulaid": "A"
      },
      {
        "conditiontype": 1,
        "operator": 0,
        "value": "10084",
        "formulaid": "B"
      },
      {
        "conditiontype": 1,
        "operator": 0,
        "value": "10106",
        "formulaid": "C"
      }
    ]
  },
  "operations": [
    {
      "operationtype": 0,
      "esc_step_from": 1,
      "esc_step_to": 1,
      "opmessage_grp": [
        {
          "usrgrp": "7"
        }
      ],
      "opmessage": {
        "default_msg": 1,
        "mediatypeid": "1"
      }
    }
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "actionids": [
      "18"
    ]
  },
  "id": 1
}

```

Create agent autoregistration rule

Create an autoregistration action that adds a host to host group "2" when the host name contains "SRV" or metadata contains

"AlmaLinux".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.create",
  "params": {
    "name": "Register Linux servers",
    "eventsources": "2",
    "filter": {
      "evaltype": "2",
      "conditions": [
        {
          "conditiontype": "22",
          "operator": "2",
          "value": "SRV"
        },
        {
          "conditiontype": "24",
          "operator": "2",
          "value": "AlmaLinux"
        }
      ]
    },
    "operations": [
      {
        "operationtype": "4",
        "opgroup": [
          {
            "groupid": "2"
          }
        ]
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "actionids": [
      19
    ]
  },
  "id": 1
}
```

See also

- [Action filter](#)
- [Action operation](#)
- [Script](#)

Source

CAction::create() in *ui/include/classes/api/services/CAction.php*.

## **action.delete**

Description

object action.delete(array actionIds)

This method allows to delete actions.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the actions to delete.

Return values

(object) Returns an object containing the IDs of the deleted actions under the `actionids` property.

Examples

Delete multiple actions

Delete two actions.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.delete",
  "params": [
    "17",
    "18"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "actionids": [
      "17",
      "18"
    ]
  },
  "id": 1
}
```

Source

`Action::delete()` in `ui/include/classes/api/services/CAction.php`.

**action.get**

Description

`integer/array action.get(object parameters)`

The method allows to retrieve actions according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter                | Type         | Description  |
|--------------------------|--------------|--|
| actionids                | string/array | Return only actions with the given IDs.  |
| groupids                 | string/array | Return only actions that use the given host groups in action conditions.           |
| hostids                  | string/array | Return only actions that use the given hosts in action conditions.                 |
| triggerids               | string/array | Return only actions that use the given triggers in action conditions.              |
| mediatypeids             | string/array | Return only actions that use the given media types to send messages.               |
| usrgrpids                | string/array | Return only actions that are configured to send messages to the given user groups. |
| usersids                 | string/array | Return only actions that are configured to send messages to the given users.       |
| scriptids                | string/array | Return only actions that are configured to run the given scripts.                  |
| selectFilter             | query        | Return a <b>filter</b> property with the action condition filter.                  |
| selectOperations         | query        | Return an <b>operations</b> property with action operations.                       |
| selectRecoveryOperations | query        | Return a <b>recovery_operations</b> property with action recovery operations.      |
| selectUpdateOperations   | query        | Return an <b>update_operations</b> property with action update operations.         |
| sortfield                | string/array | Sort the result by the given properties.   |
|                          |              | Possible values are: actionid, name and status.                                    |
|                          |              | These parameters are described in the <b>reference commentary</b> .                |
| countOutput              | boolean      |  |
| excludeSearch            | boolean      |  |
| filter                   | object       |  |
| limit                    | integer      |  |
| output                   | query        |  |
| preservekeys             | boolean      |  |
| search                   | object       |  |
| searchByAny              | boolean      |  |
| searchWildcardsEnabled   | boolean      |  |
| sortorder                | string/array |  |
| startSearch              | boolean      |  |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieve trigger actions

Retrieve all configured trigger actions together with action conditions and operations.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "action.get",
  "params": {
    "output": "extend",
    "selectOperations": "extend",
    "selectRecoveryOperations": "extend",
    "selectUpdateOperations": "extend",
    "selectFilter": "extend",
    "filter": {
      "eventsources": 0
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
```



```

"result": [
  {
    "actionid": "3",
    "name": "Report problems to Zabbix administrators",
    "eventsources": "0",
    "status": "1",
    "esc_period": "1h",
    "pause_suppressed": "1",
    "filter": {
      "evaltype": "0",
      "formula": "",
      "conditions": [],
      "eval_formula": ""
    },
    "operations": [
      {
        "operationid": "3",
        "actionid": "3",
        "operationtype": "0",
        "esc_period": "0",
        "esc_step_from": "1",
        "esc_step_to": "1",
        "evaltype": "0",
        "opconditions": [],
        "opmessage": [
          {
            "default_msg": "1",
            "subject": "",
            "message": "",
            "mediatypeid" => "0"
          }
        ],
        "opmessage_grp": [
          {
            "usrgrpid": "7"
          }
        ]
      }
    ],
    "recovery_operations": [
      {
        "operationid": "7",
        "actionid": "3",
        "operationtype": "11",
        "evaltype": "0",
        "opconditions": [],
        "opmessage": {
          "default_msg": "0",
          "subject": "{TRIGGER.STATUS}: {TRIGGER.NAME}",
          "message": "Trigger: {TRIGGER.NAME}\r\nTrigger status: {TRIGGER.STATUS}\r\nTrigger",
          "mediatypeid": "0"
        }
      }
    ],
    "update_operations": [
      {
        "operationid": "31",
        "operationtype": "12",
        "evaltype": "0",
        "opmessage": {
          "default_msg": "1",
          "subject": "",

```

```

        "message": "",
        "mediatypeid": "0"
    },
    {
        "operationid": "32",
        "operationtype": "0",
        "evaltype": "0",
        "opmessage": {
            "default_msg": "0",
            "subject": "Updated: {TRIGGER.NAME}",
            "message": "{USER.FULLNAME} updated problem at {EVENT.UPDATE.DATE} {EVENT.UPDATE.TIME}",
            "mediatypeid": "1"
        },
        "opmessage_grp": [
            {
                "usrgrp": "7"
            }
        ],
        "opmessage_usr": []
    },
    {
        "operationid": "33",
        "operationtype": "1",
        "evaltype": "0",
        "opcommand": {
            "scriptid": "3"
        },
        "opcommand_hst": [
            {
                "hostid": "10084"
            }
        ],
        "opcommand_grp": []
    }
]
},
{
    "id": 1
}
}

```

#### Retrieve discovery actions

Retrieve all configured discovery actions together with action conditions and operations. The filter uses the "and" evaluation type, so the formula property is empty and eval\_formula is generated automatically.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "action.get",
    "params": {
        "output": "extend",
        "selectOperations": "extend",
        "selectFilter": "extend",
        "filter": {
            "eventsources": 1
        }
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "actionid": "2",
      "name": "Auto discovery. Linux servers.",
      "eventsources": "1",
      "status": "1",
      "esc_period": "0s",
      "pause_suppressed": "1",
      "filter": {
        "evaltype": "0",
        "formula": "",
        "conditions": [
          {
            "conditiontype": "10",
            "operator": "0",
            "value": "0",
            "value2": "",
            "formulaid": "B"
          },
          {
            "conditiontype": "8",
            "operator": "0",
            "value": "9",
            "value2": "",
            "formulaid": "C"
          },
          {
            "conditiontype": "12",
            "operator": "2",
            "value": "Linux",
            "value2": "",
            "formulaid": "A"
          }
        ],
        "eval_formula": "A and B and C"
      },
      "operations": [
        {
          "operationid": "1",
          "actionid": "2",
          "operationtype": "6",
          "esc_period": "0s",
          "esc_step_from": "1",
          "esc_step_to": "1",
          "evaltype": "0",
          "opconditions": [],
          "optemplate": [
            {
              "templateid": "10001"
            }
          ]
        },
        {
          "operationid": "2",
          "actionid": "2",
          "operationtype": "4",
          "esc_period": "0s",
          "esc_step_from": "1",
          "esc_step_to": "1",
          "evaltype": "0",

```

```

        "opconditions": [],
        "opgroup": [
            {
                "groupid": "2"
            }
        ]
    },
    ],
    "id": 1
}

```

See also

- [Action filter](#)
- [Action operation](#)

Source

CAction::get() in `ui/include/classes/api/services/CAction.php`.

## action.update

Description

object action.update(object/array actions)

This method allows to update existing actions.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Action properties to be updated.

The `actionid` property must be defined for each action, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard action properties](#), the method accepts the following parameters.

| Parameter           | Type   | Description   |
|---------------------|--------|---|
| filter              | object | Action <a href="#">filter</a> object to replace the current filter.                 |
| operations          | array  | Action <a href="#">operations</a> to replace existing operations.                   |
| recovery_operations | array  | Action <a href="#">recovery operations</a> to replace existing recovery operations. |
| update_operations   | array  | Action <a href="#">update operations</a> to replace existing update operations.     |

Return values

(object) Returns an object containing the IDs of the updated actions under the `actionids` property.

Examples

Disable action

Disable an action, that is, set its status to "1".

Request:

```

{
    "jsonrpc": "2.0",
    "method": "action.update",
    "params": {
        "actionid": "2",
        "status": "1"
    }
}

```

```

    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "actionids": [
      "2"
    ]
  },
  "id": 1
}

```

See also

- [Action filter](#)
- [Action operation](#)

Source

CAction::update() in *ui/include/classes/api/services/CAction.php*.

## Alert

This class is designed to work with alerts.

Object references:

- [Alert](#)

Available methods:

- [alert.get](#) - retrieve alerts

### > Alert object

The following objects are directly related to the alert API.

Alert

#### Note:

Alerts are created by the Zabbix server and cannot be modified via the API.

The alert object contains information about whether certain action operations have been executed successfully. It has the following properties.

| Property    | Type      | Description  |
|-------------|-----------|--|
| alertid     | string    | ID of the alert.   |
| actionid    | string    | ID of the action that generated the alert.                                 |
| alerttype   | integer   | Alert type.<br><br>Possible values:<br>0 - message;<br>1 - remote command. |
| clock       | timestamp | Time when the alert was generated.   |
| error       | string    | Error text if there are problems sending a message or running a command.   |
| esc_step    | integer   | Action escalation step during which the alert was generated.               |
| eventid     | string    | ID of the event that triggered the action.                                 |
| mediatypeid | string    | ID of the media type that was used to send the message.                    |

| Property      | Type    | Description   |
|---------------|---------|---|
| message       | text    | Message text. Used for message alerts.  |
| retries       | integer | Number of times Zabbix tried to send the message.   |
| sendto        | string  | Address, user name or other identifier of the recipient. Used for message alerts.   |
| status        | integer | Status indicating whether the action operation has been executed successfully.<br><br>Possible values for message alerts:<br>0 - message not sent.<br>1 - message sent.<br>2 - failed after a number of retries.<br>3 - new alert is not yet processed by alert manager.<br><br>Possible values for command alerts:<br>0 - command not run.<br>1 - command run.<br>2 - tried to run the command on the Zabbix agent but it was unavailable. |
| subject       | string  | Message subject. Used for message alerts.   |
| userid        | string  | ID of the user that the message was sent to.  |
| p_eventid     | string  | ID of problem event, which generated the alert.   |
| acknowledgeid | string  | ID of acknowledgment, which generated the alert.  |

## alert.get

### Description

integer/array alert.get(object parameters)

The method allows to retrieve alerts according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter    | Type         | Description   |
|--------------|--------------|---|
| alertids     | string/array | Return only alerts with the given IDs.  |
| actionids    | string/array | Return only alerts generated by the given actions.  |
| eventids     | string/array | Return only alerts generated by the given events.   |
| groupids     | string/array | Return only alerts generated by objects from the given host groups.   |
| hostids      | string/array | Return only alerts generated by objects from the given hosts.   |
| mediatypeids | string/array | Return only message alerts that used the given media types.   |
| objectids    | string/array | Return only alerts generated by the given objects   |
| userid       | string/array | Return only message alerts that were sent to the given users.   |
| eventobject  | integer      | Return only alerts generated by events related to objects of the given type.<br><br>See event <a href="#">"object"</a> for a list of supported object types.<br><br>Default: 0 - trigger. |
| eventsources | integer      | Return only alerts generated by events of the given type.<br><br>See event <a href="#">"source"</a> for a list of supported event types.<br><br>Default: 0 - trigger events.              |

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| time_from              | timestamp    | Return only alerts that have been generated after the given time.   |
| time_till              | timestamp    | Return only alerts that have been generated before the given time.  |
| selectHosts            | query        | Return a <b>hosts</b> property with data of hosts that triggered the action operation.  |
| selectMediatypes       | query        | Return a <b>mediatypes</b> property with an array of the media types that were used for the message alert.  |
| selectUsers            | query        | Return a <b>users</b> property with an array of the users that the message was addressed to.  |
| sortfield              | string/array | See <b>user.get</b> for restrictions based on user type.<br>Sort the result by the given properties.<br><br>Possible values are: alertid, clock, eventid, mediatypeid, sendto and status. |
| countOutput            | boolean      | These parameters are described in the <b>reference commentary</b> .   |
| editable               | boolean      |   |
| excludeSearch          | boolean      |   |
| filter                 | object       |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

#### Note:

In Zabbix 6.0.38, *Admin* and *User* type users may retrieve "message" (0) type alert data only about their own user.

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieve alerts by action ID

Retrieve all alerts generated by action "3".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "alert.get",
  "params": {
    "output": "extend",
    "actionids": "3"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "alertid": "1",
      "actionid": "3",
```

```

        "eventid": "21243",
        "userid": "1",
        "clock": "1362128008",
        "mediatypeid": "1",
        "sendto": "support@company.com",
        "subject": "PROBLEM: Zabbix agent on Linux server is unreachable for 5 minutes: ",
        "message": "Trigger: Zabbix agent on Linux server is unreachable for 5 minutes: \nTrigger stat
        "status": "0",
        "retries": "3",
        "error": "",
        "esc_step": "1",
        "alerttype": "0",
        "p_eventid": "0",
        "acknowledgeid": "0"
    }
],
    "id": 1
}

```

See also

- [Host](#)
- [Media type](#)
- [User](#)

Source

`CAAlert::get()` in `ui/include/classes/api/services/CAAlert.php`.

## API info

This class is designed to retrieve meta information about the API.

Available methods:

- [apiinfo.version](#) - retrieving the version of the Zabbix API

### apiinfo.version

Description

`string apiinfo.version(array)`

This method allows to retrieve the version of the Zabbix API.

#### Attention:

This method is only available to unauthenticated users and must be called without the `auth` parameter in the JSON-RPC request.

Parameters

(array) The method accepts an empty array.

Return values

(string) Returns the version of the Zabbix API.

#### Note:

Starting from Zabbix 2.0.4 the version of the API matches the version of Zabbix.

Examples

Retrieving the version of the API

Retrieve the version of the Zabbix API.

Request:



```
{
  "jsonrpc": "2.0",
  "method": "apiinfo.version",
  "params": [],
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": "4.0.0",
  "id": 1
}
```

Source

CAPInfo::version() in *ui/include/classes/api/services/CAPInfo.php*.

## Audit log

This class is designed to work with audit log.

Object references:

- [Audit log object](#)

Available methods:

- [auditlog.get](#) - retrieve audit log records

## > Audit log object

The following objects are directly related to the auditlog API.

Audit log

The audit log object contains information about user actions. It has the following properties.

| Property             | Type      | Description  |
|----------------------|-----------|--|
| auditid              | string    | ( <i>readonly</i> ) ID of audit log entry. Generated using CUID algorithm. |
| userid               | string    | Audit log entry author userid.   |
| username             | string    | Audit log entry author username.   |
| clock                | timestamp | Audit log entry creation timestamp.  |
| ip                   | string    | Audit log entry author IP address.   |
| action               | integer   | Audit log entry action.  |
| Possible values are: |           |  |
| 0 - Add;             |           |  |
| 1 - Update;          |           |  |
| 2 - Delete;          |           |  |
| 4 - Logout;          |           |  |
| 7 - Execute;         |           |  |
| 8 - Login;           |           |  |
| 9 - Failed login;    |           |  |
| 10 - History clear.  |           |  |

| Property     | Type    | Description   |
|--------------|---------|---|
| resourcetype | integer | <p>Audit log entry resource type.</p> <p>Possible values are:</p> <ul style="list-style-type: none"> <li>0 - User;</li> <li>3 - Media type;</li> <li>4 - Host;</li> <li>5 - Action;</li> <li>6 - Graph;</li> <li>11 - User group;</li> <li>13 - Trigger;</li> <li>14 - Host group;</li> <li>15 - Item;</li> <li>16 - Image;</li> <li>17 - Value map;</li> <li>18 - Service;</li> <li>19 - Map;</li> <li>22 - Web scenario;</li> <li>23 - Discovery rule;</li> <li>25 - Script;</li> <li>26 - Proxy;</li> <li>27 - Maintenance;</li> <li>28 - Regular expression;</li> <li>29 - Macro;</li> <li>30 - Template;</li> <li>31 - Trigger prototype;</li> <li>32 - Icon mapping;</li> <li>33 - Dashboard;</li> <li>34 - Event correlation;</li> <li>35 - Graph prototype;</li> <li>36 - Item prototype;</li> <li>37 - Host prototype;</li> <li>38 - Autoregistration;</li> <li>39 - Module;</li> <li>40 - Settings;</li> <li>41 - Housekeeping;</li> <li>42 - Authentication;</li> <li>43 - Template dashboard;</li> <li>44 - User role;</li> <li>45 - API token;</li> <li>46 - Scheduled report;</li> <li>47 - High availability node;</li> <li>48 - SLA.</li> </ul> |
| resourceid   | string  | Audit log entry resource identifier.  |
| resourceName | string  | Audit log entry resource human readable name.   |
| recordsetid  | string  | Audit log entry recordset ID. The audit log records created during the same operation will have the same recordset ID. Generated using CUID algorithm.  |
| details      | text    | <p>Audit log entry details. The details are stored as JSON object where each property name is a path to property or nested object in which change occurred, and each value contain the data about the change of this property in array format.</p> <p>Possible value formats are:</p> <ul style="list-style-type: none"> <li>["add"] - Nested object has been added;</li> <li>["add", "&lt;value&gt;"] - The property of added object contain &lt;value&gt;;</li> <li>["update"] - Nested object has been updated;</li> <li>["update", "&lt;new value&gt;", "&lt;old value&gt;"] - The value of property of updated object was changed from &lt;old value&gt; to &lt;new value&gt;;</li> <li>["delete"] - Nested object has been deleted.</li> </ul>  |

## auditlog.get

### Description

integer/array auditlog.get(object parameters)

The method allows to retrieve audit log records according to the given parameters.

#### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| auditids               | string/array | Return only audit log with the given IDs.  |
| userids                | string/array | Return only audit log that were created by the given users.  |
| time_from              | timestamp    | Returns only audit log entries that have been created after or at the given time.  |
| time_till              | timestamp    | Returns only audit log entries that have been created before or at the given time.   |
| sortfield              | string/array | Sort the result by the given properties.   |
| filter                 | object       | Possible values are: auditid, userid, clock.<br>Return only results that exactly match the given filter.   |
| search                 | object       | Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.<br>Case insensitive sub-string search in content of fields: username, ip, resourcename, details. |
| countOutput            | boolean      | These parameters are described in the <a href="#">reference commentary</a> .   |
| excludeSearch          | boolean      |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

### Examples

#### Retrieve audit log

Retrieve two latest audit log records.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "auditlog.get",
  "params": {
    "output": "extend",
    "sortfield": "clock",
    "sortorder": "DESC",
```

```

        "limit": 2
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "auditid": "cksstgfm0001yhdcc41y20q2",
      "userid": "1",
      "username": "Admin",
      "clock": "1629975715",
      "ip": "127.0.0.1",
      "action": "1",
      "resourcetype": "0",
      "resourceid": "0",
      "resourceName": "Jim",
      "recordsetid": "cksstgfa10000yhdcso67ond1",
      "details": "{\"user.name\": [\"update\", \"Jim\", \"\"], \"user.medias[37]\": [\"add\"], \"user.medias[38]\": [\"add\"]}"
    },
    {
      "auditid": "ckssofl0p0001yhdcqxclsg8r",
      "userid": "1",
      "username": "Admin",
      "clock": "1629967278",
      "ip": "127.0.0.1",
      "action": "0",
      "resourcetype": "0",
      "resourceid": "20",
      "resourceName": "John",
      "recordsetid": "ckssofl0p0000yhdcpxyo1jgo",
      "details": "{\"user.username\": [\"add\", \"John\"], \"user.userid\": [\"add\", \"20\"], \"user.usertype\": [\"add\", \"0\"]}"
    }
  ],
  "id": 1
}

```

See also

- [Audit log object](#)

Source

CAuditLog::get() in *ui/include/classes/api/services/CAuditLog.php*.

## Authentication

This class is designed to work with authentication settings.

Object references:

- [Authentication](#)

Available methods:

- [authentication.get](#) - retrieve authentication
- [authentication.update](#) - update authentication

## > Authentication object

The following objects are directly related to the authentication API.

### Authentication

The authentication object has the following properties.

| Property                | Type    | Description   |
|-------------------------|---------|---|
| authentication_type     | integer | Default authentication.<br><br>Possible values:<br>0 - <i>(default)</i> Internal;<br>1 - LDAP.                  |
| http_auth_enabled       | integer | Enable HTTP authentication.<br><br>Possible values:<br>0 - <i>(default)</i> Disable;<br>1 - Enable.             |
| http_login_form         | integer | Default login form.<br><br>Possible values:<br>0 - <i>(default)</i> Zabbix login form;<br>1 - HTTP login form.  |
| http_strip_domains      | string  | Remove domain name.   |
| http_case_sensitive     | integer | HTTP case-sensitive login.<br><br>Possible values:<br>0 - Off;<br>1 - <i>(default)</i> On.                      |
| ldap_configured         | integer | Enable LDAP authentication.<br><br>Possible values:<br>0 - Disable;<br>1 - <i>(default)</i> Enable.             |
| ldap_host               | string  | LDAP host.  |
| ldap_port               | integer | LDAP port.  |
| ldap_base_dn            | string  | LDAP base DN.   |
| ldap_search_attribute   | string  | LDAP search attribute.  |
| ldap_bind_dn            | string  | LDAP bind DN.   |
| ldap_case_sensitive     | integer | LDAP case-sensitive login.<br><br>Possible values:<br>0 - Off;<br>1 - <i>(default)</i> On.                      |
| ldap_bind_password      | string  | LDAP bind password.   |
| saml_auth_enabled       | integer | Enable SAML authentication.<br><br>Possible values:<br>0 - <i>(default)</i> Disable;<br>1 - Enable.             |
| saml_idp_entityid       | string  | SAML IdP entity ID.   |
| saml_sso_url            | string  | SAML SSO service URL.   |
| saml_slo_url            | string  | SAML SLO service URL.   |
| saml_username_attribute | string  | SAML username attribute.  |
| saml_sp_entityid        | string  | SAML SP entity ID.  |
| saml_nameid_format      | string  | SAML SP name ID format.   |
| saml_sign_messages      | integer | SAML sign messages.<br><br>Possible values:<br>0 - <i>(default)</i> Do not sign messages;<br>1 - Sign messages. |

| Property                   | Type    | Description  |
|----------------------------|---------|--|
| saml_sign_assertions       | integer | SAML sign assertions.<br><br>Possible values:<br>0 - ( <i>default</i> ) Do not sign assertions;<br>1 - Sign assertions.  |
| saml_sign_authn_requests   | integer | SAML sign AuthN requests.<br><br>Possible values:<br>0 - ( <i>default</i> ) Do not sign AuthN requests;<br>1 - Sign AuthN requests.  |
| saml_sign_logout_requests  | integer | SAML sign logout requests.<br><br>Possible values:<br>0 - ( <i>default</i> ) Do not sign logout requests;<br>1 - Sign logout requests.   |
| saml_sign_logout_responses | integer | SAML sign logout responses.<br><br>Possible values:<br>0 - ( <i>default</i> ) Do not sign logout responses;<br>1 - Sign logout responses.  |
| saml_encrypt_nameid        | integer | SAML encrypt name ID.<br><br>Possible values:<br>0 - ( <i>default</i> ) Do not encrypt name ID;<br>1 - Encrypt name ID.  |
| saml_encrypt_assertions    | integer | SAML encrypt assertions.<br><br>Possible values:<br>0 - ( <i>default</i> ) Do not encrypt assertions;<br>1 - Encrypt assertions.   |
| saml_case_sensitive        | integer | SAML case-sensitive login.<br><br>Possible values:<br>0 - Off;<br>1 - ( <i>default</i> ) On.   |
| passwd_min_length          | integer | Password minimal length requirement.<br><br>Possible range of values: 1-70<br>8 - <i>default</i>   |
| passwd_check_rules         | integer | Password checking rules.<br><br>Possible bitmap values are:<br>0 - Check password length;<br>1 - Check if password uses uppercase and lowercase Latin letters;<br>2 - Check if password uses digits;<br>4 - Check if password uses special characters;<br>8 - ( <i>default</i> ) Check if password is not in the list of commonly used passwords and does not contain derivations of word "Zabbix" or user's name, last name, or username.<br><br>This is a bitmask field; any sum of possible bitmap values is acceptable (for example, 15 for checking all rules). |

## authentication.get

### Description

`object authentication.get(object parameters)`

The method allows to retrieve authentication object according to the given parameters.

**Note:**

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters defining the desired output.

The method supports only one parameter.

| Parameter | Type  | Description   |
|-----------|-------|---|
| output    | query | This parameter is described in the <a href="#">reference commentary</a> . |

**Return values**

(object) Returns authentication object.

**Examples**

Request:

```
{
  "jsonrpc": "2.0",
  "method": "authentication.get",
  "params": {
    "output": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "authentication_type": "0",
    "http_auth_enabled": "0",
    "http_login_form": "0",
    "http_strip_domains": "",
    "http_case_sensitive": "1",
    "ldap_configured": "0",
    "ldap_host": "",
    "ldap_port": "389",
    "ldap_base_dn": "",
    "ldap_search_attribute": "",
    "ldap_bind_dn": "",
    "ldap_case_sensitive": "1",
    "ldap_bind_password": "",
    "saml_auth_enabled": "0",
    "saml_idp_entityid": "",
    "saml_sso_url": "",
    "saml_slo_url": "",
    "saml_username_attribute": "",
    "saml_sp_entityid": "",
    "saml_nameid_format": "",
    "saml_sign_messages": "0",
    "saml_sign_assertions": "0",
    "saml_sign_authn_requests": "0",
    "saml_sign_logout_requests": "0",
    "saml_sign_logout_responses": "0",
    "saml_encrypt_nameid": "0",
    "saml_encrypt_assertions": "0",
    "saml_case_sensitive": "0",
    "passwd_min_length": "8",
  }
}
```

```

        "passwd_check_rules": "8"
    },
    "id": 1
}

```

Source

CAuthentication::get() in *ui/include/classes/api/services/CAuthentication.php*.

## authentication.update

Description

`object authentication.update(object authentication)`

This method allows to update existing authentication settings.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Authentication properties to be updated.

Return values

(array) Returns array with the names of updated parameters.

Examples

Request:

```

{
    "jsonrpc": "2.0",
    "method": "authentication.update",
    "params": {
        "http_auth_enabled": 1,
        "http_case_sensitive": 0,
        "http_login_form": 1
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        "http_auth_enabled",
        "http_case_sensitive",
        "http_login_form"
    ],
    "id": 1
}

```

Source

CAuthentication::update() in *ui/include/classes/api/services/CAuthentication.php*.

## Autoregistration

This class is designed to work with autoregistration.

Object references:

- [Autoregistration](#)



Available methods:

- [autoregistration.get](#) - retrieve autoregistration
- [autoregistration.update](#) - update autoregistration

## > Autoregistration object

The following objects are directly related to the `autoregistration` API.

Autoregistration

The autoregistration object has the following properties.

| Property                      | Type    | Description  |
|-------------------------------|---------|--|
| <code>tls_accept</code>       | integer | Type of allowed incoming connections for autoregistration.<br><br>Possible values:<br>1 - allow unencrypted connections;<br>2 - allow TLS with PSK.<br>3 - allow both unencrypted and TLS with PSK connections.  |
| <code>tls_psk_identity</code> | string  | (write-only) PSK identity; must be paired with only one PSK (across <a href="#">autoregistration</a> , <a href="#">hosts</a> , and <a href="#">proxies</a> ).<br>Do not include sensitive information in the PSK identity, as it is sent unencrypted over the network to inform the receiver which PSK to use. |
| <code>tls_psk</code>          | string  | (write-only) Pre-shared key (PSK); must be at least 32 hex digits.   |

## `autoregistration.get`

Description

`object autoregistration.get(object parameters)`

The method allows to retrieve autoregistration object according to the given parameters.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports only one parameter.

| Parameter           | Type  | Description   |
|---------------------|-------|---|
| <code>output</code> | query | This parameter is described in the <a href="#">reference commentary</a> . |

Return values

(object) Returns autoregistration object.

Examples

Request:

```
{
  "jsonrpc": "2.0",
  "method": "autoregistration.get",
  "params": {
    "output": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "tls_accept": "3"
  },
  "id": 1
}
```

Source

CAutoregistration::get() in *ui/include/classes/api/services/CAutoregistration.php*.

## autoregistration.update

Description

object autoregistration.update(object autoregistration)

This method allows to update existing autoregistration.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Autoregistration properties to be updated.

Return values

(boolean ) Returns boolean true as result on successful update.

Examples

Request:

```
{
  "jsonrpc": "2.0",
  "method": "autoregistration.update",
  "params": {
    "tls_accept": "3",
    "tls_psk_identity": "PSK 001",
    "tls_psk": "11111595725ac58dd977beef14b97461a7c1045b9a1c923453302c5473193478"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": true,
  "id": 1
}
```

Source

CAutoregistration::update() in *ui/include/classes/api/services/CAutoregistration.php*.

## Configuration

This class is designed to export and import Zabbix configuration data.

Available methods:

- [configuration.export](#) - exporting the configuration

- `configuration.import` - importing the configuration
- `configuration.importcompare` - comparing import file with current system elements

## configuration.export

### Description

`string configuration.export(object parameters)`

This method allows to export configuration data as a serialized string.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the objects to be exported and the format to use.

| Parameter                    | Type    | Description   |
|------------------------------|---------|---|
| <b>format</b><br>(required)  | string  | Format in which the data must be exported.<br><br>Possible values:<br>yaml - YAML;<br>xml - XML;<br>json - JSON;<br>raw - unprocessed PHP array.  |
| prettyprint                  | boolean | Make the output more human readable by adding indentation.<br><br>Possible values:<br>true - add indentation;<br>false - (default) do not add indentation.  |
| <b>options</b><br>(required) | object  | Objects to be exported.<br><br>The options object has the following parameters:<br>groups - (array) IDs of host groups to export;<br>hosts - (array) IDs of hosts to export;<br>images - (array) IDs of images to export;<br>maps - (array) IDs of maps to export;<br>mediaTypes - (array) IDs of media types to export;<br>templates - (array) IDs of templates to export. |

### Return values

(string) Returns a serialized string containing the requested configuration data.

### Examples

#### Exporting a template

Export the configuration of template "10571" as an XML string.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "configuration.export",
  "params": {
    "options": {
      "templates": [
        "10571"
      ]
    },
    "format": "xml"
  }
}
```

```

    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": "<?xml version='1.0' encoding='UTF-8'?>\n<zabbix_export><version>6.0</version><date>2023-09-14 10:10:10</date><groups><group><name>Zabbix</name></group></groups><templates><template><name>Zabbix</name></template></templates></zabbix_export>\n",
  "id": 1
}

```

Source

CConfiguration::export() in *ui/include/classes/api/services/CConfiguration.php*.

## configuration.import

Description

`boolean configuration.import(object parameters)`

This method allows to import configuration data from a serialized string.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the data to import and rules how the data should be handled.

| Parameter                   | Type   | Description   |
|-----------------------------|--------|---|
| <b>format</b><br>(required) | string | Format of the serialized string.<br><br>Possible values:<br><code>yaml</code> - YAML;<br><code>xml</code> - XML;<br><code>json</code> - JSON. |
| <b>source</b><br>(required) | string | Serialized string containing the configuration data.  |
| <b>rules</b><br>(required)  | object | Rules on how new and existing objects should be imported.<br><br>The <code>rules</code> parameter is described in detail in the table below.  |

### Note:

If no rules are given, the configuration will not be updated.

The `rules` object supports the following parameters.

| Parameter                   | Type   | Description  |
|-----------------------------|--------|--|
| <code>discoveryRules</code> | object | Rules on how to import LLD rules.<br><br>Supported parameters:<br><code>createMissing</code> - (boolean) if set to true, new LLD rules will be created; default: false;<br><code>updateExisting</code> - (boolean) if set to true, existing LLD rules will be updated; default: false;<br><code>deleteMissing</code> - (boolean) if set to true, LLD rules not present in the imported data will be deleted from the database; default: false. |

| Parameter | Type   | Description  |
|-----------|--------|--|
| graphs    | object | <p>Rules on how to import graphs.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, new graphs will be created; default: false;<br/> updateExisting - (boolean) if set to true, existing graphs will be updated; default: false;<br/> deleteMissing - (boolean) if set to true, graphs not present in the imported data will be deleted from the database; default: false.</p>                             |
| groups    | object | <p>Rules on how to import host groups.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, new host groups will be created; default: false;<br/> updateExisting - (boolean) if set to true, existing host groups will be updated; default: false.</p>  |
| hosts     | object | <p>Rules on how to import hosts.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, new hosts will be created; default: false;<br/> updateExisting - (boolean) if set to true, existing hosts will be updated; default: false.</p>  |
| httptests | object | <p>Rules on how to import web scenarios.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, new web scenarios will be created; default: false;<br/> updateExisting - (boolean) if set to true, existing web scenarios will be updated; default: false;<br/> deleteMissing - (boolean) if set to true, web scenarios not present in the imported data will be deleted from the database; default: false.</p> |
| images    | object | <p>Rules on how to import images.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, new images will be created; default: false;<br/> updateExisting - (boolean) if set to true, existing images will be updated; default: false.</p>   |
| items     | object | <p>Rules on how to import items.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, new items will be created; default: false;<br/> updateExisting - (boolean) if set to true, existing items will be updated; default: false;<br/> deleteMissing - (boolean) if set to true, items not present in the imported data will be deleted from the database; default: false.</p>                                 |
| maps      | object | <p>Rules on how to import maps.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, new maps will be created; default: false;<br/> updateExisting - (boolean) if set to true, existing maps will be updated; default: false.</p>   |

| Parameter          | Type   | Description   |
|--------------------|--------|---|
| mediaTypes         | object | Rules on how to import media types.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new media types will be created; default: false;<br>updateExisting - (boolean) if set to true, existing media types will be updated; default: false.  |
| templateLinkage    | object | Rules on how to import template links.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, templates that are not linked to the host or template being imported, but are present in the imported data, will be linked; default: false;<br>deleteMissing - (boolean) if set to true, templates that are linked to the host or template being imported, but are not present in the imported data, will be unlinked without removing entities (items, triggers, etc.) inherited from the unlinked templates; default: false. |
| templates          | object | Rules on how to import templates.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new templates will be created; default: false;<br>updateExisting - (boolean) if set to true, existing templates will be updated; default: false.  |
| templateDashboards | object | Rules on how to import template dashboards.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new template dashboards will be created; default: false;<br>updateExisting - (boolean) if set to true, existing template dashboards will be updated; default: false;<br>deleteMissing - (boolean) if set to true, template dashboards not present in the imported data will be deleted from the database; default: false.   |
| triggers           | object | Rules on how to import triggers.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new triggers will be created; default: false;<br>updateExisting - (boolean) if set to true, existing triggers will be updated; default: false;<br>deleteMissing - (boolean) if set to true, triggers not present in the imported data will be deleted from the database; default: false.   |
| valueMaps          | object | Rules on how to import host or template value maps.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new value maps will be created; default: false;<br>updateExisting - (boolean) if set to true, existing value maps will be updated; default: false;<br>deleteMissing - (boolean) if set to true, value maps not present in the imported data will be deleted from the database; default: false.  |

#### Return values

(boolean) Returns true if importing has been successful.

#### Examples

##### Importing a template

Import the template configuration contained in the XML string. If any items or triggers in the XML string are missing, they will be deleted from the database, and everything else will be left unchanged.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "configuration.import",
  "params": {
    "format": "xml",
    "rules": {
      "templates": {
        "createMissing": true,
        "updateExisting": true
      },
      "items": {
        "createMissing": true,
        "updateExisting": true,
        "deleteMissing": true
      },
      "triggers": {
        "createMissing": true,
        "updateExisting": true,
        "deleteMissing": true
      },
      "valueMaps": {
        "createMissing": true,
        "updateExisting": false
      }
    },
    "source": "<?xml version='1.0' encoding='UTF-8'?>\n<zabbix_export><version>6.0</version><date>"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": true,
  "id": 1
}
```

Source

CConfiguration::import() in ui/include/classes/api/services/CConfiguration.php.

### configuration.importcompare

Description

array configuration.importcompare(object parameters)

This method allows to compare import file with current system elements and shows what will be changed if this import file will be imported.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the possible data to import and rules how the data should be handled.

| Parameter                   | Type   | Description   |
|-----------------------------|--------|---|
| <b>format</b><br>(required) | string | Format of the serialized string.<br><br>Possible values:<br>yaml - YAML;<br>xml - XML;<br>json - JSON.                          |
| <b>source</b><br>(required) | string | Serialized string containing the configuration data.  |
| <b>rules</b><br>(required)  | object | Rules on how new and existing objects should be imported.<br><br>The rules parameter is described in detail in the table below. |

**Note:**

If no rules are given, there will be nothing to update and result will be empty.

**Note:**

Comparison will be done only for host groups and templates. Triggers and graphs will be compared only for imported templates, any other will be considered as "new".

The rules object supports the following parameters.

| Parameter      | Type   | Description   |
|----------------|--------|---|
| discoveryRules | object | Rules on how to import LLD rules.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new LLD rules will be created; default: false;<br>updateExisting - (boolean) if set to true, existing LLD rules will be updated; default: false;<br>deleteMissing - (boolean) if set to true, LLD rules not present in the imported data will be deleted from the database; default: false. |
| graphs         | object | Rules on how to import graphs.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new graphs will be created; default: false;<br>updateExisting - (boolean) if set to true, existing graphs will be updated; default: false;<br>deleteMissing - (boolean) if set to true, graphs not present in the imported data will be deleted from the database; default: false.             |
| groups         | object | Rules on how to import host groups.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new host groups will be created; default: false;<br>updateExisting - (boolean) if set to true, existing host groups will be updated; default: false.  |
| hosts          | object | Rules on how to import hosts.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new hosts will be created; default: false;<br>updateExisting - (boolean) if set to true, existing hosts will be updated; default: false.<br><br>This parameter will make no difference to the output. It is allowed only for consistency with configuration.import.                             |



| Parameter       | Type   | Description  |
|-----------------|--------|--|
| httpTests       | object | <p>Rules on how to import web scenarios.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, new web scenarios will be created; default: false;<br/> updateExisting - (boolean) if set to true, existing web scenarios will be updated; default: false;<br/> deleteMissing - (boolean) if set to true, web scenarios not present in the imported data will be deleted from the database; default: false.</p>   |
| images          | object | <p>Rules on how to import images.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, new images will be created; default: false;<br/> updateExisting - (boolean) if set to true, existing images will be updated; default: false.</p>   |
| items           | object | <p>This parameter will make no difference to the output. It is allowed only for consistency with <code>configuration.import</code>.</p> <p>Rules on how to import items.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, new items will be created; default: false;<br/> updateExisting - (boolean) if set to true, existing items will be updated; default: false;<br/> deleteMissing - (boolean) if set to true, items not present in the imported data will be deleted from the database; default: false.</p>   |
| maps            | object | <p>Rules on how to import maps.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, new maps will be created; default: false;<br/> updateExisting - (boolean) if set to true, existing maps will be updated; default: false.</p>   |
| mediaTypes      | object | <p>This parameter will make no difference to the output. It is allowed only for consistency with <code>configuration.import</code>.</p> <p>Rules on how to import media types.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, new media types will be created; default: false;<br/> updateExisting - (boolean) if set to true, existing media types will be updated; default: false.</p>  |
| templateLinkage | object | <p>This parameter will make no difference to the output. It is allowed only for consistency with <code>configuration.import</code>.</p> <p>Rules on how to import template links.</p> <p>Supported parameters:<br/> createMissing - (boolean) if set to true, templates that are not linked to the host or template being imported, but are present in the imported data, will be linked; default: false;<br/> deleteMissing - (boolean) if set to true, templates that are linked to the host or template being imported, but are not present in the imported data, will be unlinked without removing entities (items, triggers, etc.) inherited from the unlinked templates; default: false.</p> |

| Parameter          | Type   | Description   |
|--------------------|--------|---|
| templates          | object | Rules on how to import templates.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new templates will be created; default: false;<br>updateExisting - (boolean) if set to true, existing templates will be updated; default: false.  |
| templateDashboards | object | Rules on how to import template dashboards.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new template dashboards will be created; default: false;<br>updateExisting - (boolean) if set to true, existing template dashboards will be updated; default: false;<br>deleteMissing - (boolean) if set to true, template dashboards not present in the imported data will be deleted from the database; default: false. |
| triggers           | object | Rules on how to import triggers.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new triggers will be created; default: false;<br>updateExisting - (boolean) if set to true, existing triggers will be updated; default: false;<br>deleteMissing - (boolean) if set to true, triggers not present in the imported data will be deleted from the database; default: false.   |
| valueMaps          | object | Rules on how to import host or template value maps.<br><br>Supported parameters:<br>createMissing - (boolean) if set to true, new value maps will be created; default: false;<br>updateExisting - (boolean) if set to true, existing value maps will be updated; default: false;<br>deleteMissing - (boolean) if set to true, value maps not present in the imported data will be deleted from the database; default: false.                    |

#### Return values

(array) Returns an array with changes in configuration, that will be made.

#### Examples

##### Comparing the import of a template

Compare the template contained in the XML string to the current system elements, and show what will be changed if this template will be imported.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "configuration.importcompare",
  "params": {
    "format": "xml",
    "rules": {
      "discoveryRules": {
        "createMissing": true,
        "updateExisting": true,
        "deleteMissing": true
      },
      "graphs": {
        "createMissing": true,
        "updateExisting": true,
        "deleteMissing": true
      }
    }
  }
}
```

```

    },
    "groups": {
      "createMissing": true,
      "updateExisting": true
    },
    "httptests": {
      "createMissing": true,
      "updateExisting": true,
      "deleteMissing": true
    },
    "items": {
      "createMissing": true,
      "updateExisting": true,
      "deleteMissing": true
    },
    "templateLinkage": {
      "createMissing": true,
      "deleteMissing": true
    },
    "templates": {
      "createMissing": true,
      "updateExisting": true
    },
    "templateDashboards": {
      "createMissing": true,
      "updateExisting": true,
      "deleteMissing": true
    },
    "triggers": {
      "createMissing": true,
      "updateExisting": true,
      "deleteMissing": true
    },
    "valueMaps": {
      "createMissing": true,
      "updateExisting": true,
      "deleteMissing": true
    }
  },
  "source": "<?xml version=\"1.0\" encoding=\"UTF-8\"?>\n<zabbix_export><version>6.0</version><date>
",
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "templates": {
      "updated": [
        {
          "before": {
            "uuid": "5aef0444a82a4d8cb7a95dc4c0c85330",
            "template": "New template",
            "name": "New template"
          },
          "after": {
            "uuid": "5aef0444a82a4d8cb7a95dc4c0c85330",
            "template": "New template",
            "name": "New template"
          }
        }
      ]
    }
  }
}

```

```

"items": {
  "added": [
    {
      "after": {
        "uuid": "648006da5971424ead0c47ddbfb1ea2e",
        "name": "CPU utilization",
        "key": "system.cpu.util",
        "value_type": "FLOAT",
        "units": "%"
      },
      "triggers": {
        "added": [
          {
            "after": {
              "uuid": "736225012c534ec480c2a66a91322ce0",
              "expression": "avg(/New template/system.cpu.util,3m)>70",
              "name": "CPU utilization too high on 'New host' for 3 minutes",
              "priority": "WARNING"
            }
          }
        ]
      }
    }
  ],
  "removed": [
    {
      "before": {
        "uuid": "6805d4c39a624a8bab2cc8ab63df1ab3",
        "name": "CPU load",
        "key": "system.cpu.load",
        "value_type": "FLOAT"
      },
      "triggers": {
        "removed": [
          {
            "before": {
              "uuid": "ab4c2526c2bc42e48a633082255ebcb3",
              "expression": "avg(/New template/system.cpu.load,3m)>2",
              "name": "CPU load too high on 'New host' for 3 minutes",
              "priority": "WARNING"
            }
          }
        ]
      }
    }
  ],
  "updated": [
    {
      "before": {
        "uuid": "7f1e6f1e48aa4a128e5b6a958a5d11c3",
        "name": "Zabbix agent ping",
        "key": "agent.ping"
      },
      "after": {
        "uuid": "7f1e6f1e48aa4a128e5b6a958a5d11c3",
        "name": "Zabbix agent ping",
        "key": "agent.ping",
        "delay": "3m"
      }
    }
  ]
}

```

```

    }
  ],
  "id": 1
}

```

Source

CConfiguration::importcompare() in *ui/include/classes/api/services/CConfiguration.php*.

## Correlation

This class is designed to work with correlations.

Object references:

- [Correlation](#)

Available methods:

- [correlation.create](#) - creating new correlations
- [correlation.delete](#) - deleting correlations
- [correlation.get](#) - retrieving correlations
- [correlation.update](#) - updating correlations

## > Correlation object

The following objects are directly related to the `correlation` API.

Correlation

The correlation object has the following properties.

| Property                  | Type    | Description   |
|---------------------------|---------|---|
| correlationid             | string  | ( <i>readonly</i> ) ID of the correlation.  |
| <b>name</b><br>(required) | string  | Name of the correlation.  |
| description               | string  | Description of the correlation.   |
| status                    | integer | Whether the correlation is enabled or disabled.<br><br>Possible values are:<br>0 - ( <i>default</i> ) enabled;<br>1 - disabled. |

Note that for some methods (update, delete) the required/optional parameter combination is different.

Correlation operation

The correlation operation object defines an operation that will be performed when a correlation is executed. It has the following properties.

| Property                  | Type    | Description   |
|---------------------------|---------|---|
| <b>type</b><br>(required) | integer | Type of operation.<br><br>Possible values:<br>0 - close old events;<br>1 - close new event. |

Correlation filter

The correlation filter object defines a set of conditions that must be met to perform the configured correlation operations. It has the following properties.

| Property                        | Type    | Description  |
|---------------------------------|---------|--|
| <b>evaltype</b><br>(required)   | integer | Filter condition evaluation method.<br><br>Possible values:<br>0 - and/or;<br>1 - and;<br>2 - or;<br>3 - custom expression.  |
| <b>conditions</b><br>(required) | array   | Set of filter conditions to use for filtering results.   |
| eval_formula                    | string  | <i>(readonly)</i> Generated expression that will be used for evaluating filter conditions. The expression contains IDs that reference specific filter conditions by its <code>formulaid</code> . The value of <code>eval_formula</code> is equal to the value of <code>formula</code> for filters with a custom expression.  |
| formula                         | string  | User-defined expression to be used for evaluating conditions of filters with a custom expression. The expression must contain IDs that reference specific filter conditions by its <code>formulaid</code> . The IDs used in the expression must exactly match the ones defined in the filter conditions: no condition can remain unused or omitted.<br><br>Required for custom expression filters. |

#### Correlation filter condition

The correlation filter condition object defines a specific condition that must be checked before running the correlation operations.

| Property                  | Type    | Description  |
|---------------------------|---------|--|
| <b>type</b><br>(required) | integer | Type of condition.<br><br>Possible values:<br>0 - old event tag;<br>1 - new event tag;<br>2 - new event host group;<br>3 - event tag pair;<br>4 - old event tag value;<br>5 - new event tag value.   |
| tag                       | string  | Event tag (old or new). Required when type of condition is: 0, 1, 4, 5.  |
| groupid                   | string  | Host group ID. Required when type of condition is: 2.  |
| oldtag                    | string  | Old event tag. Required when type of condition is: 3.  |
| newtag                    | string  | New event tag. Required when type of condition is: 3.  |
| value                     | string  | Event tag (old or new) value. Required when type of condition is: 4, 5.  |
| formulaid                 | string  | Arbitrary unique ID that is used to reference the condition from a custom expression. Can only contain capital-case letters. The ID must be defined by the user when modifying filter conditions, but will be generated anew when requesting them afterward. |
| operator                  | integer | Condition operator.<br><br>Required when type of condition is: 2, 4, 5.  |

#### Note:

To better understand how to use filters with various types of expressions, see examples on the [correlation.get](#) and [correlation.create](#) method pages.

The following operators and values are supported for each condition type.

| Condition | Condition name      | Supported operators   | Expected value |
|-----------|---------------------|-----------------------|----------------|
| 2         | Host group          | =, <>                 | Host group ID. |
| 4         | Old event tag value | =, <>, like, not like | string         |
| 5         | New event tag value | =, <>, like, not like | string         |

## correlation.create

### Description

object correlation.create(object/array correlations)

This method allows to create new correlations.

#### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Correlations to create.

Additionally to the [standard correlation properties](#), the method accepts the following parameters.

| Parameter                       | Type   | Description  |
|---------------------------------|--------|--|
| <b>operations</b><br>(required) | array  | Correlation <b>operations</b> to create for the correlation. |
| <b>filter</b><br>(required)     | object | Correlation <b>filter</b> object for the correlation.        |

### Return values

(object) Returns an object containing the IDs of the created correlations under the `correlationids` property. The order of the returned IDs matches the order of the passed correlations.

### Examples

#### Create a new event tag correlation

Create a correlation using evaluation method AND/OR with one condition and one operation. By default the correlation will be enabled.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "correlation.create",
  "params": {
    "name": "new event tag correlation",
    "filter": {
      "evaltype": 0,
      "conditions": [
        {
          "type": 1,
          "tag": "ok"
        }
      ]
    },
    "operations": [
      {
        "type": 0
      }
    ]
  },
  "auth": "343baad4f88b4106b9b5961e77437688",
}
```

```
    "id": 1
  }
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "correlationids": [
      "1"
    ]
  },
  "id": 1
}
```

Using a custom expression filter

Create a correlation that will use a custom filter condition. The formula IDs "A" or "B" have been chosen arbitrarily. Condition type will be "Host group" with operator "<>".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "correlation.create",
  "params": {
    "name": "new host group correlation",
    "description": "a custom description",
    "status": 0,
    "filter": {
      "evaltype": 3,
      "formula": "A or B",
      "conditions": [
        {
          "type": 2,
          "operator": 1,
          "formulaid": "A"
        },
        {
          "type": 2,
          "operator": 1,
          "formulaid": "B"
        }
      ]
    },
    "operations": [
      {
        "type": 1
      }
    ]
  },
  "auth": "343baad4f88b4106b9b5961e77437688",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "correlationids": [
      "2"
    ]
  },
  "id": 1
}
```



See also

- [Correlation filter](#)
- [Correlation operation](#)

Source

CCorrelation::create() in *ui/include/classes/api/services/CCorrelation.php*.

## correlation.delete

Description

object correlation.delete(array correlationids)

This method allows to delete correlations.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the correlations to delete.

Return values

(object) Returns an object containing the IDs of the deleted correlations under the `correlationids` property.

Example

Delete multiple correlations

Delete two correlations.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "correlation.delete",
  "params": [
    "1",
    "2"
  ],
  "auth": "343baad4f88b4106b9b5961e77437688",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "correlationids": [
      "1",
      "2"
    ]
  },
  "id": 1
}
```

Source

CCorrelation::delete() in *ui/include/classes/api/services/CCorrelation.php*.

## correlation.get

Description

integer/array correlation.get(object parameters)

The method allows to retrieve correlations according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter  | Type         | Description   |
|--|--------------|---|
| correlationids   | string/array | Return only correlations with the given IDs.                          |
| selectFilter   | query        | Return a <b>filter</b> property with the correlation conditions.      |
| selectOperations   | query        | Return an <b>operations</b> property with the correlation operations. |
| sortfield  | string/array | Sort the result by the given properties.                              |
| Possible values are: correlationid, name and status.<br>These parameters are described in the <a href="#">reference commentary</a> . |              |   |
| countOutput  | boolean      |   |
| editable   | boolean      |   |
| excludeSearch  | boolean      |   |
| filter   | object       |   |
| limit  | integer      |   |
| output   | query        |   |
| preservekeys   | boolean      |   |
| search   | object       |   |
| searchByAny  | boolean      |   |
| searchWildcardsEnabled   | boolean      |   |
| sortorder  | string/array |   |
| startSearch  | boolean      |   |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

##### Retrieve correlations

Retrieve all configured correlations together with correlation conditions and operations. The filter uses the "and/or" evaluation type, so the `formula` property is empty and `eval_formula` is generated automatically.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "correlation.get",
  "params": {
    "output": "extend",
    "selectOperations": "extend",
    "selectFilter": "extend"
  },
  "auth": "343baad4f88b4106b9b5961e77437688",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "correlationid": "1",
```

```

        "name": "Correlation 1",
        "description": "",
        "status": "0",
        "filter": {
            "evaltype": "0",
            "formula": "",
            "conditions": [
                {
                    "type": "3",
                    "oldtag": "error",
                    "newtag": "ok",
                    "formulaid": "A"
                }
            ],
            "eval_formula": "A"
        },
        "operations": [
            {
                "type": "0"
            }
        ]
    },
    "id": 1
}

```

See also

- [Correlation filter](#)
- [Correlation operation](#)

Source

CCorrelation::get() in *ui/include/classes/api/services/CCorrelation.php*.

## correlation.update

Description

object correlation.update(object/array correlations)

This method allows to update existing correlations.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Correlation properties to be updated.

The `correlationid` property must be defined for each correlation, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard correlation properties](#), the method accepts the following parameters.

| Parameter  | Type   | Description  |
|------------|--------|--|
| filter     | object | Correlation <a href="#">filter</a> object to replace the current filter. |
| operations | array  | Correlation <a href="#">operations</a> to replace existing operations.   |

Return values

(object) Returns an object containing the IDs of the updated correlations under the `correlationids` property.

Examples

## Disable correlation

Request:

```
{
  "jsonrpc": "2.0",
  "method": "correlation.update",
  "params": {
    "correlationid": "1",
    "status": "1"
  },
  "auth": "343baad4f88b4106b9b5961e77437688",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "correlationids": [
      "1"
    ]
  },
  "id": 1
}
```

## Replace conditions, but keep the evaluation method

Request:

```
{
  "jsonrpc": "2.0",
  "method": "correlation.update",
  "params": {
    "correlationid": "1",
    "filter": {
      "conditions": [
        {
          "type": 3,
          "oldtag": "error",
          "newtag": "ok"
        }
      ]
    }
  },
  "auth": "343baad4f88b4106b9b5961e77437688",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "correlationids": [
      "1"
    ]
  },
  "id": 1
}
```

See also

- [Correlation filter](#)
- [Correlation operation](#)

Source

CCorrelation::update() in ui/include/classes/api/services/CCorrelation.php.

## Dashboard

This class is designed to work with dashboards.

Object references:

- [Dashboard](#)
- [Dashboard page](#)
- [Dashboard widget](#)
- [Dashboard widget field](#)
- [Dashboard user](#)
- [Dashboard user group](#)

Available methods:

- [dashboard.create](#) - creating new dashboards
- [dashboard.delete](#) - deleting dashboards
- [dashboard.get](#) - retrieving dashboards
- [dashboard.update](#) - updating dashboards

### > Dashboard object

The following objects are directly related to the dashboard API.

Dashboard

The dashboard object has the following properties.

| Property           | Type    | Description  |
|--------------------|---------|--|
| dashboardid        | string  | (readonly) ID of the dashboard.  |
| name<br>(required) | string  | Name of the dashboard.   |
| userid             | string  | Dashboard owner user ID.   |
| private            | integer | Type of dashboard sharing.<br><br>Possible values:<br>0 - public dashboard;<br>1 - (default) private dashboard.                          |
| display_period     | integer | Default page display period (in seconds).<br><br>Possible values: 10, 30, 60, 120, 600, 1800, 3600.                                      |
| auto_start         | integer | Default: 30.<br>Auto start slideshow.<br><br>Possible values:<br>0 - do not auto start slideshow;<br>1 - (default) auto start slideshow. |

Note that for some methods (update, delete) the required/optional parameter combination is different.

Dashboard page

The dashboard page object has the following properties.

| Property         | Type   | Description  |
|------------------|--------|--|
| dashboard_pageid | string | (readonly) ID of the dashboard page.               |
| name             | string | Dashboard page name.<br><br>Default: empty string. |

| Property       | Type    | Description  |
|----------------|---------|--|
| display_period | integer | Dashboard page display period (in seconds).<br><br>Possible values: 0, 10, 30, 60, 120, 600, 1800, 3600.<br><br>Default: 0 (will use the default page display period). |
| widgets        | array   | Array of the <b>dashboard widget</b> objects.  |

## Dashboard widget

The dashboard widget object has the following properties.

| Property                  | Type    | Description   |
|---------------------------|---------|---|
| widgetid                  | string  | <i>(readonly)</i> ID of the dashboard widget.   |
| <b>type</b><br>(required) | string  | Type of the dashboard widget.<br><br>Possible values:<br>actionlog - Action log;<br>clock - Clock;<br><i>(deprecated)</i> dataover - Data overview;<br>discovery - Discovery status;<br>favgraphs - Favorite graphs;<br>favmaps - Favorite maps;<br>geomap - Geomap;<br>graph - Graph (classic);<br>graphprototype - Graph prototype;<br>hostavail - Host availability;<br>item - Item value;<br>map - Map;<br>navtree - Map Navigation Tree;<br>plaintext - Plain text;<br>problemhosts - Problem hosts;<br>problems - Problems;<br>problemsbysv - Problems by severity;<br>slareport - SLA report;<br>svggraph - Graph;<br>systeminfo - System information;<br>tophosts - Top hosts;<br>trigover - Trigger overview;<br>url - URL;<br>web - Web monitoring. |
| name                      | string  | Custom widget name.   |
| x                         | integer | A horizontal position from the left side of the dashboard.<br><br>Valid values range from 0 to 23.  |
| y                         | integer | A vertical position from the top of the dashboard.<br><br>Valid values range from 0 to 62.  |
| width                     | integer | The widget width.<br><br>Valid values range from 1 to 24.   |
| height                    | integer | The widget height.<br><br>Valid values range from 2 to 32.  |
| view_mode                 | integer | The widget view mode.<br><br>Possible values:<br>0 - <i>(default)</i> default widget view;<br>1 - with hidden header;   |

| Property | Type  | Description  |
|----------|-------|--|
| fields   | array | Array of the <a href="#">dashboard widget field</a> objects.                                       |
|          |       | Required for specific widgets; see individual widgets in <a href="#">Dashboard widget fields</a> . |

#### Dashboard widget field

The dashboard widget field object has the following properties.

| Property                   | Type    | Description   |
|----------------------------|---------|---|
| <b>type</b><br>(required)  | integer | Type of the widget field.<br><br>Possible values:<br>0 - Integer;<br>1 - String;<br>2 - Host group;<br>3 - Host;<br>4 - Item;<br>5 - Item prototype;<br>6 - Graph;<br>7 - Graph prototype;<br>8 - Map;<br>9 - Service;<br>10 - SLA. |
| <b>name</b><br>(required)  | string  | Widget field name.  |
| <b>value</b><br>(required) | mixed   | Possible values: see <a href="#">Dashboard widget fields</a> .<br>Widget field value depending on the type.<br><br>Possible values: see <a href="#">Dashboard widget fields</a> .   |

#### Dashboard user group

List of dashboard permissions based on user groups. It has the following properties.

| Property                        | Type    | Description  |
|---------------------------------|---------|--|
| <b>usrgrpid</b><br>(required)   | string  | User group ID.   |
| <b>permission</b><br>(required) | integer | Type of permission level.<br><br>Possible values:<br>2 - read only;<br>3 - read-write. |

#### Dashboard user

List of dashboard permissions based on users. It has the following properties.

| Property                        | Type    | Description  |
|---------------------------------|---------|--|
| <b>userid</b><br>(required)     | string  | User ID.   |
| <b>permission</b><br>(required) | integer | Type of permission level.<br><br>Possible values:<br>2 - read only;<br>3 - read-write. |

## Dashboard widget fields

This page contains navigation links for dashboard widget parameters and possible property values for the respective **dashboard widget field** objects.

To see the parameters and property values for each widget, go to individual widget pages for:

- [Action log](#)
- [Clock](#)
- [Discovery status](#)
- [Favorite graphs](#)
- [Favorite maps](#)
- [Geomap](#)
- [Graph](#)
- [Graph \(classic\)](#)
- [Graph prototype](#)
- [Host availability](#)
- [Item value](#)
- [Map](#)
- [Map navigation tree](#)
- [Plain text](#)
- [Problem hosts](#)
- [Problems](#)
- [SLA report](#)
- [System information](#)
- [Problems by severity](#)
- [Top hosts](#)
- [Trigger overview](#)
- [URL](#)
- [Web monitoring](#)

Deprecated widgets:

- [Data overview](#)

### Attention:

Deprecated widgets will be removed in the upcoming major release.

## 1 Action log

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the **Action log** widget in `dashboard.create` and `dashboard.update` methods.

### Parameters

The following parameters are supported for the **Action log** widget.

| Parameter               | type | name    | value  |
|-------------------------|------|---------|--|
| <i>Refresh interval</i> | 0    | rf_rate | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - <i>(default)</i> 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes. |



| Parameter       | type | name          | value  |
|-----------------|------|---------------|--|
| Sort entries by | 0    | sort_triggers | 3 - Time (ascending);<br>4 - (default) Time (descending);<br>5 - Type (ascending);<br>6 - Type (descending);<br>7 - Status (ascending);<br>8 - Status (descending);<br>11 - Recipient (ascending);<br>12 - Recipient (descending). |
| Show lines      | 0    | show_lines    | Valid values range from 1-100.<br><br>Default: 25.   |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Action log* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring an *Action log* widget

Configure an *Action log* widget that displays 10 entries of action operation details, sorted by time (in ascending order).

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "actionlog",
            "name": "Action log",
            "x": 0,
            "y": 0,
            "width": 12,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 0,
                "name": "show_lines",
                "value": 10
              },
              {
                "type": 0,
                "name": "sort_triggers",
                "value": 3
              }
            ]
          }
        ]
      }
    ]
  },
  "userGroups": [
    {
      "usrgrp_id": 7,
      "permission": 2
    }
  ],
}
```

```

    "users": [
      {
        "userid": 1,
        "permission": 3
      }
    ],
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
  }
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

## 2 Clock

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Clock* widget in `dashboard.create` and `dashboard.update` methods.

#### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Clock* widget, please refer to the parameter requirements outlined in the tables below.

### Parameters

The following parameters are supported for the *Clock* widget.

| Parameter               | type | name      | value   |
|-------------------------|------|-----------|---|
| <i>Refresh interval</i> | 0    | rf_rate   | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - (default) 15 minutes. |
| <i>Time type</i>        | 0    | time_type | 0 - (default) Local time;<br>1 - Server time;<br>2 - Host time.   |

The following parameters are supported if *Time type* is set to "Host time".

| Parameter                 | type | name   | value           |
|---------------------------|------|--------|-----------------|
| <b>Item</b><br>(required) | 4    | itemid | <b>Item</b> ID. |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Clock* widget. For more information on configuring a dashboard, see `dashboard.create`.

### Configuring a *Clock* widget

Configure a *Clock* widget that displays Zabbix server time.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "clock",
            "name": "Clock",
            "x": 0,
            "y": 0,
            "width": 4,
            "height": 3,
            "view_mode": 0,
            "fields": [
              {
                "type": 0,
                "name": "time_type",
                "value": 1
              }
            ]
          }
        ]
      }
    ],
    "userGroups": [
      {
        "usrgrpid": 7,
        "permission": 2
      }
    ],
    "users": [
      {
        "userid": 1,
        "permission": 3
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
```

```

    "result": {
      "dashboardids": [
        "3"
      ]
    },
    "id": 1
  }

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

### 3 Data overview

#### Attention:

This widget is deprecated and will be removed in the upcoming major release. Consider using the [Top hosts](#) widget instead.

#### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the [Data overview](#) widget in `dashboard.create` and `dashboard.update` methods.

#### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify [built-in widgets](#) and create [custom widgets](#), but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Data overview* widget, please refer to the parameter requirements outlined in the tables below.

#### Parameters

The following parameters are supported for the *Data overview* widget.

| Parameter               | type | name     | value  |
|-------------------------|------|----------|--|
| <i>Refresh interval</i> | 0    | rf_rate  | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - <i>(default)</i> 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes.   |
| <i>Host groups</i>      | 2    | groupids | <a href="#">Host group</a> ID.<br><br>Note: To configure multiple host groups, create a dashboard widget field object for each host group.   |
| <i>Hosts</i>            | 3    | hostids  | <a href="#">Host</a> ID.<br><br>Note: To configure multiple hosts, create a dashboard widget field object for each host. For multiple hosts, the parameter <i>Host groups</i> must either be not configured at all or configured with at least one host group that the configured hosts belong to. |

| Parameter  | type | name            | value   |
|--|------|-----------------|---|
| <i>Tags</i><br>(the number in the property name (e.g. tags.tag.0) references tag order in the tag evaluation list) |      |                 |   |
| <i>Evaluation type</i>   | 0    | evaltype        | 0 - (default) And/Or;<br>2 - Or.  |
| <i>Tag name</i>  | 1    | tags.tag.0      | Any string value.   |
| <i>Operator</i>  | 0    | tags.operator.0 | Parameter <i>Tag name</i> required if configuring <i>Tags</i> .<br>0 - Contains;<br>1 - Equals;<br>2 - Does not contain;<br>3 - Does not equal;<br>4 - Exists;<br>5 - Does not exist. |
| <i>Tag value</i>   | 1    | tags.value.0    | Parameter <i>Operator</i> required if configuring <i>Tags</i> .<br>Any string value.  |
| <i>Show suppressed problems</i>  | 0    | show_suppressed | Parameter <i>Tag value</i> required if configuring <i>Tags</i> .<br>0 - (default) Disabled;<br>1 - Enabled.   |
| <i>Hosts location</i>  | 0    | style           | 0 - (default) Left;<br>1 - Top.   |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Data overview* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring a *Data overview* widget

Configure a *Data overview* widget that displays data for host "10084" and only for items for which the tag with the name "component" contains value "cpu". In addition, display the data with hosts located on top.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "dataover",
            "name": "Data overview",
            "x": 0,
            "y": 0,
            "width": 12,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 3,
                "name": "hostids",
                "value": 10084
              },
              {
                "type": 1,
                "name": "tags.tag.0",
                "value": "component"
              },
              {
                "type": 0,
                "name": "tags.operator.0",
                "value": 0
              },
              {
                "type": 1,
                "name": "tags.value.0",
                "value": "cpu"
              },
              {
                "type": 0,
                "name": "style",
                "value": 1
              }
            ]
          }
        ]
      }
    ]
  },
  "userGroups": [
    {
      "usrgrpid": 7,
      "permission": 2
    }
  ],
  "users": [
    {
      "userid": 1,
      "permission": 3
    }
  ]
},

```

```

    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

#### 4 Discovery status

##### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Discovery status* widget in `dashboard.create` and `dashboard.update` methods.

##### Parameters

The following parameters are supported for the *Discovery status* widget.

| Parameter               | type | name    | value   |
|-------------------------|------|---------|---|
| <i>Refresh interval</i> | 0    | rf_rate | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - (default) 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes. |

##### Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Discovery status* widget. For more information on configuring a dashboard, see [dashboard.create](#).

##### Configuring *Discovery status* widget

Configure a *Discovery status* widget with the refresh interval set to 15 minutes.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "discovery",

```

```

        "name": "Discovery status",
        "x": 0,
        "y": 0,
        "width": 6,
        "height": 3,
        "view_mode": 0,
        "fields": [
            {
                "type": 0,
                "name": "rf_rate",
                "value": 900
            }
        ]
    },
    ],
    "userGroups": [
        {
            "usrgrpid": 7,
            "permission": 2
        }
    ],
    "users": [
        {
            "userid": 1,
            "permission": 3
        }
    ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "dashboardids": [
            "3"
        ]
    },
    "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

## 5 Favorite graphs

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Favorite graphs* widget in `dashboard.create` and `dashboard.update` methods.

### Parameters

The following parameters are supported for the *Favorite graphs* widget.



| Parameter               | type | name    | value  |
|-------------------------|------|---------|--|
| <i>Refresh interval</i> | 0    | rf_rate | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - ( <i>default</i> ) 15 minutes. |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Favorite graphs* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring a *Favorite graphs* widget

Configure a *Favorite graphs* widget with the refresh interval set to 10 minutes.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "favgraphs",
            "name": "Favorite graphs",
            "x": 0,
            "y": 0,
            "width": 4,
            "height": 3,
            "view_mode": 0,
            "fields": [
              {
                "type": 0,
                "name": "rf_rate",
                "value": 600
              }
            ]
          }
        ]
      }
    ],
    "userGroups": [
      {
        "usrgrpId": 7,
        "permission": 2
      }
    ],
    "users": [
      {
        "userid": 1,
        "permission": 3
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
}
```

```
    "id": 1
  }
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}
```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

## 6 Favorite maps

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Favorite maps* widget in `dashboard.create` and `dashboard.update` methods.

### Parameters

The following parameters are supported for the *Favorite maps* widget.

| Parameter               | type | name    | value   |
|-------------------------|------|---------|---|
| <i>Refresh interval</i> | 0    | rf_rate | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - (default) 15 minutes. |

### Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Favorite maps* widget. For more information on configuring a dashboard, see [dashboard.create](#).

#### Configuring a *Favorite maps* widget

Configure a *Favorite maps* widget with the refresh interval set to 10 minutes.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "favmaps",
            "name": "Favorite maps",
```

```

        "x": 0,
        "y": 0,
        "width": 4,
        "height": 3,
        "view_mode": 0,
        "fields": [
            {
                "type": 0,
                "name": "rf_rate",
                "value": 600
            }
        ]
    },
    ],
    "userGroups": [
        {
            "usrgrpid": 7,
            "permission": 2
        }
    ],
    "users": [
        {
            "userid": 1,
            "permission": 3
        }
    ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "dashboardids": [
            "3"
        ]
    },
    "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

7 Geomap

Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Geomap* widget in `dashboard.create` and `dashboard.update` methods.

**Attention:**

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Geomap* widget, please refer to the parameter requirements outlined in the tables below.

**Parameters**

The following parameters are supported for the *Geomap* widget.

| Parameter  | type | name       | value   |
|--|------|------------|---|
| <i>Refresh interval</i>  | 0    | rf_rate    | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - (default) 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes.   |
| <i>Host groups</i>   | 2    | groupids   | <b>Host group</b> ID.<br><br>Note: To configure multiple host groups, create a dashboard widget field object for each host group.   |
| <i>Hosts</i>   | 3    | hostids    | <b>Host</b> ID.<br><br>Note: To configure multiple hosts, create a dashboard widget field object for each host. For multiple hosts, the parameter <i>Host groups</i> must either be not configured at all or configured with at least one host group that the configured hosts belong to. |
| <i>Tags</i><br>(the number in the property name (e.g. tags.tag.0) references tag order in the tag evaluation list) |      |            |   |
| <i>Evaluation type</i>   | 0    | evaltype   | 0 - (default) And/Or;<br>2 - Or.  |
| <i>Tag name</i>  | 1    | tags.tag.0 | Any string value.   |

Parameter *Tag name* required if configuring *Tags*.

| Parameter           | type | name            | value   |
|---------------------|------|-----------------|---|
| <i>Operator</i>     | 0    | tags.operator.0 | 0 - Contains;<br>1 - Equals;<br>2 - Does not contain;<br>3 - Does not equal;<br>4 - Exists;<br>5 - Does not exist.  |
| <i>Tag value</i>    | 1    | tags.value.0    | Parameter <i>Operator</i> required if configuring <i>Tags</i> .<br>Any string value.  |
| <i>Initial view</i> | 1    | default_view    | Parameter <i>Tag value</i> required if configuring <i>Tags</i> .<br>Comma separated <i>latitude</i> , <i>longitude</i> , <i>zoom level</i> (optional, valid values range from 0-30).<br>Example: 40.6892494,-74.0466891,10. |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Geomap* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring a *Geomap* widget

Configure a *Geomap* widget that displays hosts from host groups "2" and "22" based on the following tag configuration: tag with the name "component" contains value "node", or tag with the name "location" equals value "New York". In addition, set the map initial view to coordinates "40.6892494" (latitude), "-74.0466891" (longitude) with the zoom level "10".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "geomap",
            "name": "Geomap",
            "x": 0,
            "y": 0,
            "width": 12,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 2,
                "name": "groupids",
                "value": 22
              },
              {
                "type": 2,
                "name": "groupids",
                "value": 2
              },
              {
                "type": 1,
                "name": "default_view",
                "value": "40.6892494,-74.0466891,10"
              }
            ]
          }
        ]
      }
    ]
  }
}
```

```

        "type": 0,
        "name": "evaltype",
        "value": 2
      },
      {
        "type": 1,
        "name": "tags.tag.0",
        "value": "component"
      },
      {
        "type": 0,
        "name": "tags.operator.0",
        "value": 0
      },
      {
        "type": 1,
        "name": "tags.value.0",
        "value": "node"
      },
      {
        "type": 1,
        "name": "tags.tag.1",
        "value": "location"
      },
      {
        "type": 0,
        "name": "tags.operator.1",
        "value": 1
      },
      {
        "type": 1,
        "name": "tags.value.1",
        "value": "New York"
      }
    ]
  },
  "userGroups": [
    {
      "usrgrpId": 7,
      "permission": 2
    }
  ],
  "users": [
    {
      "userId": 1,
      "permission": 3
    }
  ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  }
}

```

```

    ],
    },
    "id": 1
  }
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

## 8 Graph

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Graph* widget in `dashboard.create` and `dashboard.update` methods.

#### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Graph* widget, please refer to the parameter requirements outlined in the tables below.

### Parameters

The following parameters are supported for the *Graph* widget.

| Parameter               | type | name    | value  |
|-------------------------|------|---------|--|
| <i>Refresh interval</i> | 0    | rf_rate | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - <i>(default)</i> 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes. |

### Data set

The following parameters are supported for configuring a *Data set*.

#### Note:

The first number in the property name (e.g. `ds.hosts.0.0`, `ds.items.0.0`) represents the particular data set, while the second number, if present, represents the configured host or item.

| Parameter                         | type | name         | value   |
|-----------------------------------|------|--------------|---|
| <b>Host pattern</b><br>(required) | 1    | ds.hosts.0.0 | <b>Host</b> name or pattern (e.g. Zabbix*).   |
| <b>Item pattern</b><br>(required) | 1    | ds.items.0.0 | <b>Item</b> name or pattern (e.g. *: Number of processed *values per second).               |
| <i>Color</i>                      | 1    | ds.color.0   | Hexadecimal color code (e.g. FF0000).   |
| <i>Draw</i>                       | 0    | ds.type.0    | Default: FF465C.<br>0 - <i>(default)</i> Line;<br>1 - Points;<br>2 - Staircase;<br>3 - Bar. |

| Parameter                   | type | name                    | value  |
|-----------------------------|------|-------------------------|--|
| <i>Width</i>                | 0    | ds.width.0              | Valid values range from 1-10.<br><br>Default: 1.   |
| <i>Point size</i>           | 0    | ds.pointsize.0          | Parameter <i>Width</i> not available if <i>Draw</i> is set to "Points" or "Bar".<br>Valid values range from 1-10.<br><br>Default: 3.                     |
| <i>Transparency</i>         | 0    | ds.transparency.0       | Parameter <i>Point size</i> not available if <i>Draw</i> is set to "Line", "Staircase" or "Bar".<br>Valid values range from 1-10.<br><br>Default: 5.     |
| <i>Fill</i>                 | 0    | ds.fill.0               | Valid values range from 1-10.<br><br>Default: 3.   |
| <i>Missing data</i>         | 0    | ds.missingdatafunc.0    | Parameter <i>Fill</i> not available if <i>Draw</i> is set to "Points" or "Bar".<br>0 - (default) None;<br>1 - Connected;<br>2 - Treat as 0.              |
| <i>Y-axis</i>               | 0    | ds.axisy.0              | Parameter <i>Missing data</i> not available if <i>Draw</i> is set to "Points" or "Bar".<br>0 - (default) Left;<br>1 - Right.                             |
| <i>Time shift</i>           | 1    | ds.timeshift.0          | Valid time string (e.g. 3600, 1h, etc.).<br>You may use <b>time suffixes</b> . Negative values are also allowed.   |
| <i>Aggregation function</i> | 0    | ds.aggregate_function.0 | Default: "" (empty).<br>0 - (default) none;<br>1 - min;<br>2 - max;<br>3 - avg;<br>4 - count;<br>5 - sum;<br>6 - first;<br>7 - last.                     |
| <i>Aggregation interval</i> | 1    | ds.aggregate_interval.0 | Valid time string (e.g. 3600, 1h, etc.).<br>You may use <b>time suffixes</b> .   |
| <i>Aggregate</i>            | 0    | ds.aggregate_grouping.0 | Default: 1h.<br>0 (default) Each item;<br>1 - Data set.<br><br>Parameter <i>Aggregate</i> not available if <i>Aggregation function</i> is set to "none". |

#### Display options

The following parameters are supported for configuring *Display options*.

| Parameter                     | type | name   | value  |
|-------------------------------|------|--------|--|
| <i>History data selection</i> | 0    | source | 0 - (default) Auto;<br>1 - History;<br>2 - Trends. |

#### Time period

The following parameters are supported for configuring *Time period*.



| Parameter                     | type | name       | value   |
|-------------------------------|------|------------|---|
| <i>Set custom time period</i> | 0    | graph_time | 0 - (default) Disabled;<br>1 - Enabled.   |
| <i>From</i>                   | 1    | time_from  | Valid time string in format YYYY-MM-DD hh:mm:ss.<br><b>Relative time period</b> values (now, now/d, now/w-1w, etc.) are also supported.                           |
| <i>To</i>                     | 1    | time_to    | Default: now-1h.<br>Valid time string value in format YYYY-MM-DD hh:mm:ss.<br><b>Relative time period</b> values (now, now/d, now/w-1w, etc.) are also supported. |
|                               |      |            | Default: now.   |

## Axes

The following parameters are supported for configuring *Axes*.

| Parameter            | type | name                               | value   |
|----------------------|------|------------------------------------|---|
| <i>Left Y</i>        | 0    | lefty                              | 0 - Disabled;<br>1 - (default) Enabled.   |
| <i>Right Y</i>       | 0    | righty                             | Parameter available if Y-axis (in <i>Data set</i> configuration) is set to "Left".<br>0 - (default) Disabled;<br>1 - Enabled. |
| <i>Min</i>           | 1    | lefty_min                          | Parameter available if Y-axis (in <i>Data set</i> configuration) is set to "Right".<br>Any numeric value.                     |
| <i>Max</i>           | 1    | righty_min<br>lefty_max            | Default: "" (empty).<br>Any numeric value.  |
| <i>Units (type)</i>  | 0    | righty_max<br>lefty_units          | Default: "" (empty).<br>0 - (default) Auto;<br>1 - Static.  |
| <i>Units (value)</i> | 1    | righty_units<br>lefty_static_units | Any string value.   |
| <i>X-Axis</i>        | 0    | righty_static_units<br>xaxis       | Default: "" (empty).<br>0 - Disabled;<br>1 - (default) Enabled.   |

## Legend

The following parameters are supported for configuring *Legend*.

| Parameter             | type | name         | value                                   |
|-----------------------|------|--------------|---|
| <i>Show legend</i>    | 0    | legend       | 0 - Disabled;<br>1 - (default) Enabled. |
| <i>Number of rows</i> | 0    | legend_lines | Valid values range from 1-5.            |
|                       |      |              | Default: 1.                             |

## Problems

The following parameters are supported for configuring *Problems*.

| Parameter  | type | name                | value  |
|--|------|---------------------|--|
| <i>Show problems</i>   | 0    | show_problems       | 0 - (default) Disabled;<br>1 - Enabled.  |
| <i>Selected items only</i>   | 0    | graph_item_problems | 0 - Disabled;<br>1 - (default) Enabled.  |
| <i>Problem hosts</i>   | 1    | problemhosts.0      | Host name.<br><br>Note: The number in the property name references the configured host.<br>To configure multiple hosts, create a dashboard widget field object for each host.  |
| <i>Severity</i>  | 0    | severities          | 0 - Not classified;<br>1 - Information;<br>2 - Warning;<br>3 - Average;<br>4 - High;<br>5 - Disaster.<br><br>Default: empty (all enabled).   |
| <i>Problem Tags</i><br>(the number in the property name (e.g. tags.tag.0) references tag order in the tag evaluation list) | 1    | problem_name        | Note: To configure multiple values, create a dashboard widget field object for each value.<br>Problem <b>event name</b> (case insensitive, full name or part of it).   |
| <i>Evaluation type</i>   | 0    | evaltype            | 0 - (default) And/Or;<br>2 - Or.   |
| <i>Tag name</i>  | 1    | tags.tag.0          | Any string value.  |
| <i>Operator</i>  | 0    | tags.operator.0     | Parameter <i>Tag name</i> required if configuring <i>Tags</i> .<br>0 - Contains;<br>1 - Equals;<br>2 - Does not contain;<br>3 - Does not equal;<br>4 - Exists;<br>5 - Does not exist.<br><br>Parameter <i>Operator</i> required if configuring <i>Tags</i> . |

| Parameter  | type | name         | value             |
|--|------|--------------|-------------------|
| <i>Tag value</i>   | 1    | tags.value.0 | Any string value. |
| Parameter <i>Tag value</i> required if configuring <i>Tags</i> . |      |              |                   |

## Overrides

The following parameters are supported for configuring *Overrides*.

### Note:

The first number in the property name (e.g. or.hosts.0.0, or.items.0.0) represents the particular data set, while the second number, if present, represents the configured host or item.

| Parameter                         | type | name                 | value   |
|-----------------------------------|------|----------------------|---|
| <b>Host pattern</b><br>(required) | 1    | or.hosts.0.0         | <b>Host</b> name or pattern (e.g. Zabbix*).   |
| <b>Item pattern</b><br>(required) | 1    | or.items.0.0         | <b>Item</b> name or pattern (e.g. *: Number of processed *values per second).                               |
| <i>Base color</i>                 | 1    | or.color.0           | Hexadecimal color code (e.g. FF0000).   |
| <i>Width</i>                      | 0    | or.width.0           | Valid values range from 1-10.   |
| <i>Draw</i>                       | 0    | or.type.0            | 0 - Line;<br>1 - Points;<br>2 - Staircase;<br>3 - Bar.  |
| <i>Transparency</i>               | 0    | or.transparency.0    | Valid values range from 1-10.   |
| <i>Fill</i>                       | 0    | or.fill.0            | Valid values range from 1-10.   |
| <i>Point size</i>                 | 0    | or.pointsize.0       | Valid values range from 1-10.   |
| <i>Missing data</i>               | 0    | or.missingdatafunc.0 | 0 - None;<br>1 - Connected;<br>2 - Treat as 0.  |
| <i>Y-axis</i>                     | 0    | or.axisy.0           | 0 - Left;<br>1 - Right.   |
| <i>Time shift</i>                 | 1    | or.timeshift.0       | Valid time string (e.g. 3600, 1h, etc.).<br>You may use <b>time suffixes</b> . Negative values are allowed. |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Graph* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring a *Graph* widget

Configure a *Graph* widget in the following way:

- 4 data sets for a total of 9 items on 1 host.
- Each data set consists of a line that has a custom color, width, transparency, and fill.
- Data set 4 has a configured aggregation.
- Data in the graph are displayed for a time period of the last 3 hours.
- Problems in the graph are displayed only for the configured items.
- Graph has two Y axes of which the right Y axis displays values only for Data set 4.
- Graph legend displays configured items in 2 rows.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
```

```

"widgets": [
  {
    "type": "svggraph",
    "name": "Graph",
    "x": 0,
    "y": 0,
    "width": 12,
    "height": 5,
    "view_mode": 0,
    "fields": [
      {
        "type": 1,
        "name": "ds.hosts.0.0",
        "value": "Zabbix server"
      },
      {
        "type": 1,
        "name": "ds.items.0.0",
        "value": "Zabbix server: Utilization of poller data collector processes, i"
      },
      {
        "type": 1,
        "name": "ds.color.0",
        "value": "FF0000"
      },
      {
        "type": 0,
        "name": "ds.width.0",
        "value": 3
      },
      {
        "type": 0,
        "name": "ds.transparency.0",
        "value": 3
      },
      {
        "type": 0,
        "name": "ds.fill.0",
        "value": 1
      },
      {
        "type": 1,
        "name": "ds.hosts.1.0",
        "value": "Zabbix server"
      },
      {
        "type": 1,
        "name": "ds.items.1.0",
        "value": "Zabbix server: Utilization of trapper data collector processes, i"
      },
      {
        "type": 1,
        "name": "ds.color.1",
        "value": "BF00FF"
      },
      {
        "type": 0,
        "name": "ds.width.1",
        "value": 3
      },
      {
        "type": 0,

```

```

        "name": "ds.transparency.1",
        "value": 3
    },
    {
        "type": 0,
        "name": "ds.fill.1",
        "value": 1
    },
    {
        "type": 1,
        "name": "ds.hosts.2.0",
        "value": "Zabbix server"
    },
    {
        "type": 1,
        "name": "ds.items.2.0",
        "value": "Zabbix server: Utilization of history syncer internal processes,"
    },
    {
        "type": 1,
        "name": "ds.color.2",
        "value": "0040FF"
    },
    {
        "type": 0,
        "name": "ds.width.2",
        "value": 3
    },
    {
        "type": 0,
        "name": "ds.transparency.2",
        "value": 3
    },
    {
        "type": 0,
        "name": "ds.fill.2",
        "value": 1
    },
    {
        "type": 1,
        "name": "ds.hosts.3.0",
        "value": "Zabbix server"
    },
    {
        "type": 1,
        "name": "ds.items.3.0",
        "value": "*: Number of processed *values per second"
    },
    {
        "type": 1,
        "name": "ds.color.3",
        "value": "000000"
    },
    {
        "type": 0,
        "name": "ds.transparency.3",
        "value": 0
    },
    {
        "type": 0,
        "name": "ds.fill.3",
        "value": 0
    }

```

```

    },
    {
        "type": 0,
        "name": "ds.axisy.3",
        "value": 1
    },
    {
        "type": 0,
        "name": "ds.aggregate_function.3",
        "value": 3
    },
    {
        "type": 1,
        "name": "ds.aggregate_interval.3",
        "value": "1m"
    },
    {
        "type": 0,
        "name": "ds.aggregate_grouping.3",
        "value": 1
    },
    {
        "type": 0,
        "name": "graph_time",
        "value": 1
    },
    {
        "type": 1,
        "name": "time_from",
        "value": "now-3h"
    },
    {
        "type": 0,
        "name": "legend_lines",
        "value": 2
    },
    {
        "type": 0,
        "name": "show_problems",
        "value": 1
    }
}
]
}
],
"userGroups": [
    {
        "usrgrpid": 7,
        "permission": 2
    }
],
"users": [
    {
        "userid": 1,
        "permission": 3
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}
```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

## 9 Graph (classic)

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Graph (classic)* widget in `dashboard.create` and `dashboard.update` methods.

#### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Graph (classic)* widget, please refer to the parameter requirements outlined in the tables below.

### Parameters

The following parameters are supported for the *Graph (classic)* widget.

| Parameter               | type | name        | value   |
|-------------------------|------|-------------|---|
| <i>Refresh interval</i> | 0    | rf_rate     | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - (default) 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes. |
| <i>Source</i>           | 0    | source_type | 0 - (default) Graph;<br>1 - Simple graph.   |
| <i>Graph</i>            | 6    | graphid     | <b>Graph</b> ID.  |
| <i>Item</i>             | 4    | itemid      | Parameter <i>Graph</i> required if <i>Source</i> is set to "Graph".<br><b>Item</b> ID.  |
| <i>Show legend</i>      | 0    | show_legend | Parameter <i>Item</i> required if <i>Source</i> is set to "Simple graph".<br>0 - Disabled;<br>1 - (default) Enabled.                              |
| <i>Dynamic item</i>     | 0    | dynamic     | 0 - (default) Disabled;<br>1 - Enabled.   |

### Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Graph (classic)* widget. For more information on configuring a dashboard, see [dashboard.create](#).

#### Configuring a *Graph (classic)* widget

Configure a *Graph (classic)* widget that displays a simple graph for the item "42269".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "graph",
            "name": "Graph (classic)",
            "x": 0,
            "y": 0,
            "width": 12,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 0,
                "name": "source_type",
                "value": 1
              },
              {
                "type": 4,
                "name": "itemid",
                "value": 42269
              }
            ]
          }
        ]
      }
    ]
  },
  "userGroups": [
    {
      "usrgrpid": 7,
      "permission": 2
    }
  ],
  "users": [
    {
      "userid": 1,
      "permission": 3
    }
  ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}
```



See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

## 10 Graph prototype

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Graph prototype* widget in `dashboard.create` and `dashboard.update` methods.

#### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Graph prototype* widget, please refer to the parameter requirements outlined in the tables below.

### Parameters

The following parameters are supported for the *Graph prototype* widget.

| Parameter               | type | name        | value   |
|-------------------------|------|-------------|---|
| <i>Refresh interval</i> | 0    | rf_rate     | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - (default) 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes. |
| <i>Source</i>           | 0    | source_type | 2 - (default) Graph prototype;<br>3 - Simple graph prototype.   |
| <i>Graph prototype</i>  | 7    | graphid     | <b>Graph prototype</b> ID.<br><br>Parameter <i>Graph prototype</i> required if <i>Source</i> is set to "Graph prototype".                         |
| <i>Item prototype</i>   | 5    | itemid      | <b>Item prototype</b> ID.<br><br>Parameter <i>Item prototype</i> required if <i>Source</i> is set to "Simple graph prototype".                    |
| <i>Show legend</i>      | 0    | show_legend | 0 - Disabled;<br>1 - (default) Enabled.   |
| <i>Dynamic item</i>     | 0    | dynamic     | 0 - (default) Disabled;<br>1 - Enabled.   |
| <i>Columns</i>          | 0    | columns     | Valid values range from 1-24.   |
| <i>Rows</i>             | 0    | rows        | Default: 2.<br>Valid values range from 1-16.  |
|                         |      |             | Default: 1.   |

### Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Graph prototype* widget. For more information on configuring a dashboard, see [dashboard.create](#).

#### Configuring a *Graph prototype* widget

Configure a *Graph prototype* widget that displays a grid of 3 graphs (3 columns, 1 row) created from an item prototype (ID: "42316") by low-level discovery.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "graphprototype",
            "name": "Graph prototype",
            "x": 0,
            "y": 0,
            "width": 16,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 0,
                "name": "source_type",
                "value": 3
              },
              {
                "type": 5,
                "name": "itemid",
                "value": 42316
              },
              {
                "type": 0,
                "name": "columns",
                "value": 3
              }
            ]
          }
        ]
      }
    ],
    "userGroups": [
      {
        "usrgrpid": 7,
        "permission": 2
      }
    ],
    "users": [
      {
        "userid": 1,
        "permission": 3
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  }
}

```

```

    ],
    "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

## 11 Host availability

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Host availability* widget in `dashboard.create` and `dashboard.update` methods.

### Parameters

The following parameters are supported for the *Host availability* widget.

| Parameter                        | type | name           | value  |
|----------------------------------|------|----------------|--|
| <i>Refresh interval</i>          | 0    | rf_rate        | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - ( <i>default</i> ) 15 minutes.   |
| <i>Host groups</i>               | 2    | groupids       | <i>Host group</i> ID.<br><br>Note: To configure multiple host groups, create a dashboard widget field object for each host group.  |
| <i>Interface type</i>            | 0    | interface_type | 0 - None;<br>1 - Zabbix agent;<br>2 - SNMP;<br>3 - IPMI;<br>4 - JMX.<br><br>Default: 1, 2, 3, 4 (all enabled).<br><br>Note: To configure multiple values, create a dashboard widget field object for each value. |
| <i>Layout</i>                    | 0    | layout         | 0 - ( <i>default</i> ) Horizontal;<br>1 - Vertical.  |
| <i>Show hosts in maintenance</i> | 0    | maintenance    | 0 - ( <i>default</i> ) Disabled;<br>1 - Enabled.   |

### Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Host availability* widget. For more information on configuring a dashboard, see [dashboard.create](#).

#### Configuring a *Host availability* widget

Configure a *Host availability* widget that displays availability information (in a vertical layout) for hosts in host group "4" with "Zabbix agent" and "SNMP" interfaces configured.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "dashboard.create",

```

```

"params": {
  "name": "My dashboard",
  "display_period": 30,
  "auto_start": 1,
  "pages": [
    {
      "widgets": [
        {
          "type": "hostavail",
          "name": "Host availability",
          "x": 0,
          "y": 0,
          "width": 6,
          "height": 3,
          "view_mode": 0,
          "fields": [
            {
              "type": 2,
              "name": "groupids",
              "value": 4
            },
            {
              "type": 0,
              "name": "interface_type",
              "value": 1
            },
            {
              "type": 0,
              "name": "interface_type",
              "value": 2
            },
            {
              "type": 0,
              "name": "layout",
              "value": 1
            }
          ]
        }
      ]
    }
  ],
  "userGroups": [
    {
      "usrgrpid": 7,
      "permission": 2
    }
  ],
  "users": [
    {
      "userid": 1,
      "permission": 3
    }
  ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {

```

```

    "dashboardids": [
        "3"
    ],
    "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

12 Item value

## Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Item value* widget in `dashboard.create` and `dashboard.update` methods.

### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Item value* widget, please refer to the parameter requirements outlined in the tables below.

## Parameters

The following parameters are supported for the *Item value* widget.

| Parameter                     | type | name     | value  |
|-------------------------------|------|----------|--|
| <i>Refresh interval</i>       | 0    | rf_rate  | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - <i>(default)</i> 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes. |
| <b>Item</b><br>(required)     | 4    | itemid   | <b>Item</b> ID.  |
| <i>Show</i>                   | 0    | show     | 1 - Description;<br>2 - Value;<br>3 - Time;<br>4 - Change indicator.<br><br>Default: 1, 2, 3, 4 (all enabled).   |
| <i>Dynamic item</i>           | 0    | dynamic  | Note: To configure multiple values, create a dashboard widget field object for each value.<br>0 - <i>(default)</i> Disabled;<br>1 - Enabled.             |
| <i>Advanced configuration</i> | 0    | adv_conf | 0 - <i>(default)</i> Disabled;<br>1 - Enabled.   |

## Advanced configuration

The following parameters are supported if *Advanced configuration* is set to "Enabled".

| Parameter               | type | name     | value   |
|-------------------------|------|----------|---|
| <i>Background color</i> | 1    | bg_color | Hexadecimal color code (e.g. FF0000).<br><br>Default: "" (empty). |

## Description

The following parameters are supported if *Advanced configuration* is set to "Enabled", and *Show* is set to "Description".

| Parameter                  | type | name        | value  |
|----------------------------|------|-------------|--|
| <i>Description</i>         | 1    | description | Any string value, including macros.<br>Supported macros: {HOST.*}, {ITEM.*}, {INVENTORY.*}, User macros.<br><br>Default: {ITEM.NAME}.  |
| <i>Horizontal position</i> | 0    | desc_h_pos  | 0 - Left;<br>1 - <i>(default)</i> Center;<br>2 - Right.  |
| <i>Vertical position</i>   | 0    | desc_v_pos  | Two or more elements (Description, Value, Time) cannot share the same <i>Horizontal position</i> and <i>Vertical position</i> .<br>0 - Top;<br>1 - Middle;<br>2 - <i>(default)</i> Bottom. |
| <i>Size</i>                | 0    | desc_size   | Two or more elements (Description, Value, Time) cannot share the same <i>Horizontal position</i> and <i>Vertical position</i> .<br>Valid values range from 1-100.                          |
| <i>Bold</i>                | 0    | desc_bold   | Default: 15.<br>0 - <i>(default)</i> Disabled;<br>1 - Enabled.   |
| <i>Color</i>               | 1    | desc_color  | Hexadecimal color code (e.g. FF0000).<br><br>Default: "" (empty).  |

## Value

The following parameters are supported if *Advanced configuration* is set to "Enabled", and *Show* is set to "Value".

| Parameter                  | type | name           | value   |
|----------------------------|------|----------------|---|
| <i>Decimal places</i>      |      |                |   |
| <i>Decimal places</i>      | 0    | decimal_places | Valid values range from 1-10.   |
| <i>Size</i>                | 0    | decimal_size   | Default: 2.<br>Valid values range from 1-100.   |
| <i>Position</i>            |      |                | Default: 35.  |
| <i>Horizontal position</i> | 0    | value_h_pos    | 0 - Left;<br>1 - <i>(default)</i> Center;<br>2 - Right.   |
|                            |      |                | Two or more elements (Description, Value, Time) cannot share the same <i>Horizontal position</i> and <i>Vertical position</i> . |

| Parameter                | type | name        | value   |
|--------------------------|------|-------------|---|
| <i>Vertical position</i> | 0    | value_v_pos | 0 - Top;<br>1 - (default) Middle;<br>2 - Bottom.  |
| <i>Size</i>              | 0    | value_size  | Two or more elements (Description, Value, Time) cannot share the same <i>Horizontal position</i> and <i>Vertical position</i> .<br>Valid values range from 1-100. |
| <i>Bold</i>              | 0    | value_bold  | Default: 45.<br>0 - Disabled;<br>1 - (default) Enabled.   |
| <i>Color</i>             | 1    | value_color | Hexadecimal color code (e.g. FF0000).   |
| <i>Units</i>             |      |             | Default: "" (empty).  |
| <i>Units</i> (checkbox)  | 0    | units_show  | 0 - Disabled;<br>1 - (default) Enabled.   |
| <i>Units</i> (value)     | 1    | units       | Any string value.   |
| <i>Position</i>          | 0    | units_pos   | 0 - Before value;<br>1 - Above value;<br>2 - (default) After value;<br>3 - Below value.   |
| <i>Size</i>              | 0    | units_size  | Valid values range from 1-100.  |
| <i>Bold</i>              | 0    | units_bold  | Default: 35.<br>0 - Disabled;<br>1 - (default) Enabled.   |
| <i>Color</i>             | 1    | units_color | Hexadecimal color code (e.g. FF0000).   |
|                          |      |             | Default: "" (empty).  |

## Time

The following parameters are supported if *Advanced configuration* is set to "Enabled", and *Show* is set to "Time".

| Parameter                  | type | name       | value   |
|----------------------------|------|------------|---|
| <i>Horizontal position</i> | 0    | time_h_pos | 0 - Left;<br>1 - (default) Center;<br>2 - Right.  |
| <i>Vertical position</i>   | 0    | time_v_pos | Two or more elements (Description, Value, Time) cannot share the same <i>Horizontal position</i> and <i>Vertical position</i> .<br>0 - (default) Top;<br>1 - Middle;<br>2 - Bottom. |
| <i>Size</i>                | 0    | time_size  | Two or more elements (Description, Value, Time) cannot share the same <i>Horizontal position</i> and <i>Vertical position</i> .<br>Valid values range from 1-100.                   |
| <i>Bold</i>                | 0    | time_bold  | Default: 15.<br>0 - (default) Disabled;<br>1 - Enabled.   |
| <i>Color</i>               | 1    | time_color | Hexadecimal color code (e.g. FF0000).   |
|                            |      |            | Default: "" (empty).  |

## Change indicator

The following parameters are supported if *Advanced configuration* is set to "Enabled", and *Show* is set to "Change indicator".

| Parameter                | type | name         | value   |
|--------------------------|------|--------------|---|
| Change indicator ↑ color | 1    | up_color     | Hexadecimal color code (e.g. FF0000).<br><br>Default: "" (empty). |
| Change indicator ↓ color | 1    | down_color   | Hexadecimal color code (e.g. FF0000).<br><br>Default: "" (empty). |
| Change indicator ↕ color | 1    | updown_color | Hexadecimal color code (e.g. FF0000).<br><br>Default: "" (empty). |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Item value* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring an *Item value* widget

Configure an *Item value* widget that displays the item value for the item "42266" (Zabbix agent availability). In addition, visually fine-tune the widget with multiple advanced options.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "item",
            "name": "Item value",
            "x": 0,
            "y": 0,
            "width": 4,
            "height": 3,
            "view_mode": 0,
            "fields": [
              {
                "type": 4,
                "name": "itemid",
                "value": 42266
              },
              {
                "type": 0,
                "name": "show",
                "value": 1
              },
              {
                "type": 0,
                "name": "show",
                "value": 2
              },
              {
                "type": 0,
                "name": "show",
                "value": 3
              }
            ]
          },
          {
            "type": 0,
```



```

        "name": "adv_conf",
        "value": 1
    },
    {
        "type": 1,
        "name": "bg_color",
        "value": "D1C4E9"
    },
    {
        "type": 1,
        "name": "description",
        "value": "Agent status"
    },
    {
        "type": 0,
        "name": "desc_h_pos",
        "value": 0
    },
    {
        "type": 0,
        "name": "desc_v_pos",
        "value": 0
    },
    {
        "type": 0,
        "name": "desc_bold",
        "value": 1
    },
    {
        "type": 1,
        "name": "desc_color",
        "value": "F06291"
    },
    {
        "type": 0,
        "name": "value_h_pos",
        "value": 0
    },
    {
        "type": 0,
        "name": "value_size",
        "value": 25
    },
    {
        "type": 1,
        "name": "value_color",
        "value": "FFFF00"
    },
    {
        "type": 0,
        "name": "units_show",
        "value": 0
    },
    {
        "type": 0,
        "name": "time_h_pos",
        "value": 2
    },
    {
        "type": 0,
        "name": "time_v_pos",
        "value": 2
    }

```

```

    },
    {
      "type": 0,
      "name": "time_size",
      "value": 10
    },
    {
      "type": 0,
      "name": "time_bold",
      "value": 1
    },
    {
      "type": 1,
      "name": "time_color",
      "value": "9FA8DA"
    }
  ]
}
],
"userGroups": [
  {
    "usrgrpid": 7,
    "permission": 2
  }
],
"users": [
  {
    "userid": 1,
    "permission": 3
  }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

13 Map

Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Map* widget in `dashboard.create` and `dashboard.update` methods.

**Attention:**

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Map* widget, please refer to the parameter requirements outlined in the tables below.

## Parameters

The following parameters are supported for the *Map* widget.

| Parameter                      | type | name                    | value   |
|--------------------------------|------|-------------------------|---|
| <i>Refresh interval</i>        | 0    | rf_rate                 | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - (default) 15 minutes.   |
| <i>Source type</i>             | 0    | source_type             | 1 - (default) Map;<br>2 - Map navigation tree.  |
| <i>Map</i>                     | 8    | sysmapid                | <b>Map</b> ID.  |
| <i>Linked widget reference</i> | 1    | filter_widget_reference | Parameter <i>Map</i> required if <i>Source type</i> is set to "Map".<br>Valid <b>Map navigation tree</b> widget parameter <i>Reference</i> value.<br><br>Parameter <i>Linked widget reference</i> required if <i>Source type</i> is set to "Map navigation tree". |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Map* widget. For more information on configuring a dashboard, see **dashboard.create**.

Configuring a *Map* widget

Configure a *Map* widget that displays the map "1".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "map",
            "name": "Map",
            "x": 0,
            "y": 0,
            "width": 18,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 8,
                "name": "sysmapid",
                "value": 1
              }
            ]
          }
        ]
      }
    ]
  }
}
```

```

    }
  ],
  "userGroups": [
    {
      "usrgrpid": 7,
      "permission": 2
    }
  ],
  "users": [
    {
      "userid": 1,
      "permission": 3
    }
  ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}

```

Configuring a linked *Map* widget

Configure a *Map* widget that is linked to a *Map navigation tree* widget.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "map",
            "name": "Map",
            "x": 0,
            "y": 5,
            "width": 18,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 0,
                "name": "source_type",
                "value": 2
              },
              {
                "type": 1,

```

```

        "name": "filter_widget_reference",
        "value": "ABCDE"
    }
]
},
{
    "type": "navtree",
    "name": "Map navigation tree",
    "x": 0,
    "y": 0,
    "width": 6,
    "height": 5,
    "view_mode": 0,
    "fields": [
        {
            "type": 1,
            "name": "navtree.name.1",
            "value": "Element A"
        },
        {
            "type": 1,
            "name": "navtree.name.2",
            "value": "Element B"
        },
        {
            "type": 1,
            "name": "navtree.name.3",
            "value": "Element C"
        },
        {
            "type": 1,
            "name": "navtree.name.4",
            "value": "Element A1"
        },
        {
            "type": 1,
            "name": "navtree.name.5",
            "value": "Element A2"
        },
        {
            "type": 1,
            "name": "navtree.name.6",
            "value": "Element B1"
        },
        {
            "type": 1,
            "name": "navtree.name.7",
            "value": "Element B2"
        },
        {
            "type": 0,
            "name": "navtree.parent.4",
            "value": 1
        },
        {
            "type": 0,
            "name": "navtree.parent.5",
            "value": 1
        },
        {
            "type": 0,
            "name": "navtree.parent.6",

```

```

        "value": 2
    },
    {
        "type": 0,
        "name": "navtree.parent.7",
        "value": 2
    },
    {
        "type": 0,
        "name": "navtree.order.1",
        "value": 1
    },
    {
        "type": 0,
        "name": "navtree.order.2",
        "value": 2
    },
    {
        "type": 0,
        "name": "navtree.order.3",
        "value": 3
    },
    {
        "type": 0,
        "name": "navtree.order.4",
        "value": 1
    },
    {
        "type": 0,
        "name": "navtree.order.5",
        "value": 2
    },
    {
        "type": 0,
        "name": "navtree.order.6",
        "value": 1
    },
    {
        "type": 0,
        "name": "navtree.order.7",
        "value": 2
    },
    {
        "type": 8,
        "name": "navtree.sysmapid.6",
        "value": 1
    },
    {
        "type": 1,
        "name": "reference",
        "value": "ABCDE"
    }
}
]
}
],
"userGroups": [
    {
        "usrgrpid": 7,
        "permission": 2
    }
]

```

```

    ],
    "users": [
      {
        "userid": 1,
        "permission": 3
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)
- [Map navigation tree](#)

14 Map navigation tree

## Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Map navigation tree* widget in `dashboard.create` and `dashboard.update` methods.

### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Map navigation tree* widget, please refer to the parameter requirements outlined in the tables below.

## Parameters

The following parameters are supported for the *Map navigation tree* widget.

| Parameter  | type | name             | value   |
|--|------|------------------|---|
| <i>Refresh interval</i>  | 0    | rf_rate          | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - (default) 15 minutes. |
| <i>Show unavailable maps</i>   | 1    | show_unavailable | 0 - (default) Disabled;<br>1 - Enabled.   |
| <i>Reference</i>   | 1    | reference        | Any string value consisting of 5 characters (e.g. ABCDE, JBPNL, etc.).  |
| Parameter <i>Reference</i> value is used in the <i>Map</i> widget ( <i>Linked widget reference</i> ) for linking with the <i>Map navigation tree</i> widget. |      |                  |   |

The following parameters are supported for configuring map navigation tree elements.

| Parameter  | type | name               | value   |
|--|------|--------------------|---|
| <i>Name</i>                                      | 1    | navtree.name.1     | Any string value.   |
| <i>Linked map</i>                                | 8    | navtree.sysmapid.1 | Note: The number in the property name sets the element number.<br><b>Map</b> ID.  |
| <i>Parameters for creating element hierarchy</i> | 0    | navtree.parent.1   | Note: The number in the property name references the element to which the map is linked.<br>Parent element number.  |
|  | 0    | navtree.order.1    | Note: The number in the property name references the child element.<br>The property value references the parent element.<br>Element position in the map navigation tree.  |
|  |      |                    | Note: The number in the property name references the element number. The property value references the element position in the map navigation tree. Parent element position is determined within the whole map navigation tree. Child element position is determined within the parent element. |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Map navigation tree* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring a *Map navigation tree* widget

Configure a *Map navigation tree* widget that displays the following map navigation tree:

- Element A
  - Element A1
  - Element A2
- Element B
  - Element B1 (contains linked map "1" that can be displayed in a *linked Map widget*)
  - Element B2
- Element C

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "navtree",
            "name": "Map navigation tree",
            "x": 0,
            "y": 0,
            "width": 6,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 1,
                "name": "navtree.name.1",
                "value": "Element A"
              }
            ]
          }
        ]
      }
    ]
  }
}
```



```

{
  "type": 1,
  "name": "navtree.name.2",
  "value": "Element B"
},
{
  "type": 1,
  "name": "navtree.name.3",
  "value": "Element C"
},
{
  "type": 1,
  "name": "navtree.name.4",
  "value": "Element A1"
},
{
  "type": 1,
  "name": "navtree.name.5",
  "value": "Element A2"
},
{
  "type": 1,
  "name": "navtree.name.6",
  "value": "Element B1"
},
{
  "type": 1,
  "name": "navtree.name.7",
  "value": "Element B2"
},
{
  "type": 0,
  "name": "navtree.parent.4",
  "value": 1
},
{
  "type": 0,
  "name": "navtree.parent.5",
  "value": 1
},
{
  "type": 0,
  "name": "navtree.parent.6",
  "value": 2
},
{
  "type": 0,
  "name": "navtree.parent.7",
  "value": 2
},
{
  "type": 0,
  "name": "navtree.order.1",
  "value": 1
},
{
  "type": 0,
  "name": "navtree.order.2",
  "value": 2
},
{
  "type": 0,

```

```

        "name": "navtree.order.3",
        "value": 3
    },
    {
        "type": 0,
        "name": "navtree.order.4",
        "value": 1
    },
    {
        "type": 0,
        "name": "navtree.order.5",
        "value": 2
    },
    {
        "type": 0,
        "name": "navtree.order.6",
        "value": 1
    },
    {
        "type": 0,
        "name": "navtree.order.7",
        "value": 2
    },
    {
        "type": 8,
        "name": "navtree.sysmapid.6",
        "value": 1
    },
    {
        "type": 1,
        "name": "reference",
        "value": "ABCDE"
    }
    ]
}
],
"userGroups": [
    {
        "usrgrpid": 7,
        "permission": 2
    }
],
"users": [
    {
        "userid": 1,
        "permission": 3
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "dashboardids": [
            "3"
        ]
    }
}

```

```

    },
    "id": 1
  }

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)
- [Map](#)

15 Plain text

## Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Plain text* widget in `dashboard.create` and `dashboard.update` methods.

### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Plain text* widget, please refer to the parameter requirements outlined in the tables below.

## Parameters

The following parameters are supported for the *Plain text* widget.

| Parameter                  | type | name         | value  |
|----------------------------|------|--------------|--|
| <i>Refresh interval</i>    | 0    | rf_rate      | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - <i>(default)</i> 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes. |
| <b>Items</b><br>(required) | 4    | itemids      | <b>Item</b> ID.<br><br>Note: To configure multiple items, create a dashboard widget field object for each item.  |
| <i>Items location</i>      | 0    | style        | 0 - <i>(default)</i> Left;<br>1 - Top.   |
| <i>Show lines</i>          | 0    | show_lines   | Valid values range from 1-100.   |
| <i>Show text as HTML</i>   | 0    | show_as_html | Default: 25.<br>0 - <i>(default)</i> Disabled;<br>1 - Enabled.   |
| <i>Dynamic item</i>        | 0    | dynamic      | 0 - <i>(default)</i> Disabled;<br>1 - Enabled.   |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Plain text* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring a *Plain text* widget

Configure a *Plain text* widget that displays latest data for items "42269" and "42253". In addition, configure the item names to be located at the top of the data columns, and only 15 lines of data to be displayed.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "plaintext",
            "name": "Plain text",
            "x": 0,
            "y": 0,
            "width": 6,
            "height": 3,
            "view_mode": 0,
            "fields": [
              {
                "type": 4,
                "name": "itemids",
                "value": 42269
              },
              {
                "type": 4,
                "name": "itemids",
                "value": 42253
              },
              {
                "type": 0,
                "name": "style",
                "value": 1
              },
              {
                "type": 0,
                "name": "show_lines",
                "value": 15
              }
            ]
          }
        ]
      }
    ],
    "userGroups": [
      {
        "usrgrpid": 7,
        "permission": 2
      }
    ],
    "users": [
      {
        "userid": 1,
        "permission": 3
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}
```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

## 16 Problem hosts

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Problem hosts* widget in `dashboard.create` and `dashboard.update` methods.

#### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Problem hosts* widget, please refer to the parameter requirements outlined in the tables below.

### Parameters

The following parameters are supported for the *Problem hosts* widget.

| Parameter                  | type | name             | value   |
|----------------------------|------|------------------|---|
| <i>Refresh interval</i>    | 0    | rf_rate          | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - (default) 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes.   |
| <i>Host groups</i>         | 2    | groupids         | <b>Host group</b> ID.<br><br>Note: To configure multiple host groups, create a dashboard widget field object for each host group.   |
| <i>Exclude host groups</i> | 2    | exclude_groupids | <b>Host group</b> ID.<br><br>Note: To exclude multiple host groups, create a dashboard widget field object for each host group.   |
| <i>Hosts</i>               | 3    | hostids          | <b>Host</b> ID.<br><br>Note: To configure multiple hosts, create a dashboard widget field object for each host. For multiple hosts, the parameter <i>Host groups</i> must either be not configured at all or configured with at least one host group that the configured hosts belong to. |
| <i>Problem</i>             | 1    | problem          | Problem <b>event name</b> (case insensitive, full name or part of it).  |

| Parameter  | type | name            | value  |
|--|------|-----------------|--|
| Severity   | 0    | severities      | 0 - Not classified;<br>1 - Information;<br>2 - Warning;<br>3 - Average;<br>4 - High;<br>5 - Disaster.<br><br>Default: empty (all enabled).<br><br>Note: To configure multiple values, create a dashboard widget field object for each value. |
| <i>Tags</i><br>(the number in the property name (e.g. tags.tag.0) references tag order in the tag evaluation list) |      |                 |  |
| <i>Evaluation type</i>   | 0    | evaltype        | 0 - (default) And/Or;<br>2 - Or.   |
| <i>Tag name</i>  | 1    | tags.tag.0      | Any string value.  |
| <i>Operator</i>  | 0    | tags.operator.0 | Parameter <i>Tag name</i> required if configuring <i>Tags</i> .<br>0 - Contains;<br>1 - Equals;<br>2 - Does not contain;<br>3 - Does not equal;<br>4 - Exists;<br>5 - Does not exist.  |
| <i>Tag value</i>   | 1    | tags.value.0    | Parameter <i>Operator</i> required if configuring <i>Tags</i> .<br>Any string value.   |
| <i>Show suppressed problems</i>  | 0    | show_suppressed | Parameter <i>Tag value</i> required if configuring <i>Tags</i> .<br>0 - (default) Disabled;<br>1 - Enabled.  |

| Parameter                     | type | name              | value  |
|-------------------------------|------|-------------------|--|
| Hide groups with-out problems | 0    | hide_empty_groups | 0 - (default) Disabled;<br>1 - Enabled.                          |
| Problem display               | 0    | ext_ack           | 0 - (default) All;<br>1 - Unacknowledged only;<br>2 - Separated. |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Problem hosts* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring a *Problem hosts* widget

Configure a *Problem hosts* widget that displays hosts from host groups "2" and "4" that have problems with a name that includes the string "CPU" and that have the following severities: "Warning", "Average", "High", "Disaster".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "problemhosts",
            "name": "Problem hosts",
            "x": 0,
            "y": 0,
            "width": 12,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 2,
                "name": "groupids",
                "value": 2
              },
              {
                "type": 2,
                "name": "groupids",
                "value": 4
              },
              {
                "type": 1,
                "name": "problem",
                "value": "cpu"
              },
              {
                "type": 0,
                "name": "severities",
                "value": 2
              },
              {
                "type": 0,
```

```

        "name": "severities",
        "value": 3
    },
    {
        "type": 0,
        "name": "severities",
        "value": 4
    },
    {
        "type": 0,
        "name": "severities",
        "value": 5
    }
]
}
],
"userGroups": [
    {
        "usrgrpid": 7,
        "permission": 2
    }
],
"users": [
    {
        "userid": 1,
        "permission": 3
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "dashboardids": [
            "3"
        ]
    },
    "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

17 Problems

Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Problems* widget in `dashboard.create` and `dashboard.update` methods.



**Attention:**

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Problems* widget, please refer to the parameter requirements outlined in the tables below.

**Parameters**

The following parameters are supported for the *Problems* widget.

| Parameter                  | type   | name                  | value  |
|----------------------------|--------|-----------------------|--|
| <i>Refresh interval</i>    | 0      | rf_rate               | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - (default) 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes.  |
| <i>Show</i>                | 0      | show                  | 1 - (default) Recent problems;<br>2 - History;<br>3 - Problems.  |
| <i>Host groups</i>         | 2      | groupids              | <b>Host group</b> ID.<br><br>Note: To configure multiple host groups, create a dashboard widget field object for each host group.  |
| <i>Exclude host groups</i> | 2      | exclude_groupids      | <b>Host group</b> ID.<br><br>Note: To exclude multiple host groups, create a dashboard widget field object for each host group.  |
| <i>Hosts</i>               | 3      | hostids               | <b>Host</b> ID.<br><br>Note: To configure multiple hosts, create a dashboard widget field object for each host. For multiple hosts, the parameter <i>Host groups</i> must either be not configured at all or configured with at least one host group that the configured hosts belong to.                              |
| <i>Problem Severity</i>    | 1<br>0 | problem<br>severities | Problem <b>event name</b> (case insensitive, full name or part of it).<br>0 - Not classified;<br>1 - Information;<br>2 - Warning;<br>3 - Average;<br>4 - High;<br>5 - Disaster.<br><br>Default: empty (all enabled).<br><br>Note: To configure multiple values, create a dashboard widget field object for each value. |

| Parameter  | type | name            | value  |
|--|------|-----------------|--|
| <i>Tags</i><br>(the number in the property name (e.g. tags.tag.0) references tag order in the tag evaluation list) |      |                 |  |
| <i>Evaluation type</i>   | 0    | evaltype        | 0 - (default) And/Or;<br>2 - Or.   |
| <i>Tag name</i>  | 1    | tags.tag.0      | Any string value.  |
| <i>Operator</i>  | 0    | tags.operator.0 | Parameter <i>Tag name</i> required if configuring <i>Tags</i> .<br>0 - Contains;<br>1 - Equals;<br>2 - Does not contain;<br>3 - Does not equal;<br>4 - Exists;<br>5 - Does not exist.                                    |
| <i>Tag value</i>   | 1    | tags.value.0    | Parameter <i>Operator</i> required if configuring <i>Tags</i> .<br>Any string value.   |
| <i>Show tags</i>   | 0    | show_tags       | Parameter <i>Tag value</i> required if configuring <i>Tags</i> .<br>0 - (default) None;<br>1 - 1;<br>2 - 2;<br>3 - 3.  |
| <i>Tag name (format)</i>   | 0    | tag_name_format | 0 - (default) Full;<br>1 - Shortened;<br>2 - None.   |
| <i>Tag display priority</i>  | 1    | tag_priority    | Parameter <i>Tag name (format)</i> not available if <i>Show tags</i> is set to "None".<br>Comma-separated list of tags.<br><br>Parameter <i>Tag display priority</i> not available if <i>Show tags</i> is set to "None". |

| Parameter                | type | name            | value  |
|--------------------------|------|-----------------|--|
| Show operational data    | 0    | show_opdata     | 0 - (default) None;<br>1 - Separately;<br>2 - With problem name.   |
| Show suppressed problems | 0    | show_suppressed | 0 - (default) Disabled;<br>1 - Enabled.  |
| Show unacknowledged only | 0    | unacknowledged  | 0 - (default) Disabled;<br>1 - Enabled.  |
| Sort entries by          | 0    | sort_triggers   | 1 - Severity (descending);<br>2 - Host (ascending);<br>3 - Time (ascending);<br>4 - (default) Time (descending);<br>13 - Severity (ascending);<br>14 - Host (descending);<br>15 - Problem (ascending);<br>16 - Problem (descending). |
| Show timeline            | 0    | show_timeline   | For all values, except "Time (descending)" and "Time (ascending)", the parameter <i>Show timeline</i> must be set to "Disabled".<br>0 - Disabled;<br>1 - (default) Enabled.  |
| Show lines               | 0    | show_lines      | Parameter <i>Show timeline</i> available if <i>Sort entries by</i> is set to "Time (descending)" or "Time (ascending)".<br>Valid values range from 1-100.<br><br>Default: 25.  |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Problems* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring a *Problems* widget

Configure a *Problems* widget that displays problems for host group "4" that satisfy the following conditions:

- Problems that have a tag with the name "scope" that contains values "performance" or "availability", or "capacity".
- Problems that have the following severities: "Warning", "Average", "High", "Disaster".

In addition, configure the widget to show tags and operational data.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
```

```

"type": "problems",
"name": "Problems",
"x": 0,
"y": 0,
"width": 12,
"height": 5,
"view_mode": 0,
"fields": [
  {
    "type": 2,
    "name": "groupids",
    "value": 4
  },
  {
    "type": 1,
    "name": "tags.tag.0",
    "value": "scope"
  },
  {
    "type": 0,
    "name": "tags.operator.0",
    "value": 0
  },
  {
    "type": 1,
    "name": "tags.value.0",
    "value": "performance"
  },
  {
    "type": 1,
    "name": "tags.tag.1",
    "value": "scope"
  },
  {
    "type": 0,
    "name": "tags.operator.1",
    "value": 0
  },
  {
    "type": 1,
    "name": "tags.value.1",
    "value": "availability"
  },
  {
    "type": 1,
    "name": "tags.tag.2",
    "value": "scope"
  },
  {
    "type": 0,
    "name": "tags.operator.2",
    "value": 0
  },
  {
    "type": 1,
    "name": "tags.value.2",
    "value": "capacity"
  },
  {
    "type": 0,
    "name": "severities",
    "value": 2
  }
]

```

```

    },
    {
      "type": 0,
      "name": "severities",
      "value": 3
    },
    {
      "type": 0,
      "name": "severities",
      "value": 4
    },
    {
      "type": 0,
      "name": "severities",
      "value": 5
    },
    {
      "type": 0,
      "name": "show_tags",
      "value": 1
    },
    {
      "type": 0,
      "name": "show_opdata",
      "value": 1
    }
  ]
},
{
  "userGroups": [
    {
      "usrgrpid": 7,
      "permission": 2
    }
  ],
  "users": [
    {
      "userid": 1,
      "permission": 3
    }
  ]
},
{
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)

- `dashboard.update`

## 18 Problems by severity

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Problems by severity* widget in `dashboard.create` and `dashboard.update` methods.

#### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Problems by severity* widget, please refer to the parameter requirements outlined in the tables below.

### Parameters

The following parameters are supported for the *Problems by severity* widget.

| Parameter                  | type   | name                            | value  |
|----------------------------|--------|---------------------------------|--|
| <i>Refresh interval</i>    | 0      | <code>rf_rate</code>            | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - (default) 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes.  |
| <i>Host groups</i>         | 2      | <code>groupids</code>           | <b>Host group</b> ID.<br><br>Note: To configure multiple host groups, create a dashboard widget field object for each host group.  |
| <i>Exclude host groups</i> | 2      | <code>exclude_groupids</code>   | <b>Host group</b> ID.<br><br>Note: To exclude multiple host groups, create a dashboard widget field object for each host group.  |
| <i>Hosts</i>               | 3      | <code>hostids</code>            | <b>Host</b> ID.<br><br>Note: To configure multiple hosts, create a dashboard widget field object for each host. For multiple hosts, the parameter <i>Host groups</i> must either be not configured at all or configured with at least one host group that the configured hosts belong to.                              |
| <i>Problem Severity</i>    | 1<br>0 | <code>problem severities</code> | Problem <b>event name</b> (case insensitive, full name or part of it).<br>0 - Not classified;<br>1 - Information;<br>2 - Warning;<br>3 - Average;<br>4 - High;<br>5 - Disaster.<br><br>Default: empty (all enabled).<br><br>Note: To configure multiple values, create a dashboard widget field object for each value. |

| Parameter  | type | name            | value   |
|--|------|-----------------|---|
| <i>Tags</i><br>(the number in the property name (e.g. tags.tag.0) references tag order in the tag evaluation list) |      |                 |   |
| <i>Evaluation type</i>   | 0    | evaltype        | 0 - (default) And/Or;<br>2 - Or.  |
| <i>Tag name</i>  | 1    | tags.tag.0      | Any string value.   |
| <i>Operator</i>  | 0    | tags.operator.0 | Parameter <i>Tag name</i> required if configuring <i>Tags</i> .<br>0 - Contains;<br>1 - Equals;<br>2 - Does not contain;<br>3 - Does not equal;<br>4 - Exists;<br>5 - Does not exist. |
| <i>Tag value</i>   | 1    | tags.value.0    | Parameter <i>Operator</i> required if configuring <i>Tags</i> .<br>Any string value.  |
| <i>Show</i>  | 0    | show_type       | Parameter <i>Tag value</i> required if configuring <i>Tags</i> .<br>0 - (default) Host groups;<br>1 - Totals.   |
| <i>Layout</i>  | 0    | layout          | 0 - (default) Horizontal;<br>1 - Vertical.  |
| <i>Show operational data</i>   | 0    | show_opdata     | Parameter <i>Layout</i> not available if <i>Show</i> is set to "Host groups".<br>0 - (default) None;<br>1 - Separately;<br>2 - With problem name.                                     |
| <i>Show suppressed problems</i>  | 0    | show_suppressed | 0 - (default) Disabled;<br>1 - Enabled.   |

| Parameter                    | type | name              | value   |
|------------------------------|------|-------------------|---|
| Hide groups without problems | 0    | hide_empty_groups | 0 - (default) Disabled;<br>1 - Enabled.<br><br>Parameter <i>Hide groups without problems</i> not available if <i>Show</i> is set to "Totals". |
| Problem display              | 0    | ext_ack           | 0 - (default) All;<br>1 - Unacknowledged only;<br>2 - Separated.  |
| Show timeline                | 0    | show_timeline     | 0 - Disabled;<br>1 - (default) Enabled.   |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Problems by severity* widget. For more information on configuring a dashboard, see [dashboard.create](#).

Configuring a *Problems by severity* widget

Configure a *Problems by severity* widget that displays problem totals for all host groups.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "problemsbysv",
            "name": "Problems by severity",
            "x": 0,
            "y": 0,
            "width": 12,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 0,
                "name": "show_type",
                "value": 1
              }
            ]
          }
        ]
      }
    ],
    "userGroups": [
      {
        "usrgrp_id": 7,
        "permission": 2
      }
    ],
    "users": [
      {
        "userid": 1,
        "permission": 3
      }
    ]
  }
}
```



```

    }
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

## 19 SLA report

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the **SLA report** widget in `dashboard.create` and `dashboard.update` methods.

#### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *SLA report* widget, please refer to the parameter requirements outlined in the tables below.

### Parameters

The following parameters are supported for the *SLA report* widget.

| Parameter                | type | name         | value   |
|--------------------------|------|--------------|---|
| <i>Refresh interval</i>  | 0    | rf_rate      | 0 - (default) No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes.           |
| <b>SLA</b><br>(required) | 10   | slaid        | <b>SLA</b> ID.  |
| <i>Service</i>           | 9    | serviceid    | <b>Service</b> ID.  |
| <i>Show periods</i>      | 0    | show_periods | Valid values range from 1-100.  |
| <i>From</i>              | 1    | date_from    | Default: 20.<br>Valid date string in format YYYY-MM-DD.<br><b>Relative dates</b> with modifiers d, w, M, y (e.g. now, now/d, now/w-1w, etc.) are supported. |
| <i>To</i>                | 1    | date_to      | Valid date string in format YYYY-MM-DD.<br><b>Relative dates</b> with modifiers d, w, M, y (e.g. now, now/d, now/w-1w, etc.) are supported.                 |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *SLA report* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring an *SLA report* widget

Configure an *SLA report* widget that displays the SLA report for SLA "4" service "2" for the period of last 30 days.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "slareport",
            "name": "SLA report",
            "x": 0,
            "y": 0,
            "width": 12,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 10,
                "name": "slaid",
                "value": 4
              },
              {
                "type": 9,
                "name": "serviceid",
                "value": 2
              },
              {
                "type": 1,
                "name": "date_from",
                "value": "now-30d"
              },
              {
                "type": 1,
                "name": "date_to",
                "value": "now"
              }
            ]
          }
        ]
      }
    ]
  },
  "userGroups": [
    {
      "usrgrpId": 7,
      "permission": 2
    }
  ],
  "users": [
    {
      "userid": 1,
      "permission": 3
    }
  ]
}
```

```

    }
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

## 20 System information

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *System Information* widget in `dashboard.create` and `dashboard.update` methods.

### Parameters

The following parameters are supported for the *System Information* widget.

| Parameter               | type | name      | value   |
|-------------------------|------|-----------|---|
| <i>Refresh interval</i> | 0    | rf_rate   | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - (default) 15 minutes. |
| <i>Show</i>             | 0    | info_type | 0 - (default) System stats;<br>1 - High availability nodes.   |

### Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *System information* widget. For more information on configuring a dashboard, see [dashboard.create](#).

#### Configuring a *System information* widget

Configure a *System information* widget that displays system stats with a refresh interval of 10 minutes.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,

```

```

    "pages": [
      {
        "widgets": [
          {
            "type": "systeminfo",
            "name": "System information",
            "x": 0,
            "y": 0,
            "width": 12,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 0,
                "name": "rf_rate",
                "value": 600
              }
            ]
          }
        ]
      }
    ],
    "userGroups": [
      {
        "usrgrpid": 7,
        "permission": 2
      }
    ],
    "users": [
      {
        "userid": 1,
        "permission": 3
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

21 Top hosts

Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Top hosts* widget in `dashboard.create` and `dashboard.update` methods.

**Attention:**

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Top hosts* widget, please refer to the parameter requirements outlined in the tables below.

**Parameters**

The following parameters are supported for the *Top Hosts* widget.

| Parameter   | type | name       | value   |
|---|------|------------|---|
| <i>Refresh interval</i>   | 0    | rf_rate    | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - (default) 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes.   |
| <i>Host groups</i>  | 2    | groupids   | <b>Host group</b> ID.<br><br>Note: To configure multiple host groups, create a dashboard widget field object for each host group.   |
| <i>Hosts</i>  | 3    | hostids    | <b>Host</b> ID.<br><br>Note: To configure multiple hosts, create a dashboard widget field object for each host. For multiple hosts, the parameter <i>Host groups</i> must either be not configured at all or configured with at least one host group that the configured hosts belong to. |
| <i>Host Tags</i><br>(the number in the property name (e.g. tags.tag.0) references tag order in the tag evaluation list) |      |            |   |
| <i>Evaluation type</i>  | 0    | evaltype   | 0 - (default) And/Or;<br>2 - Or.  |
| <i>Tag name</i>   | 1    | tags.tag.0 | Any string value.   |

Parameter *Tag name* required if configuring *Tags*.

| Parameter                     | type | name            | value  |
|-------------------------------|------|-----------------|--|
| <i>Operator</i>               | 0    | tags.operator.0 | 0 - Contains;<br>1 - Equals;<br>2 - Does not contain;<br>3 - Does not equal;<br>4 - Exists;<br>5 - Does not exist. |
| <i>Tag value</i>              | 1    | tags.value.0    | Parameter <i>Operator</i> required if configuring <i>Tags</i> .<br>Any string value.                               |
| <i>Columns</i><br>(see below) |      |                 | Parameter <i>Tag value</i> required if configuring <i>Tags</i> .   |
| <i>Order</i>                  | 0    | order           | 2 - (default) Top N;<br>3 - Bottom N.  |
| <i>Order column</i>           | 0    | column          | Column numeric value from the configured columns.  |
| <i>Host count</i>             | 0    | count           | Valid values range from 1-100.<br><br>Default: 10.   |

## Columns

Columns have common parameters and additional parameters depending on the configuration of the parameter *Data*.

### Note:

For all parameters related to columns the number in the property name (e.g. columns.name.0) references a column for which the parameter is configured.

The following parameters are supported for all columns.

| Parameter                       | type | name                 | value  |
|---------------------------------|------|----------------------|--|
| <i>Name</i>                     | 1    | columns.name.0       | Any string value.                              |
| <b>Data</b><br>(required)       | 0    | columns.data.0       | 1 - Item value;<br>2 - Host name;<br>3 - Text. |
| <b>Base color</b><br>(required) | 1    | columns.base_color.0 | Hexadecimal color code (e.g. FF0000).          |

## Item value

The following parameters are supported if *Data* is set to "Item value".

### Note:

The first number in the *Thresholds* property name (e.g. columnsthresholds.color.0.0) references the column for which thresholds are configured, while the second number references threshold place in a list, sorted in ascending order. However, if thresholds are configured in a different order, the values will be sorted in ascending order after updating widget configuration in Zabbix frontend (e.g. "threshold.threshold.0": "5" → "threshold.threshold.0": "1"; "threshold.threshold.1": "1" → "threshold.threshold.1": "5").

| Parameter                       | type | name                | value  |
|---------------------------------|------|---------------------|--|
| <i>Item</i>                     | 1    | columns.item.0      | Valid item name.   |
| <b>Time shift</b><br>(required) | 1    | columns.timeshift.0 | Valid numeric or time string value (e.g. 3600 or 1h).<br>You may use <b>time suffixes</b> . Negative values are allowed. |

| Parameter                   | type | name                        | value   |
|-----------------------------|------|-----------------------------|---|
| <i>Aggregation function</i> | 0    | columns.aggregate_function  | On <i>default</i> none;<br>1 - min;<br>2 - max;<br>3 - avg;<br>4 - count;<br>5 - sum;<br>6 - first;<br>7 - last.  |
| <i>Aggregation interval</i> | 1    | columns.aggregate_interval  | Valid string (e.g. 3600, 1h, etc.).<br>You may use <b>time suffixes</b> .<br><br>Parameter <i>Aggregation interval</i> not available if <i>Aggregation function</i> is set to <i>none</i> . |
| <i>Display</i>              | 0    | columns.display             | Default: 1h.<br>1 - (default) As is;<br>2 - Bar;<br>3 - Indicators.   |
| <i>Min</i>                  | 1    | columns.min                 | Any numeric value.  |
| <i>Max</i>                  | 1    | columns.max                 | Parameter <i>Min</i> not available if <i>Display</i> is set to "As is".<br>Any numeric value.   |
| <i>History data</i>         | 0    | columns.history             | Parameter <i>Max</i> not available if <i>Display</i> is set to "As is".<br>1 - (default) Auto;<br>2 - History;<br>3 - Trends.   |
| <i>Thresholds Color</i>     | 1    | columnsthresholds.color     | Hexadecimal color code (e.g. FF0000).   |
| <i>Threshold</i>            | 1    | columnsthresholds.threshold | Default: "" (empty).<br>Any string value.   |

## Text

The following parameters are supported if *Data* is set to "Text".

| Parameter   | type | name         | value  |
|-------------|------|--------------|--|
| <i>Text</i> | 1    | columns.text | Any string value, including macros.<br>Supported macros: {HOST.*}, {INVENTORY.*}.<br><br>Parameter <i>Text</i> required if <i>Data</i> is set to "Text". |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Top hosts* widget. For more information on configuring a dashboard, see **dashboard.create**.

### Configuring a *Top hosts* widget

Configure a *Top hosts* widget that displays top hosts by CPU utilization in host group "4". In addition, configure the following custom columns: "Host name", "Utilization", "1m avg", "5m avg", "15m avg", "Processes".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
```

```

"pages": [
  {
    "widgets": [
      {
        "type": "tophosts",
        "name": "Top hosts",
        "x": 0,
        "y": 0,
        "width": 12,
        "height": 5,
        "view_mode": 0,
        "fields": [
          {
            "type": 2,
            "name": "groupids",
            "value": 4
          },
          {
            "type": 1,
            "name": "columns.name.0",
            "value": ""
          },
          {
            "type": 0,
            "name": "columns.data.0",
            "value": 2
          },
          {
            "type": 1,
            "name": "columns.base_color.0",
            "value": "FFFFFF"
          },
          {
            "type": 1,
            "name": "columns.timeshift.0",
            "value": ""
          },
          {
            "type": 1,
            "name": "columns.name.1",
            "value": "Utilization"
          },
          {
            "type": 0,
            "name": "columns.data.1",
            "value": 1
          },
          {
            "type": 1,
            "name": "columns.base_color.1",
            "value": "4CAF50"
          },
          {
            "type": 1,
            "name": "columns.timeshift.1",
            "value": ""
          },
          {
            "type": 1,
            "name": "columns.item.1",
            "value": "CPU utilization"
          }
        ]
      }
    ]
  }
]

```



```

{
  "type": 0,
  "name": "columns.display.1",
  "value": 3
},
{
  "type": 1,
  "name": "columns.min.1",
  "value": "0"
},
{
  "type": 1,
  "name": "columns.max.1",
  "value": "100"
},
{
  "type": 1,
  "name": "columnsthresholds.color.1.0",
  "value": "FFFF00"
},
{
  "type": 1,
  "name": "columnsthresholds.threshold.1.0",
  "value": "50"
},
{
  "type": 1,
  "name": "columnsthresholds.color.1.1",
  "value": "FF8000"
},
{
  "type": 1,
  "name": "columnsthresholds.threshold.1.1",
  "value": "80"
},
{
  "type": 1,
  "name": "columnsthresholds.color.1.2",
  "value": "FF4000"
},
{
  "type": 1,
  "name": "columnsthresholds.threshold.1.2",
  "value": "90"
},
{
  "type": 1,
  "name": "columns.name.2",
  "value": "1m avg"
},
{
  "type": 0,
  "name": "columns.data.2",
  "value": 1
},
{
  "type": 1,
  "name": "columns.base_color.2",
  "value": "FFFFFF"
},
{
  "type": 1,

```

```

        "name": "columns.timeshift.2",
        "value": ""
    },
    {
        "type": 1,
        "name": "columns.item.2",
        "value": "Load average (1m avg)"
    },
    {
        "type": 1,
        "name": "columns.name.3",
        "value": "5m avg"
    },
    {
        "type": 0,
        "name": "columns.data.3",
        "value": 1
    },
    {
        "type": 1,
        "name": "columns.base_color.3",
        "value": "FFFFFF"
    },
    {
        "type": 1,
        "name": "columns.timeshift.3",
        "value": ""
    },
    {
        "type": 1,
        "name": "columns.item.3",
        "value": "Load average (5m avg)"
    },
    {
        "type": 1,
        "name": "columns.name.4",
        "value": "15m avg"
    },
    {
        "type": 0,
        "name": "columns.data.4",
        "value": 1
    },
    {
        "type": 1,
        "name": "columns.base_color.4",
        "value": "FFFFFF"
    },
    {
        "type": 1,
        "name": "columns.timeshift.4",
        "value": ""
    },
    {
        "type": 1,
        "name": "columns.item.4",
        "value": "Load average (15m avg)"
    },
    {
        "type": 1,
        "name": "columns.name.5",
        "value": "Processes"
    }

```

```

        },
        {
            "type": 0,
            "name": "columns.data.5",
            "value": 1
        },
        {
            "type": 1,
            "name": "columns.base_color.5",
            "value": "FFFFFF"
        },
        {
            "type": 1,
            "name": "columns.timeshift.5",
            "value": ""
        },
        {
            "type": 1,
            "name": "columns.item.5",
            "value": "Number of processes"
        },
        {
            "type": 0,
            "name": "column",
            "value": 1
        }
    ]
}

    ],
    "userGroups": [
        {
            "usrgrpid": 7,
            "permission": 2
        }
    ],
    "users": [
        {
            "userid": 1,
            "permission": 3
        }
    ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "dashboardids": [
            "3"
        ]
    },
    "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)

- `dashboard.update`

## 22 Trigger overview

### Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Trigger overview* widget in `dashboard.create` and `dashboard.update` methods.

#### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Trigger overview* widget, please refer to the parameter requirements outlined in the tables below.

### Parameters

The following parameters are supported for the *Trigger Overview* widget.

| Parameter               | type | name     | value   |
|-------------------------|------|----------|---|
| <i>Refresh interval</i> | 0    | rf_rate  | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - (default) 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes.   |
| <i>Show</i>             | 0    | show     | 1 - (default) Recent problems;<br>2 - Any;<br>3 - Problems.   |
| <i>Host groups</i>      | 2    | groupids | <b>Host group</b> ID.<br><br>Note: To configure multiple host groups, create a dashboard widget field object for each host group.   |
| <i>Hosts</i>            | 3    | hostids  | <b>Host</b> ID.<br><br>Note: To configure multiple hosts, create a dashboard widget field object for each host. For multiple hosts, the parameter <i>Host groups</i> must either be not configured at all or configured with at least one host group that the configured hosts belong to. |

| Parameter  | type | name            | value   |
|--|------|-----------------|---|
| <i>Tags</i><br>(the number in the property name (e.g. tags.tag.0) references tag order in the tag evaluation list) |      |                 |   |
| <i>Evaluation type</i>   | 0    | evaltype        | 0 - (default) And/Or;<br>2 - Or.  |
| <i>Tag name</i>  | 1    | tags.tag.0      | Any string value.   |
| <i>Operator</i>  | 0    | tags.operator.0 | Parameter <i>Tag name</i> required if configuring <i>Tags</i> .<br>0 - Contains;<br>1 - Equals;<br>2 - Does not contain;<br>3 - Does not equal;<br>4 - Exists;<br>5 - Does not exist. |
| <i>Tag value</i>   | 1    | tags.value.0    | Parameter <i>Operator</i> required if configuring <i>Tags</i> .<br>Any string value.  |
| <i>Show suppressed problems</i>  | 0    | show_suppressed | Parameter <i>Tag value</i> required if configuring <i>Tags</i> .<br>0 - (default) Disabled;<br>1 - Enabled.   |
| <i>Hosts location</i>  | 0    | style           | 0 - (default) Left;<br>1 - Top.   |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Trigger overview* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring a *Trigger overview* widget

Configure a *Trigger overview* widget that displays trigger states for all host groups that have triggers with a tag that has the name "scope" and contains value "availability".

Request:

```

{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "trigover",
            "name": "Trigger overview",
            "x": 0,
            "y": 0,
            "width": 12,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 1,
                "name": "tags.tag.0",
                "value": "scope"
              },
              {
                "type": 0,
                "name": "tags.operator.0",
                "value": 0
              },
              {
                "type": 1,
                "name": "tags.value.0",
                "value": "availability"
              }
            ]
          }
        ]
      }
    ],
    "userGroups": [
      {
        "usrgrpId": 7,
        "permission": 2
      }
    ],
    "users": [
      {
        "userId": 1,
        "permission": 3
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  }
}

```

```

    ],
    },
    "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

23 URL

## Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the [URL](#) widget in `dashboard.create` and `dashboard.update` methods.

### Attention:

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify [built-in widgets](#) and create [custom widgets](#), but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the [URL](#) widget, please refer to the parameter requirements outlined in the tables below.

## Parameters

The following parameters are supported for the [URL](#) widget.

| Parameter                | type | name    | value   |
|--------------------------|------|---------|---|
| <i>Refresh interval</i>  | 0    | rf_rate | 0 - (default) No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes. |
| <b>URL</b><br>(required) | 1    | url     | Valid URL string.   |
| <i>Dynamic item</i>      | 0    | dynamic | 0 - (default) Disabled;<br>1 - Enabled.   |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the [URL](#) widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring a [URL](#) widget

Configure a [URL](#) widget that displays the home page of Zabbix manual.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "url",

```

```

        "name": "URL",
        "x": 0,
        "y": 0,
        "width": 12,
        "height": 5,
        "view_mode": 0,
        "fields": [
            {
                "type": 1,
                "name": "url",
                "value": "https://www.zabbix.com/documentation/6.0/en"
            }
        ]
    },
    ],
    "userGroups": [
        {
            "usrgrp_id": 7,
            "permission": 2
        }
    ],
    "users": [
        {
            "userid": 1,
            "permission": 3
        }
    ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "dashboardids": [
            "3"
        ]
    },
    "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

24 Web monitoring

Description

These parameters and the possible property values for the respective dashboard widget field objects allow to configure the *Web monitoring* widget in `dashboard.create` and `dashboard.update` methods.



**Attention:**

Widget fields properties are not validated during the creation or update of a dashboard. This allows users to modify **built-in widgets** and create **custom widgets**, but also introduces the risk of creating or updating widgets incorrectly. To ensure the successful creation or update of the *Web monitoring* widget, please refer to the parameter requirements outlined in the tables below.

**Parameters**

The following parameters are supported for the *Web monitoring* widget.

| Parameter  | type | name             | value   |
|--|------|------------------|---|
| <i>Refresh interval</i>  | 0    | rf_rate          | 0 - No refresh;<br>10 - 10 seconds;<br>30 - 30 seconds;<br>60 - (default) 1 minute;<br>120 - 2 minutes;<br>600 - 10 minutes;<br>900 - 15 minutes.   |
| <i>Host groups</i>   | 2    | groupids         | <b>Host group ID.</b><br><br>Note: To configure multiple host groups, create a dashboard widget field object for each host group.   |
| <i>Exclude host groups</i>   | 2    | exclude_groupids | <b>Host group ID.</b><br><br>Note: To exclude multiple host groups, create a dashboard widget field object for each host group.   |
| <i>Hosts</i>   | 3    | hostids          | <b>Host ID.</b><br><br>Note: To configure multiple hosts, create a dashboard widget field object for each host. For multiple hosts, the parameter <i>Host groups</i> must either be not configured at all or configured with at least one host group that the configured hosts belong to. |
| <i>Tags</i><br>(the number in the property name (e.g. tags.tag.0) references tag order in the tag evaluation list) |      |                  |   |
| <i>Evaluation type</i>   | 0    | evaltype         | 0 - (default) And/Or;<br>2 - Or.  |
| <i>Tag name</i>  | 1    | tags.tag.0       | Any string value.   |

Parameter *Tag name* required if configuring *Tags*.

| Parameter                        | type | name            | value  |
|----------------------------------|------|-----------------|--|
| <i>Operator</i>                  | 0    | tags.operator.0 | 0 - Contains;<br>1 - Equals;<br>2 - Does not contain;<br>3 - Does not equal;<br>4 - Exists;<br>5 - Does not exist. |
| <i>Tag value</i>                 | 1    | tags.value.0    | Parameter <i>Operator</i> required if configuring <i>Tags</i> .<br>Any string value.                               |
| <i>Show hosts in maintenance</i> | 0    | maintenance     | Parameter <i>Tag value</i> required if configuring <i>Tags</i> .<br>0 - Disabled;<br>1 - (default) Enabled.        |

## Examples

The following examples aim to only describe the configuration of the dashboard widget field objects for the *Web monitoring* widget. For more information on configuring a dashboard, see [dashboard.create](#).

### Configuring a *Web monitoring* widget

Configure a *Web monitoring* widget that displays a status summary of the active web monitoring scenarios for host group "4".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "web",
            "name": "Web monitoring",
            "x": 0,
            "y": 0,
            "width": 6,
            "height": 3,
            "view_mode": 0,
            "fields": [
              {
                "type": 2,
                "name": "groupids",
                "value": 4
              }
            ]
          }
        ]
      }
    ]
  },
  "userGroups": [
    {
      "usrgrpId": 7,
      "permission": 2
    }
  ]
}
```

```

    ],
    "users": [
      {
        "userid": 1,
        "permission": 3
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "3"
    ]
  },
  "id": 1
}

```

See also

- [Dashboard widget field](#)
- [dashboard.create](#)
- [dashboard.update](#)

## dashboard.create

Description

object dashboard.create(object/array dashboards)

This method allows to create new dashboards.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Dashboards to create.

Additionally to the [standard dashboard properties](#), the method accepts the following parameters.

| Parameter                  | Type  | Description  |
|----------------------------|-------|--|
| <b>pages</b><br>(required) | array | Dashboard <b>pages</b> to be created for the dashboard. Dashboard pages will be ordered in the same order as specified. At least one dashboard page object is required for pages property. |
| users                      | array | Dashboard <b>user</b> shares to be created on the dashboard.   |
| userGroups                 | array | Dashboard <b>user group</b> shares to be created on the dashboard.   |

Return values

(object) Returns an object containing the IDs of the created dashboards under the dashboardids property. The order of the returned IDs matches the order of the passed dashboards.

Examples

Creating a dashboard

Create a dashboard named "My dashboard" with one Problems widget with tags and using two types of sharing (user group and user) on a single dashboard page.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.create",
  "params": {
    "name": "My dashboard",
    "display_period": 30,
    "auto_start": 1,
    "pages": [
      {
        "widgets": [
          {
            "type": "problems",
            "x": 0,
            "y": 0,
            "width": 12,
            "height": 5,
            "view_mode": 0,
            "fields": [
              {
                "type": 1,
                "name": "tags.tag.0",
                "value": "service"
              },
              {
                "type": 0,
                "name": "tags.operator.0",
                "value": 1
              },
              {
                "type": 1,
                "name": "tags.value.0",
                "value": "zabbix_server"
              }
            ]
          }
        ]
      }
    ],
    "userGroups": [
      {
        "usrgrpid": "7",
        "permission": 2
      }
    ],
    "users": [
      {
        "userid": "4",
        "permission": 3
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "2"
    ]
  }
}
```

```

    ],
    },
    "id": 1
}

```

See also

- [Dashboard page](#)
- [Dashboard widget](#)
- [Dashboard widget field](#)
- [Dashboard user](#)
- [Dashboard user group](#)

Source

CDashboard::create() in *ui/include/classes/api/services/CDashboard.php*.

## dashboard.delete

Description

object dashboard.delete(array dashboardids)

This method allows to delete dashboards.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the dashboards to delete.

Return values

(object) Returns an object containing the IDs of the deleted dashboards under the dashboardids property.

Examples

Deleting multiple dashboards

Delete two dashboards.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "dashboard.delete",
  "params": [
    "2",
    "3"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "2",
      "3"
    ]
  },
  "id": 1
}

```

## Source

CDashboard::delete() in *ui/include/classes/api/services/CDashboard.php*.

## dashboard.get

### Description

integer/array dashboard.get(object parameters)

The method allows to retrieve dashboards according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| dashboardids           | string/array | Return only dashboards with the given IDs.  |
| selectPages            | query        | Return a <b>pages</b> property with dashboard pages, correctly ordered.   |
| selectUsers            | query        | Return a <b>users</b> property with users that the dashboard is shared with.                                    |
| selectUserGroups       | query        | Return a <b>userGroups</b> property with user groups that the dashboard is shared with.                         |
| sortfield              | string/array | Sort the result by the given properties.  |
| countOutput            | boolean      | Possible value is: dashboardid.<br>These parameters are described in the <a href="#">reference commentary</a> . |
| editable               | boolean      |   |
| excludeSearch          | boolean      |   |
| filter                 | object       |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

### Examples

Retrieving a dashboard by ID

Retrieve all data about dashboards "1" and "2".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.get",
  "params": {
    "output": "extend",
    "selectPages": "extend",
    "selectUsers": "extend",
    "selectUserGroups": "extend",
```

```

        "dashboardids": [
            "1",
            "2"
        ]
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "dashboardid": "1",
            "name": "Dashboard",
            "userid": "1",
            "private": "0",
            "display_period": "30",
            "auto_start": "1",
            "users": [],
            "userGroups": [],
            "pages": [
                {
                    "dashboard_pageid": "1",
                    "name": "",
                    "display_period": "0",
                    "widgets": [
                        {
                            "widgetid": "9",
                            "type": "systeminfo",
                            "name": "",
                            "x": "12",
                            "y": "8",
                            "width": "12",
                            "height": "5",
                            "view_mode": "0",
                            "fields": []
                        },
                        {
                            "widgetid": "8",
                            "type": "problemsbysv",
                            "name": "",
                            "x": "12",
                            "y": "4",
                            "width": "12",
                            "height": "4",
                            "view_mode": "0",
                            "fields": []
                        },
                        {
                            "widgetid": "7",
                            "type": "problemhosts",
                            "name": "",
                            "x": "12",
                            "y": "0",
                            "width": "12",
                            "height": "4",
                            "view_mode": "0",
                            "fields": []
                        }
                    ]
                }
            ]
        }
    ]
}

```

```

        "widgetid": "6",
        "type": "discovery",
        "name": "",
        "x": "6",
        "y": "9",
        "width": "6",
        "height": "4",
        "view_mode": "0",
        "fields": []
    },
    {
        "widgetid": "5",
        "type": "web",
        "name": "",
        "x": "0",
        "y": "9",
        "width": "6",
        "height": "4",
        "view_mode": "0",
        "fields": []
    },
    {
        "widgetid": "4",
        "type": "problems",
        "name": "",
        "x": "0",
        "y": "3",
        "width": "12",
        "height": "6",
        "view_mode": "0",
        "fields": []
    },
    {
        "widgetid": "3",
        "type": "favmaps",
        "name": "",
        "x": "8",
        "y": "0",
        "width": "4",
        "height": "3",
        "view_mode": "0",
        "fields": []
    },
    {
        "widgetid": "1",
        "type": "favgraphs",
        "name": "",
        "x": "0",
        "y": "0",
        "width": "4",
        "height": "3",
        "view_mode": "0",
        "fields": []
    }
]
},
{
    "dashboard_pageid": "2",
    "name": "",
    "display_period": "0",
    "widgets": []
},

```



```

        {
            "dashboard_pageid": "3",
            "name": "Custom page name",
            "display_period": "60",
            "widgets": []
        }
    ],
    {
        "dashboardid": "2",
        "name": "My dashboard",
        "userid": "1",
        "private": "1",
        "display_period": "60",
        "auto_start": "1",
        "users": [
            {
                "userid": "4",
                "permission": "3"
            }
        ],
        "userGroups": [
            {
                "usrgrpid": "7",
                "permission": "2"
            }
        ],
        "pages": [
            {
                "dashboard_pageid": "4",
                "name": "",
                "display_period": "0",
                "widgets": [
                    {
                        "widgetid": "10",
                        "type": "problems",
                        "name": "",
                        "x": "0",
                        "y": "0",
                        "width": "12",
                        "height": "5",
                        "view_mode": "0",
                        "fields": [
                            {
                                "type": "2",
                                "name": "groupids",
                                "value": "4"
                            }
                        ]
                    }
                ]
            }
        ]
    },
    "id": 1
}

```

See also

- [Dashboard page](#)
- [Dashboard widget](#)
- [Dashboard widget field](#)

- [Dashboard user](#)
- [Dashboard user group](#)

Source

CDashboard::get() in *ui/include/classes/api/services/CDashboard.php*.

## dashboard.update

Description

object dashboard.update(object/array dashboards)

This method allows to update existing dashboards.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Dashboard properties to be updated.

The dashboardid property must be specified for each dashboard, all other properties are optional. Only the specified properties will be updated.

Additionally to the [standard dashboard properties](#), the method accepts the following parameters.

| Parameter  | Type  | Description  |
|------------|-------|--|
| pages      | array | Dashboard <a href="#">pages</a> to replace the existing dashboard pages.<br><br>Dashboard pages are updated by the dashboard_pageid property. New dashboard pages will be created for objects without dashboard_pageid property and the existing dashboard pages will be deleted if not reused. Dashboard pages will be ordered in the same order as specified. Only the specified properties of the dashboard pages will be updated. At least one dashboard page object is required for pages property. |
| users      | array | Dashboard <a href="#">user</a> shares to replace the existing elements.  |
| userGroups | array | Dashboard <a href="#">user group</a> shares to replace the existing elements.  |

Return values

(object) Returns an object containing the IDs of the updated dashboards under the dashboardids property.

Examples

Renaming a dashboard

Rename a dashboard to "SQL server status".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.update",
  "params": {
    "dashboardid": "2",
    "name": "SQL server status"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "2"
    ]
  },
  "id": 1
}
```

#### Updating dashboard pages

Rename the first dashboard page, replace widgets on the second dashboard page and add a new page as the third one. Delete all other dashboard pages.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.update",
  "params": {
    "dashboardid": "2",
    "pages": [
      {
        "dashboard_pageid": 1,
        "name": 'Renamed Page'
      },
      {
        "dashboard_pageid": 2,
        "widgets": [
          {
            "type": "clock",
            "x": 0,
            "y": 0,
            "width": 4,
            "height": 3
          }
        ]
      },
      {
        "display_period": 60
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "2"
    ]
  },
  "id": 2
}
```

#### Change dashboard owner

Available only for admins and super admins.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dashboard.update",
  "params": {
    "dashboardid": "2",
    "userid": "1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 2
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "2"
    ]
  },
  "id": 2
}
```

See also

- [Dashboard page](#)
- [Dashboard widget](#)
- [Dashboard widget field](#)
- [Dashboard user](#)
- [Dashboard user group](#)

Source

CDashboard::update() in *ui/include/classes/api/services/CDashboard.php*.

## Discovered host

This class is designed to work with discovered hosts.

Object references:

- [Discovered host](#)

Available methods:

- [dhost.get](#) - retrieve discovered hosts

## > Discovered host object

The following objects are directly related to the dhost API.

Discovered host

### Note:

Discovered host are created by the Zabbix server and cannot be modified via the API.

The discovered host object contains information about a host discovered by a network discovery rule. It has the following properties.

| Property | Type      | Description                                      |
|----------|-----------|--|
| dhostid  | string    | ID of the discovered host.                       |
| druleid  | string    | ID of the discovery rule that detected the host. |
| lastdown | timestamp | Time when the discovered host last went down.    |
| lastup   | timestamp | Time when the discovered host last went up.      |

| Property | Type    | Description   |
|----------|---------|---|
| status   | integer | Whether the discovered host is up or down. A host is up if it has at least one active discovered service.<br><br>Possible values:<br>0 - host up;<br>1 - host down. |

## dhost.get

### Description

integer/array dhost.get(object parameters)

The method allows to retrieve discovered hosts according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| dhostids               | string/array | Return only discovered hosts with the given IDs.   |
| druleids               | string/array | Return only discovered hosts that have been created by the given discovery rules.  |
| dserviceids            | string/array | Return only discovered hosts that are running the given services.  |
| selectDRules           | query        | Return a <b>drules</b> property with an array of the discovery rules that detected the host.   |
| selectDServices        | query        | Return a <b>dservices</b> property with the discovered services running on the host.   |
| limitSelects           | integer      | Supports count.<br>Limits the number of records returned by subselects.  |
| sortfield              | string/array | Applies to the following subselects:<br>selectDServices - results will be sorted by dserviceid.<br>Sort the result by the given properties.<br><br>Possible values are: dhostid and druleid.<br>These parameters are described in the <a href="#">reference commentary</a> . |
| countOutput            | boolean      |  |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

### Return values

(integer/array) Returns either:

- an array of objects;

- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieve discovered hosts by discovery rule

Retrieve all hosts and the discovered services they are running that have been detected by discovery rule "4".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dhost.get",
  "params": {
    "output": "extend",
    "selectDServices": "extend",
    "druleids": "4"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "dservices": [
        {
          "dserviceid": "1",
          "dhostid": "1",
          "type": "4",
          "key_": "",
          "value": "",
          "port": "80",
          "status": "0",
          "lastup": "1337697227",
          "lastdown": "0",
          "dcheckid": "5",
          "ip": "192.168.1.1",
          "dns": "station.company.lan"
        }
      ],
      "dhostid": "1",
      "druleid": "4",
      "status": "0",
      "lastup": "1337697227",
      "lastdown": "0"
    },
    {
      "dservices": [
        {
          "dserviceid": "2",
          "dhostid": "2",
          "type": "4",
          "key_": "",
          "value": "",
          "port": "80",
          "status": "0",
          "lastup": "1337697234",
          "lastdown": "0",
          "dcheckid": "5",
          "ip": "192.168.1.4",
          "dns": "john.company.lan"
        }
      ]
    }
  ]
}
```

```

    ],
    "dhostid": "2",
    "druleid": "4",
    "status": "0",
    "lastup": "1337697234",
    "lastdown": "0"
  },
  {
    "dservices": [
      {
        "dserviceid": "3",
        "dhostid": "3",
        "type": "4",
        "key_": "",
        "value": "",
        "port": "80",
        "status": "0",
        "lastup": "1337697234",
        "lastdown": "0",
        "dcheckid": "5",
        "ip": "192.168.1.26",
        "dns": "printer.company.lan"
      }
    ],
    "dhostid": "3",
    "druleid": "4",
    "status": "0",
    "lastup": "1337697234",
    "lastdown": "0"
  },
  {
    "dservices": [
      {
        "dserviceid": "4",
        "dhostid": "4",
        "type": "4",
        "key_": "",
        "value": "",
        "port": "80",
        "status": "0",
        "lastup": "1337697234",
        "lastdown": "0",
        "dcheckid": "5",
        "ip": "192.168.1.7",
        "dns": "mail.company.lan"
      }
    ],
    "dhostid": "4",
    "druleid": "4",
    "status": "0",
    "lastup": "1337697234",
    "lastdown": "0"
  }
],
"id": 1
}

```

See also

- [Discovered service](#)
- [Discovery rule](#)

Source

CDHost::get() in *ui/include/classes/api/services/CDHost.php*.

## Discovered service

This class is designed to work with discovered services.

Object references:

- [Discovered service](#)

Available methods:

- [dservice.get](#) - retrieve discovered services

### > Discovered service object

The following objects are directly related to the `dservice` API.

Discovered service

#### Note:

Discovered services are created by the Zabbix server and cannot be modified via the API.

The discovered service object contains information about a service discovered by a network discovery rule on a host. It has the following properties.

| Property                | Type      | Description   |
|-------------------------|-----------|---|
| <code>dserviceid</code> | string    | ID of the discovered service.   |
| <code>dcheckid</code>   | string    | ID of the discovery check used to detect the service.   |
| <code>dhostid</code>    | string    | ID of the discovered host running the service.  |
| <code>dns</code>        | string    | DNS of the host running the service.  |
| <code>ip</code>         | string    | IP address of the host running the service.   |
| <code>lastdown</code>   | timestamp | Time when the discovered service last went down.  |
| <code>lastup</code>     | timestamp | Time when the discovered service last went up.  |
| <code>port</code>       | integer   | Service port number.  |
| <code>status</code>     | integer   | Status of the service.  |
|                         |           | Possible values:<br>0 - service up;<br>1 - service down.  |
| <code>value</code>      | string    | Value returned by the service when performing a Zabbix agent, SNMPv1, SNMPv2 or SNMPv3 discovery check. |

## `dservice.get`

Description

`integer/array dservice.get(object parameters)`

The method allows to retrieve discovered services according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.



| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| dserviceids            | string/array | Return only discovered services with the given IDs.   |
| dhostids               | string/array | Return only discovered services that belong to the given discovered hosts.  |
| dcheckids              | string/array | Return only discovered services that have been detected by the given discovery checks.  |
| druleids               | string/array | Return only discovered services that have been detected by the given discovery rules.   |
| selectDRules           | query        | Return a <b>drules</b> property with an array of the discovery rules that detected the service.   |
| selectDHosts           | query        | Return a <b>dhosts</b> property with an array the discovered hosts that the service belongs to.   |
| selectHosts            | query        | Return a <b>hosts</b> property with the hosts with the same IP address and proxy as the service.  |
| limitSelects           | integer      | Supports count.<br>Limits the number of records returned by subselects.   |
| sortfield              | string/array | Applies to the following subselects:<br><code>selectHosts</code> - result will be sorted by <code>hostid</code> .<br>Sort the result by the given properties.             |
| countOutput            | boolean      | Possible values are: <code>dserviceid</code> , <code>dhostid</code> and <code>ip</code> .<br>These parameters are described in the <a href="#">reference commentary</a> . |
| editable               | boolean      |   |
| excludeSearch          | boolean      |   |
| filter                 | object       |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieve services discovered on a host

Retrieve all discovered services detected on discovered host "11".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dservice.get",
  "params": {
    "output": "extend",
    "dhostids": "11"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
```

```

"result": [
  {
    "dserviceid": "12",
    "dhostid": "11",
    "value": "",
    "port": "80",
    "status": "1",
    "lastup": "0",
    "lastdown": "1348650607",
    "dcheckid": "5",
    "ip": "192.168.1.134",
    "dns": "john.local"
  },
  {
    "dserviceid": "13",
    "dhostid": "11",
    "value": "",
    "port": "21",
    "status": "1",
    "lastup": "0",
    "lastdown": "1348650610",
    "dcheckid": "6",
    "ip": "192.168.1.134",
    "dns": "john.local"
  }
],
"id": 1
}

```

See also

- [Discovered host](#)
- [Discovery check](#)
- [Host](#)

Source

`CDService::get()` in `ui/include/classes/api/services/CDService.php`.

## Discovery check

This class is designed to work with discovery checks.

Object references:

- [Discovery check](#)

Available methods:

- `dcheck.get` - retrieve discovery checks

## > Discovery check object

The following objects are directly related to the `dcheck` API.

Discovery check

The discovery check object defines a specific check performed by a network discovery rule. It has the following properties.

| Property              | Type   | Description   |
|-----------------------|--------|---|
| <code>dcheckid</code> | string | ( <i>readonly</i> ) ID of the discovery check.                          |
| <code>druleid</code>  | string | ( <i>readonly</i> ) ID of the discovery rule that the check belongs to. |

| Property                  | Type    | Description  |
|---------------------------|---------|--|
| key_                      | string  | The value of this property differs depending on the type of the check:<br>- key to query for Zabbix agent checks, required;<br>- SNMP OID for SNMPv1, SNMPv2 and SNMPv3 checks, required.  |
| ports                     | string  | One or several port ranges to check separated by commas. Used for all checks except for ICMP.  |
| snmp_community            | string  | Default: 0.<br>SNMP community.   |
| snmpv3_authpassphrase     | string  | Required for SNMPv1 and SNMPv2 agent checks.<br>Authentication passphrase used for SNMPv3 agent checks with security level set to <i>authNoPriv</i> or <i>authPriv</i> .   |
| snmpv3_authprotocol       | integer | Authentication protocol used for SNMPv3 agent checks with security level set to <i>authNoPriv</i> or <i>authPriv</i> .<br><br>Possible values:<br>0 - (default) MD5;<br>1 - SHA1;<br>2 - SHA224;<br>3 - SHA256;<br>4 - SHA384;<br>5 - SHA512.  |
| snmpv3_contextname        | string  | SNMPv3 context name. Used only by SNMPv3 checks.   |
| snmpv3_privpassphrase     | string  | Privacy passphrase used for SNMPv3 agent checks with security level set to <i>authPriv</i> .   |
| snmpv3_privprotocol       | integer | Privacy protocol used for SNMPv3 agent checks with security level set to <i>authPriv</i> .<br><br>Possible values:<br>0 - (default) DES;<br>1 - AES128;<br>2 - AES192;<br>3 - AES256;<br>4 - AES192C;<br>5 - AES256C.  |
| snmpv3_securitylevel      | string  | Security level used for SNMPv3 agent checks.<br><br>Possible values:<br>0 - noAuthNoPriv;<br>1 - authNoPriv;<br>2 - authPriv.  |
| snmpv3_securityname       | string  | Security name used for SNMPv3 agent checks.  |
| <b>type</b><br>(required) | integer | Type of check.<br><br>Possible values:<br>0 - SSH;<br>1 - LDAP;<br>2 - SMTP;<br>3 - FTP;<br>4 - HTTP;<br>5 - POP;<br>6 - NNTP;<br>7 - IMAP;<br>8 - TCP;<br>9 - Zabbix agent;<br>10 - SNMPv1 agent;<br>11 - SNMPv2 agent;<br>12 - ICMP ping;<br>13 - SNMPv3 agent;<br>14 - HTTPS;<br>15 - Telnet. |

| Property    | Type    | Description  |
|-------------|---------|--|
| uniq        | integer | Whether to use this check as a device uniqueness criteria. Only a single unique check can be configured for a discovery rule. Used for Zabbix agent, SNMPv1, SNMPv2 and SNMPv3 agent checks.<br><br>Possible values:<br>0 - <i>(default)</i> do not use this check as a uniqueness criteria;<br>1 - use this check as a uniqueness criteria. |
| host_source | integer | Source for host name.<br><br>Possible values:<br>1 - <i>(default)</i> DNS;<br>2 - IP;<br>3 - discovery value of this check.  |
| name_source | integer | Source for visible name.<br><br>Possible values:<br>0 - <i>(default)</i> not specified;<br>1 - DNS;<br>2 - IP;<br>3 - discovery value of this check.   |

## dcheck.get

### Description

`integer/array dcheck.get(object parameters)`

The method allows to retrieve discovery checks according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| dcheckids              | string/array | Return only discovery checks with the given IDs.   |
| druleids               | string/array | Return only discovery checks that belong to the given discovery rules.   |
| dserviceids            | string/array | Return only discovery checks that have detected the given discovered services.   |
| selectDRules           | query        | Return discovery rules related to the discovery checks.  |
| sortfield              | string/array | Sort the result by the given properties.<br><br>Possible values are: dcheckid and druleid.<br>These parameters are described in the <a href="#">reference commentary</a> . |
| countOutput            | boolean      |  |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

Examples

Retrieve discovery checks for a discovery rule

Retrieve all discovery checks used by discovery rule "6".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "dcheck.get",
  "params": {
    "output": "extend",
    "dcheckids": "6"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "dcheckid": "6",
      "druleid": "4",
      "type": "3",
      "key_": "",
      "snmp_community": "",
      "ports": "21",
      "snmpv3_securityname": "",
      "snmpv3_securitylevel": "0",
      "snmpv3_authpassphrase": "",
      "snmpv3_privpassphrase": "",
      "uniq": "0",
      "snmpv3_authprotocol": "0",
      "snmpv3_privprotocol": "0",
      "host_source": "1",
      "name_source": "0"
    }
  ],
  "id": 1
}
```

Source

`CDCheck::get()` in `ui/include/classes/api/services/CDCheck.php`.

## Discovery rule

This class is designed to work with network discovery rules.

### Note:

This API is meant to work with network discovery rules. For the low-level discovery rules see the [LLD rule API](#).

Object references:

- [Discovery rule](#)

Available methods:

- **drule.create** - create new discovery rules
- **drule.delete** - delete discovery rules
- **drule.get** - retrieve discovery rules
- **drule.update** - update discovery rules

## > Discovery rule object

The following objects are directly related to the **drule** API.

Discovery rule

The discovery rule object defines a network discovery rule. It has the following properties.

| Property                     | Type      | Description   |
|------------------------------|-----------|---|
| druleid                      | string    | ( <i>readonly</i> ) ID of the discovery rule.   |
| <b>iprange</b><br>(required) | string    | One or several IP ranges to check separated by commas.<br><br>Refer to the <b>network discovery configuration</b> section for more information on supported formats of IP ranges. |
| <b>name</b><br>(required)    | string    | Name of the discovery rule.   |
| delay                        | string    | Execution interval of the discovery rule. Accepts seconds, time unit with suffix and user macro.<br><br>Default: 1h.  |
| nextcheck                    | timestamp | ( <i>readonly</i> ) Time when the discovery rule will be executed next.   |
| proxy_hostid                 | string    | ID of the proxy used for discovery.   |
| status                       | integer   | Whether the discovery rule is enabled.<br><br>Possible values:<br>0 - ( <i>default</i> ) enabled;<br>1 - disabled.  |

Note that for some methods (update, delete) the required/optional parameter combination is different.

## **drule.create**

Description

object **drule.create**(object/array discoveryRules)

This method allows to create new discovery rules.

### **Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See **User roles** for more information.

Parameters

(object/array) Discovery rules to create.

Additionally to the **standard discovery rule properties**, the method accepts the following parameters.

| Parameter                    | Type  | Description   |
|------------------------------|-------|---|
| <b>dchecks</b><br>(required) | array | Discovery <b>checks</b> to create for the discovery rule. |

Return values

(object) Returns an object containing the IDs of the created discovery rules under the `druleids` property. The order of the returned IDs matches the order of the passed discovery rules.

#### Examples

##### Create a discovery rule

Create a discovery rule to find machines running the Zabbix agent in the local network. The rule must use a single Zabbix agent check on port 10050.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "drule.create",
  "params": {
    "name": "Zabbix agent discovery",
    "iprange": "192.168.1.1-255",
    "dchecks": [
      {
        "type": "9",
        "key_": "system.uname",
        "ports": "10050",
        "uniq": "0"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "druleids": [
      "6"
    ]
  },
  "id": 1
}
```

#### See also

- [Discovery check](#)

#### Source

`CDRule::create()` in `ui/include/classes/api/services/CDRule.php`.

### **drule.delete**

#### Description

object `drule.delete(array discoveryRuleIds)`

This method allows to delete discovery rules.

##### **Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(array) IDs of the discovery rules to delete.

#### Return values

(object) Returns an object containing the IDs of the deleted discovery rules under the `druleids` property.

Examples

Delete multiple discovery rules

Delete two discovery rules.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "drule.delete",
  "params": [
    "4",
    "6"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "druleids": [
      "4",
      "6"
    ]
  },
  "id": 1
}
```

Source

CDRule::delete() in ui/include/classes/api/services/CDRule.php.

drule.get

Description

integer/array drule.get(object parameters)

The method allows to retrieve discovery rules according to the given parameters.

**Note:**  
This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter     | Type         | Description  |
|---------------|--------------|--|
| dhostids      | string/array | Return only discovery rules that created the given discovered hosts.                     |
| druleids      | string/array | Return only discovery rules with the given IDs.  |
| dserviceids   | string/array | Return only discovery rules that created the given discovered services.                  |
| selectDChecks | query        | Return a <b>dchecks</b> property with the discovery checks used by the discovery rule.   |
| selectDHosts  | query        | Supports count.  |
|               |              | Return a <b>dhosts</b> property with the discovered hosts created by the discovery rule. |
|               |              | Supports count.  |



| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| limitSelects           | integer      | Limits the number of records returned by subselects.   |
| sortfield              | string/array | <p>Applies to the following subselects:</p> <p>selectDChecks - results will be sorted by dcheckid;</p> <p>selectDHosts - results will be sorted by dhostsid.</p> <p>Sort the result by the given properties.</p> |
| countOutput            | boolean      | Possible values are: druleid and name.<br>These parameters are described in the <a href="#">reference commentary</a> .   |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieve all discovery rules

Retrieve all configured discovery rules and the discovery checks they use.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "drule.get",
  "params": {
    "output": "extend",
    "selectDChecks": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "druleid": "2",
      "proxy_hostid": "0",
      "name": "Local network",
      "iprange": "192.168.3.1-255",
      "delay": "5s",
      "nextcheck": "1348754327",
      "status": "0",
      "dchecks": [
        {
          "dcheckid": "7",
          "druleid": "2",
          "type": "3",

```

```

        "key_": "",
        "snmp_community": "",
        "ports": "21",
        "snmpv3_securityname": "",
        "snmpv3_securitylevel": "0",
        "snmpv3_authpassphrase": "",
        "snmpv3_privpassphrase": "",
        "uniq": "0",
        "snmpv3_authprotocol": "0",
        "snmpv3_privprotocol": "0",
        "host_source": "1",
        "name_source": "0"
    },
    {
        "dcheckid": "8",
        "druleid": "2",
        "type": "4",
        "key_": "",
        "snmp_community": "",
        "ports": "80",
        "snmpv3_securityname": "",
        "snmpv3_securitylevel": "0",
        "snmpv3_authpassphrase": "",
        "snmpv3_privpassphrase": "",
        "uniq": "0",
        "snmpv3_authprotocol": "0",
        "snmpv3_privprotocol": "0",
        "host_source": "1",
        "name_source": "0"
    }
]
},
{
    "druleid": "6",
    "proxy_hostid": "0",
    "name": "Zabbix agent discovery",
    "iprange": "192.168.1.1-255",
    "delay": "1h",
    "nextcheck": "0",
    "status": "0",
    "dchecks": [
        {
            "dcheckid": "10",
            "druleid": "6",
            "type": "9",
            "key_": "system.uname",
            "snmp_community": "",
            "ports": "10050",
            "snmpv3_securityname": "",
            "snmpv3_securitylevel": "0",
            "snmpv3_authpassphrase": "",
            "snmpv3_privpassphrase": "",
            "uniq": "0",
            "snmpv3_authprotocol": "0",
            "snmpv3_privprotocol": "0",
            "host_source": "2",
            "name_source": "3"
        }
    ]
}
],
"id": 1

```

```
}
```

See also

- [Discovered host](#)
- [Discovery check](#)

Source

CDRule::get() in *ui/include/classes/api/services/CDRule.php*.

## drule.update

Description

`object drule.update(object/array discoveryRules)`

This method allows to update existing discovery rules.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Discovery rule properties to be updated.

The `druleid` property must be defined for each discovery rule, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard discovery rule properties](#), the method accepts the following parameters.

| Parameter | Type  | Description  |
|-----------|-------|--|
| dchecks   | array | Discovery <a href="#">checks</a> to replace existing checks. |

Return values

(object) Returns an object containing the IDs of the updated discovery rules under the `druleids` property.

Examples

Change the IP range of a discovery rule

Change the IP range of a discovery rule to "192.168.2.1-255".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "drule.update",
  "params": {
    "druleid": "6",
    "iprange": "192.168.2.1-255"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "druleids": [
      "6"
    ]
  },
  "id": 1
}
```

See also

- [Discovery check](#)

Source

CDRule::update() in *ui/include/classes/api/services/CDRule.php*.

**Event**

This class is designed to work with events.

Object references:

- [Event](#)

Available methods:

- [event.get](#) - retrieving events
- [event.acknowledge](#) - acknowledging events

> **Event object**

The following objects are directly related to the event API.

Event

**Note:**

Events are created by the Zabbix server and cannot be modified via the API.

The event object has the following properties.

| Property     | Type    | Description   |
|--------------|---------|---|
| eventid      | string  | ID of the event.  |
| source       | integer | Type of the event.<br><br>Possible values:<br>0 - event created by a trigger;<br>1 - event created by a discovery rule;<br>2 - event created by active agent autoregistration;<br>3 - internal event;<br>4 - event created on service status update.  |
| object       | integer | Type of object that is related to the event.<br><br>Possible values for trigger events:<br>0 - trigger.<br><br>Possible values for discovery events:<br>1 - discovered host;<br>2 - discovered service.<br><br>Possible values for autoregistration events:<br>3 - auto-registered host.<br><br>Possible values for internal events:<br>0 - trigger;<br>4 - item;<br>5 - LLD rule.<br><br>Possible values for service events:<br>6 - service. |
| objectid     | string  | ID of the related object.   |
| acknowledged | integer | Whether the event has been acknowledged.  |

| Property      | Type      | Description   |
|---------------|-----------|---|
| clock         | timestamp | Time when the event was created.  |
| ns            | integer   | Nanoseconds when the event was created.   |
| name          | string    | Resolved event name.  |
| value         | integer   | State of the related object.  |
|               |           | Possible values for trigger and service events:<br>0 - OK;<br>1 - problem.  |
|               |           | Possible values for discovery events:<br>0 - host or service up;<br>1 - host or service down;<br>2 - host or service discovered;<br>3 - host or service lost.     |
|               |           | Possible values for internal events:<br>0 - "normal" state;<br>1 - "unknown" or "not supported" state.  |
| severity      | integer   | This parameter is not used for active agent autoregistration events.<br>Event current severity.   |
|               |           | Possible values:<br>0 - not classified;<br>1 - information;<br>2 - warning;<br>3 - average;<br>4 - high;<br>5 - disaster.   |
| r_eventid     | string    | Recovery event ID   |
| c_eventid     | string    | ID of the event that was used to override (close) current event under global correlation rule. See <code>correlationid</code> to identify exact correlation rule. |
|               |           | This parameter is only defined when the event is closed by global correlation rule.   |
| correlationid | string    | ID of the correlation rule that generated closing of the problem.   |
|               |           | This parameter is only defined when the event is closed by global correlation rule.   |
| userid        | string    | User ID if the event was manually closed.   |
| suppressed    | integer   | Whether the event is suppressed.  |
|               |           | Possible values:<br>0 - event is in normal state;<br>1 - event is suppressed.   |
| opdata        | string    | Operational data with expanded macros.  |
| urls          | array     | Active <b>media type</b> URLs.  |

#### Event tag

The event tag object has the following properties.

| Property | Type   | Description      |
|----------|--------|------------------|
| tag      | string | Event tag name.  |
| value    | string | Event tag value. |

#### Media type URL

The media type URL object has the following properties.

| Property | Type   | Description                   |
|----------|--------|-------------------------------|
| name     | string | Media type defined URL name.  |
| url      | string | Media type defined URL value. |

Results will contain entries only for active media types with enabled event menu entry. Macro used in properties will be expanded, but if one of the properties contains an unexpanded macro, both properties will be excluded from results. For supported macros, see *Supported macros*.

## event.acknowledge

Description

`object event.acknowledge(object/array parameters)`

This method allows to update events. Following update actions can be performed:

- Close event. If event is already resolved, this action will be skipped.
- Acknowledge event. If event is already acknowledged, this action will be skipped.
- Unacknowledge event. If event is not acknowledged, this action will be skipped.
- Add message.
- Change event severity. If event already has same severity, this action will be skipped.

### Attention:

Only trigger events can be updated.

Only problem events can be updated.

Read/Write rights for trigger are required to close the event or to change event's severity.

To close an event, manual close should be allowed in the trigger.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See *User roles* for more information.

Parameters

(object/array) Parameters containing the IDs of the events and update operations that should be performed.

| Parameter                     | Type          | Description   |
|-------------------------------|---------------|---|
| <b>eventids</b><br>(required) | string/object | IDs of the events to acknowledge.   |
| <b>action</b><br>(required)   | integer       | Event update action(s).<br><br>Possible bitmap values are:<br>1 - close problem;<br>2 - acknowledge event;<br>4 - add message;<br>8 - change severity;<br>16 - unacknowledge event.<br><br>This is a bitmask field; any sum of possible bitmap values is acceptable (for example, 6 for acknowledge event and add message). |
| message                       | string        | Text of the message.<br><b>Required</b> , if action contains 'add message' flag.  |

| Parameter | Type    | Description   |
|-----------|---------|---|
| severity  | integer | <p>New severity for events.<br/> <b>Required</b>, if action contains 'change severity' flag.</p> <p>Possible values:<br/> 0 - not classified;<br/> 1 - information;<br/> 2 - warning;<br/> 3 - average;<br/> 4 - high;<br/> 5 - disaster.</p> |

#### Return values

(object) Returns an object containing the IDs of the updated events under the eventids property.

#### Examples

##### Acknowledging an event

Acknowledge a single event and leave a message.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "event.acknowledge",
  "params": {
    "eventids": "20427",
    "action": 6,
    "message": "Problem resolved."
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "eventids": [
      "20427"
    ]
  },
  "id": 1
}
```

##### Changing event's severity

Change severity for multiple events and leave a message.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "event.acknowledge",
  "params": {
    "eventids": ["20427", "20428"],
    "action": 12,
    "message": "Maintenance required to fix it.",
    "severity": 4
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "eventids": [
      "20427",
      "20428"
    ]
  },
  "id": 1
}
```

Source

CEvent::acknowledge() in *ui/include/classes/api/services/CEvent.php*.

## event.get

Description

integer/array event.get(object parameters)

The method allows to retrieve events according to the given parameters.

### Attention:

This method may return events of a deleted entity if these events have not been removed by the housekeeper yet.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter    | Type          | Description  |
|--------------|---------------|--|
| eventids     | string/array  | Return only events with the given IDs.   |
| groupids     | string/array  | Return only events created by objects that belong to the given host groups.  |
| hostids      | string/array  | Return only events created by objects that belong to the given hosts.  |
| objectids    | string/array  | Return only events created by the given objects.   |
| source       | integer       | Return only events with the given type.<br><br>Refer to the <a href="#">event object page</a> for a list of supported event types.   |
| object       | integer       | Default: 0 - trigger events.<br>Return only events created by objects of the given type.<br><br>Refer to the <a href="#">event object page</a> for a list of supported object types. |
| acknowledged | boolean       | Default: 0 - trigger.  |
| suppressed   | boolean       | If set to true return only acknowledged events.<br>true - return only suppressed events;<br>false - return events in the normal state.   |
| severities   | integer/array | Return only events with given event severities. Applies only if object is trigger.   |
| evaltype     | integer       | Rules for tag searching.<br><br>Possible values:<br>0 - (default) And/Or;<br>2 - Or.   |



| Parameter             | Type             | Description  |
|-----------------------|------------------|--|
| tags                  | array of objects | <p>Return only events with given tags. Exact match by tag and case-insensitive search by value and operator.<br/> Format: [{"tag": "&lt;tag&gt;", "value": "&lt;value&gt;", "operator": "&lt;operator&gt;"}, ...].<br/> An empty array returns all events.</p> <p>Possible operator types:<br/> 0 - (default) Like;<br/> 1 - Equal;<br/> 2 - Not like;<br/> 3 - Not equal<br/> 4 - Exists;<br/> 5 - Not exists.</p>  |
| eventid_from          | string           | Return only events with IDs greater or equal to the given ID.  |
| eventid_till          | string           | Return only events with IDs less or equal to the given ID.   |
| time_from             | timestamp        | Return only events that have been created after or at the given time.  |
| time_till             | timestamp        | Return only events that have been created before or at the given time.   |
| problem_time_from     | timestamp        | Returns only events that were in the problem state starting with problem_time_from. Applies only if the source is trigger event and object is trigger. Mandatory if problem_time_till is specified.  |
| problem_time_till     | timestamp        | Returns only events that were in the problem state until problem_time_till. Applies only if the source is trigger event and object is trigger. Mandatory if problem_time_from is specified.  |
| value                 | integer/array    | Return only events with the given values.  |
| selectHosts           | query            | Return a <b>hosts</b> property with hosts containing the object that created the event. Supported only for events generated by triggers, items or LLD rules.   |
| selectRelatedObject   | query            | Return a <b>relatedObject</b> property with the object that created the event. The type of object returned depends on the event type.  |
| select_alerts         | query            | Return an <b>alerts</b> property with alerts generated by the event. Alerts are sorted in reverse chronological order.   |
| select_acknowledges   | query            | Return an <b>acknowledges</b> property with event updates. Event updates are sorted in reverse chronological order.  |
|                       |                  | <p>The event update object has the following properties:<br/> <b>acknowledgeid</b> - (string) acknowledgment's ID;<br/> <b>userid</b> - (string) ID of the user that updated the event;<br/> <b>eventid</b> - (string) ID of the updated event;<br/> <b>clock</b> - (timestamp) time when the event was updated;<br/> <b>message</b> - (string) text of the message;<br/> <b>action</b> - (integer) update action that was performed see <b>event.acknowledge</b>;<br/> <b>old_severity</b> - (integer) event severity before this update action;<br/> <b>new_severity</b> - (integer) event severity after this update action;<br/> <b>username</b> - (string) username of the user that updated the event;<br/> <b>name</b> - (string) name of the user that updated the event;<br/> <b>surname</b> - (string) surname of the user that updated the event.</p> |
|                       |                  | Supports count.  |
| selectTags            | query            | Return a <b>tags</b> property with event tags.   |
| selectSuppressionData | query            | Return a <b>suppression_data</b> property with the list of maintenances:<br><b>maintenanceid</b> - (string) ID of the maintenance;<br><b>suppress_until</b> - (integer) time until the event is suppressed.  |
| sortfield             | string/array     | Sort the result by the given properties.   |
|                       |                  | Possible values are: eventid, objectid and clock.  |
| countOutput           | boolean          | These parameters are described in the <b>reference commentary</b> .  |
| editable              | boolean          |  |
| excludeSearch         | boolean          |  |
| filter                | object           |  |
| limit                 | integer          |  |

| Parameter              | Type         | Description |
|------------------------|--------------|-------------|
| output                 | query        |             |
| preservekeys           | boolean      |             |
| search                 | object       |             |
| searchByAny            | boolean      |             |
| searchWildcardsEnabled | boolean      |             |
| sortorder              | string/array |             |
| startSearch            | boolean      |             |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving trigger events

Retrieve the latest events from trigger "13926."

Request:

```
{
  "jsonrpc": "2.0",
  "method": "event.get",
  "params": {
    "output": "extend",
    "select_acknowledges": "extend",
    "selectTags": "extend",
    "selectSuppressionData": "extend",
    "objectids": "13926",
    "sortfield": ["clock", "eventid"],
    "sortorder": "DESC"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "eventid": "9695",
      "source": "0",
      "object": "0",
      "objectid": "13926",
      "clock": "1347970410",
      "value": "1",
      "acknowledged": "1",
      "ns": "413316245",
      "name": "MySQL is down",
      "severity": "5",
      "r_eventid": "0",
      "c_eventid": "0",
      "correlationid": "0",
      "userid": "0",
      "opdata": "",
      "acknowledges": [
        {
          "acknowledgeid": "1",
          "userid": "1",
          "eventid": "9695",

```

```

        "clock": "1350640590",
        "message": "Problem resolved.\n\r----[BULK ACKNOWLEDGE]----",
        "action": "6",
        "old_severity": "0",
        "new_severity": "0",
        "username": "Admin",
        "name": "Zabbix",
        "surname": "Administrator"
    }
],
"suppression_data": [
    {
        "maintenanceid": "15",
        "suppress_until": "1472511600"
    }
],
"suppressed": "1",
"tags": [
    {
        "tag": "service",
        "value": "mysqld"
    },
    {
        "tag": "error",
        "value": ""
    }
]
},
{
    "eventid": "9671",
    "source": "0",
    "object": "0",
    "objectid": "13926",
    "clock": "1347970347",
    "value": "0",
    "acknowledged": "0",
    "ns": "0",
    "name": "Unavailable by ICMP ping",
    "severity": "4",
    "r_eventid": "0",
    "c_eventid": "0",
    "correlationid": "0",
    "userid": "0",
    "opdata": "",
    "acknowledges": [],
    "suppression_data": [],
    "suppressed": "0",
    "tags": []
}
],
"id": 1
}

```

Retrieving events by time period

Retrieve all events that have been created between October 9 and 10, 2012, in reverse chronological order.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "event.get",
    "params": {
        "output": "extend",

```

```

    "time_from": "1349797228",
    "time_till": "1350661228",
    "sortfield": ["clock", "eventid"],
    "sortorder": "desc"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "eventid": "20616",
      "source": "0",
      "object": "0",
      "objectid": "14282",
      "clock": "1350477814",
      "value": "1",
      "acknowledged": "0",
      "ns": "0",
      "name": "Less than 25% free in the history cache",
      "severity": "3",
      "r_eventid": "0",
      "c_eventid": "0",
      "correlationid": "0",
      "userid": "0",
      "opdata": "",
      "suppressed": "0"
    },
    {
      "eventid": "20617",
      "source": "0",
      "object": "0",
      "objectid": "14283",
      "clock": "1350477814",
      "value": "0",
      "acknowledged": "0",
      "ns": "0",
      "name": "Zabbix trapper processes more than 75% busy",
      "severity": "3",
      "r_eventid": "0",
      "c_eventid": "0",
      "correlationid": "0",
      "userid": "0",
      "opdata": "",
      "suppressed": "0"
    },
    {
      "eventid": "20618",
      "source": "0",
      "object": "0",
      "objectid": "14284",
      "clock": "1350477815",
      "value": "1",
      "acknowledged": "0",
      "ns": "0",
      "name": "High ICMP ping loss",
      "severity": "3",
      "r_eventid": "0",
      "c_eventid": "0",

```

```

        "correlationid": "0",
        "userid": "0",
        "opdata": "",
        "suppressed": "0"
    }
],
    "id": 1
}

```

See also

- [Alert](#)
- [Item](#)
- [Host](#)
- [LLD rule](#)
- [Trigger](#)

Source

CEvent::get() in *ui/include/classes/api/services/CEvent.php*.

## Graph

This class is designed to work with graphs.

Object references:

- [Graph](#)

Available methods:

- [graph.create](#) - creating new graphs
- [graph.delete](#) - deleting graphs
- [graph.get](#) - retrieving graphs
- [graph.update](#) - updating graphs

## > Graph object

The following objects are directly related to the `graph` API.

Graph

The graph object has the following properties.

| Property                    | Type    | Description  |
|-----------------------------|---------|--|
| graphid                     | string  | <i>(readonly)</i> ID of the graph.   |
| <b>height</b><br>(required) | integer | Height of the graph in pixels.   |
| <b>name</b><br>(required)   | string  | Name of the graph  |
| <b>width</b><br>(required)  | integer | Width of the graph in pixels.  |
| flags                       | integer | <i>(readonly)</i> Origin of the graph.<br><br>Possible values are:<br>0 - <i>(default)</i> a plain graph;<br>4 - a discovered graph. |
| graphtype                   | integer | Graph's layout type.<br><br>Possible values:<br>0 - <i>(default)</i> normal;<br>1 - stacked;<br>2 - pie;<br>3 - exploded.            |

| Property         | Type    | Description   |
|------------------|---------|---|
| percent_left     | float   | Left percentile.  |
| percent_right    | float   | Default: 0.<br>Right percentile.  |
| show_3d          | integer | Default: 0.<br>Whether to show pie and exploded graphs in 3D.   |
| show_legend      | integer | Possible values:<br>0 - <i>(default)</i> show in 2D;<br>1 - show in 3D.<br>Whether to show the legend on the graph.   |
| show_work_period | integer | Possible values:<br>0 - hide;<br>1 - <i>(default)</i> show.<br>Whether to show the working time on the graph.   |
| show_triggers    | integer | Possible values:<br>0 - hide;<br>1 - <i>(default)</i> show.<br>Whether to show the trigger line on the graph.   |
| templateid       | string  | Possible values:<br>0 - hide;<br>1 - <i>(default)</i> show.<br><i>(readonly)</i> ID of the parent template graph.   |
| yaxismax         | float   | The fixed maximum value for the Y axis.   |
| yaxismin         | float   | Default: 100.<br>The fixed minimum value for the Y axis.  |
| ymax_itemid      | string  | Default: 0.<br>ID of the item that is used as the maximum value for the Y axis.   |
| ymax_type        | integer | Starting with Zabbix 6.0.7, if user have no access to specified item, the graph is rendered like ymax_type would be set to '0' (calculated).<br>Maximum value calculation method for the Y axis.<br><br>Possible values:<br>0 - <i>(default)</i> calculated;<br>1 - fixed;<br>2 - item. |
| ymin_itemid      | string  | ID of the item that is used as the minimum value for the Y axis.  |
| ymin_type        | integer | Starting with Zabbix 6.0.7, if user have no access to specified item, the graph is rendered like ymax_type would be set to '0' (calculated).<br>Minimum value calculation method for the Y axis.<br><br>Possible values:<br>0 - <i>(default)</i> calculated;<br>1 - fixed;<br>2 - item. |
| uuid             | string  | Universal unique identifier, used for linking imported graphs to already existing ones. Used only for graphs on templates. Auto-generated, if not given.  |

Note that for some methods (update, delete) the required/optional parameter combination is different.

## graph.create

Description

object graph.create(object/array graphs)

This method allows to create new graphs.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Graphs to create.

Additionally to the **standard graph properties**, the method accepts the following parameters.

| Parameter                   | Type  | Description                                     |
|-----------------------------|-------|---|
| <b>gitems</b><br>(required) | array | Graph <b>items</b> to be created for the graph. |

Return values

(object) Returns an object containing the IDs of the created graphs under the **graphids** property. The order of the returned IDs matches the order of the passed graphs.

Examples

Creating a graph

Create a graph with two items.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graph.create",
  "params": {
    "name": "MySQL bandwidth",
    "width": 900,
    "height": 200,
    "gitems": [
      {
        "itemid": "22828",
        "color": "00AA00"
      },
      {
        "itemid": "22829",
        "color": "3333FF"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "graphids": [
      "652"
    ]
  },
  "id": 1
}
```

See also

- [Graph item](#)

Source

CGraph::create() in *ui/include/classes/api/services/CGraph.php*.

## graph.delete

Description

object graph.delete(array graphIds)

This method allows to delete graphs.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the graphs to delete.

Return values

(object) Returns an object containing the IDs of the deleted graphs under the *graphids* property.

Examples

Deleting multiple graphs

Delete two graphs.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graph.delete",
  "params": [
    "652",
    "653"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "graphids": [
      "652",
      "653"
    ]
  },
  "id": 1
}
```

Source

CGraph::delete() in *ui/include/classes/api/services/CGraph.php*.

## graph.get

Description

integer/array graph.get(object parameters)

The method allows to retrieve graphs according to the given parameters.



**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| graphids               | string/array | Return only graphs with the given IDs.  |
| groupids               | string/array | Return only graphs that belong to hosts in the given host groups.   |
| templateids            | string/array | Return only graph that belong to the given templates.   |
| hostids                | string/array | Return only graphs that belong to the given hosts.  |
| itemids                | string/array | Return only graphs that contain the given items.  |
| templated              | boolean      | If set to true return only graphs that belong to templates.   |
| inherited              | boolean      | If set to true return only graphs inherited from a template.  |
| expandName             | flag         | Expand macros in the graph name.  |
| selectGroups           | query        | Return a <b>groups</b> property with the host groups that the graph belongs to.   |
| selectTemplates        | query        | Return a <b>templates</b> property with the templates that the graph belongs to.  |
| selectHosts            | query        | Return a <b>hosts</b> property with the hosts that the graph belongs to.  |
| selectItems            | query        | Return an <b>items</b> property with the items used in the graph.   |
| selectGraphDiscovery   | query        | Return a <b>graphDiscovery</b> property with the graph discovery object. The graph discovery objects links the graph to a graph prototype from which it was created.  |
|                        |              | It has the following properties:<br>graphid - (string) ID of the graph;<br>parent_graphid - (string) ID of the graph prototype from which the graph has been created. |
| selectGraphItems       | query        | Return a <b>gitems</b> property with the items used in the graph.   |
| selectDiscoveryRule    | query        | Return a <b>discoveryRule</b> property with the low-level discovery rule that created the graph.  |
| filter                 | object       | Return only those results that exactly match the given filter.  |
|                        |              | Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.                                 |
|                        |              | Supports additional filters:<br>host - technical name of the host that the graph belongs to;<br>hostid - ID of the host that the graph belongs to.                    |
| sortfield              | string/array | Sort the result by the given properties.  |
|                        |              | Possible values are: graphid, name and graphtype.<br>These parameters are described in the <a href="#">reference commentary</a> .                                     |
| countOutput            | boolean      |   |
| editable               | boolean      |   |
| excludeSearch          | boolean      |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

**Return values**

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

##### Retrieving graphs from hosts

Retrieve all graphs from host "10107" and sort them by name.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "graph.get",
  "params": {
    "output": "extend",
    "hostids": 10107,
    "sortfield": "name"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "graphid": "612",
      "name": "CPU jumps",
      "width": "900",
      "height": "200",
      "yaxismin": "0",
      "yaxismax": "100",
      "templateid": "439",
      "show_work_period": "1",
      "show_triggers": "1",
      "graphtype": "0",
      "show_legend": "1",
      "show_3d": "0",
      "percent_left": "0",
      "percent_right": "0",
      "ymin_type": "0",
      "ymax_type": "0",
      "ymin_itemid": "0",
      "ymax_itemid": "0",
      "flags": "0"
    },
    {
      "graphid": "613",
      "name": "CPU load",
      "width": "900",
      "height": "200",
      "yaxismin": "0",
      "yaxismax": "100",
      "templateid": "433",
      "show_work_period": "1",
      "show_triggers": "1",
      "graphtype": "0",
      "show_legend": "1",
      "show_3d": "0",
      "percent_left": "0",
      "percent_right": "0",
      "ymin_type": "1",
      "ymax_type": "0",

```

```

        "ymin_itemid": "0",
        "ymax_itemid": "0",
        "flags": "0"
    },
    {
        "graphid": "614",
        "name": "CPU utilization",
        "width": "900",
        "height": "200",
        "yaxismin": "0",
        "yaxismax": "100",
        "templateid": "387",
        "show_work_period": "1",
        "show_triggers": "0",
        "graphtype": "1",
        "show_legend": "1",
        "show_3d": "0",
        "percent_left": "0",
        "percent_right": "0",
        "ymin_type": "1",
        "ymax_type": "1",
        "ymin_itemid": "0",
        "ymax_itemid": "0",
        "flags": "0"
    },
    {
        "graphid": "645",
        "name": "Disk space usage /",
        "width": "600",
        "height": "340",
        "yaxismin": "0",
        "yaxismax": "0",
        "templateid": "0",
        "show_work_period": "0",
        "show_triggers": "0",
        "graphtype": "2",
        "show_legend": "1",
        "show_3d": "1",
        "percent_left": "0",
        "percent_right": "0",
        "ymin_type": "0",
        "ymax_type": "0",
        "ymin_itemid": "0",
        "ymax_itemid": "0",
        "flags": "4"
    }
],
"id": 1
}

```

See also

- [Discovery rule](#)
- [Graph item](#)
- [Item](#)
- [Host](#)
- [Host group](#)
- [Template](#)

Source

CGraph::get() in `ui/include/classes/api/services/CGraph.php`.

## graph.update

### Description

object graph.update(object/array graphs)

This method allows to update existing graphs.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Graph properties to be updated.

The `graphid` property must be defined for each graph, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard graph properties](#) the method accepts the following parameters.

| Parameter | Type  | Description  |
|-----------|-------|--|
| gitems    | array | Graph <a href="#">items</a> to replace existing graph items. If a graph item has the <code>gitemid</code> property defined it will be updated, otherwise a new graph item will be created. |

### Return values

(object) Returns an object containing the IDs of the updated graphs under the `graphids` property.

### Examples

Setting the maximum for the Y scale

Set the maximum of the Y scale to a fixed value of 100.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graph.update",
  "params": {
    "graphid": "439",
    "ymax_type": 1,
    "yaxismax": 100
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "graphids": [
      "439"
    ]
  },
  "id": 1
}
```

### Source

CGraph::update() in `ui/include/classes/api/services/CGraph.php`.

## Graph item

This class is designed to work with graph items.

Object references:

- [Graph item](#)

Available methods:

- [graphitem.get](#) - retrieving graph items

### > Graph item object

The following objects are directly related to the `graphitem` API.

Graph item

#### Note:

Graph items can only be modified via the `graph` API.

The graph item object has the following properties.

| Property                                 | Type    | Description  |
|--|---------|--|
| <code>gitemid</code>                     | string  | <i>(readonly)</i> ID of the graph item.  |
| <b><code>color</code></b><br>(required)  | string  | Graph item's draw color as a hexadecimal color code.   |
| <b><code>itemid</code></b><br>(required) | string  | ID of the item.  |
| <code>calc_fnc</code>                    | integer | Value of the item that will be displayed.<br><br>Possible values:<br>1 - minimum value;<br>2 - <i>(default)</i> average value;<br>4 - maximum value;<br>7 - all values;<br>9 - last value, used only by pie and exploded graphs. |
| <code>drawtype</code>                    | integer | Draw style of the graph item.<br><br>Possible values:<br>0 - <i>(default)</i> line;<br>1 - filled region;<br>2 - bold line;<br>3 - dot;<br>4 - dashed line;<br>5 - gradient line.  |
| <code>graphid</code>                     | string  | ID of the graph that the graph item belongs to.  |
| <code>sortorder</code>                   | integer | Position of the item in the graph.   |
| <code>type</code>                        | integer | Default: starts with 0 and increases by one with each entry.<br>Type of graph item.<br><br>Possible values:<br>0 - <i>(default)</i> simple;<br>2 - graph sum, used only by pie and exploded graphs.                              |
| <code>yaxisside</code>                   | integer | Side of the graph where the graph item's Y scale will be drawn.<br><br>Possible values:<br>0 - <i>(default)</i> left side;<br>1 - right side.  |

## graphitem.get

### Description

integer/array graphitem.get(object parameters)

The method allows to retrieve graph items according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter    | Type         | Description   |
|--------------|--------------|---|
| graphids     | string/array | Return only graph items that belong to the given graphs.  |
| itemids      | string/array | Return only graph items with the given item IDs.  |
| type         | integer      | Return only graph items with the given type.<br><br>Refer to the <a href="#">graph item object page</a> for a list of supported graph item types. |
| selectGraphs | query        | Return a <b>graphs</b> property with an array of graphs that the item belongs to.   |
| sortfield    | string/array | Sort the result by the given properties.<br><br>Possible values are: <code>gitemid</code> .   |
| countOutput  | boolean      | These parameters are described in the <a href="#">reference commentary</a> .  |
| editable     | boolean      |   |
| limit        | integer      |   |
| output       | query        |   |
| preservekeys | boolean      |   |
| sortorder    | string/array |   |

### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

### Examples

Retrieving graph items from a graph

Retrieve all graph items used in a graph with additional information about the item and the host.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graphitem.get",
  "params": {
    "output": "extend",
    "graphids": "387"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
```

```

"result": [
  {
    "gitemid": "1242",
    "graphid": "387",
    "itemid": "22665",
    "drawtype": "1",
    "sortorder": "1",
    "color": "FF5555",
    "yaxisside": "0",
    "calc_fnc": "2",
    "type": "0"
  },
  {
    "gitemid": "1243",
    "graphid": "387",
    "itemid": "22668",
    "drawtype": "1",
    "sortorder": "2",
    "color": "55FF55",
    "yaxisside": "0",
    "calc_fnc": "2",
    "type": "0"
  },
  {
    "gitemid": "1244",
    "graphid": "387",
    "itemid": "22671",
    "drawtype": "1",
    "sortorder": "3",
    "color": "009999",
    "yaxisside": "0",
    "calc_fnc": "2",
    "type": "0"
  }
],
"id": 1
}

```

See also

- [Graph](#)

Source

CGraphItem::get() in *ui/include/classes/api/services/CGraphItem.php*.

## Graph prototype

This class is designed to work with graph prototypes.

Object references:

- [Graph prototype](#)

Available methods:

- [graphprototype.create](#) - creating new graph prototypes
- [graphprototype.delete](#) - deleting graph prototypes
- [graphprototype.get](#) - retrieving graph prototypes
- [graphprototype.update](#) - updating graph prototypes

## > Graph prototype object

The following objects are directly related to the `graphprototype` API.

## Graph prototype

The graph prototype object has the following properties.

| Property                                 | Type    | Description  |
|--|---------|--|
| <code>graphid</code>                     | string  | <i>(readonly)</i> ID of the graph prototype.   |
| <b><code>height</code></b><br>(required) | integer | Height of the graph prototype in pixels.   |
| <b><code>name</code></b><br>(required)   | string  | Name of the graph prototype.   |
| <b><code>width</code></b><br>(required)  | integer | Width of the graph prototype in pixels.  |
| <code>graphtype</code>                   | integer | Graph prototypes's layout type.<br><br>Possible values:<br>0 - <i>(default)</i> normal;<br>1 - stacked;<br>2 - pie;<br>3 - exploded.   |
| <code>percent_left</code>                | float   | Left percentile.   |
| <code>percent_right</code>               | float   | Default: 0.<br>Right percentile.   |
| <code>show_3d</code>                     | integer | Default: 0.<br>Whether to show discovered pie and exploded graphs in 3D.   |
| <code>show_legend</code>                 | integer | Possible values:<br>0 - <i>(default)</i> show in 2D;<br>1 - show in 3D.<br>Whether to show the legend on the discovered graph.   |
| <code>show_work_period</code>            | integer | Possible values:<br>0 - hide;<br>1 - <i>(default)</i> show.<br>Whether to show the working time on the discovered graph.   |
| <code>templateid</code>                  | string  | Possible values:<br>0 - hide;<br>1 - <i>(default)</i> show.  |
| <code>yaxismax</code>                    | float   | <i>(readonly)</i> ID of the parent template graph prototype.   |
| <code>yaxismin</code>                    | float   | The fixed maximum value for the Y axis.  |
| <code>ymax_itemid</code>                 | string  | The fixed minimum value for the Y axis.  |
| <code>ymin_itemid</code>                 | string  | ID of the item that is used as the maximum value for the Y axis.   |
| <code>ymin_type</code>                   | integer | Starting with Zabbix 6.0.7, if user have no access to specified item, the graph is rendered like <code>ymin_type</code> would be set to '0' (calculated).<br>Maximum value calculation method for the Y axis.<br><br>Possible values:<br>0 - <i>(default)</i> calculated;<br>1 - fixed;<br>2 - item. |
| <code>ymin_type</code>                   | integer | ID of the item that is used as the minimum value for the Y axis.   |
| <code>ymin_type</code>                   | integer | Starting with Zabbix 6.0.7, if user have no access to specified item, the graph is rendered like <code>ymin_type</code> would be set to '0' (calculated).  |



| Property  | Type    | Description   |
|-----------|---------|---|
| ymin_type | integer | Minimum value calculation method for the Y axis.<br><br>Possible values:<br>0 - <i>(default)</i> calculated;<br>1 - fixed;<br>2 - item.   |
| discover  | integer | Graph prototype discovery status.<br><br>Possible values:<br>0 - <i>(default)</i> new graphs will be discovered;<br>1 - new graphs will not be discovered and existing graphs will be marked as lost. |
| uuid      | string  | Universal unique identifier, used for linking imported graph prototypes to already existing ones. Used only for graph prototypes on templates. Auto-generated, if not given.                          |

Note that for some methods (update, delete) the required/optional parameter combination is different.

### graphprototype.create

#### Description

object graphprototype.create(object/array graphPrototypes)

This method allows to create new graph prototypes.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object/array) Graph prototypes to create.

Additionally to the [standard graph prototype properties](#), the method accepts the following parameters.

| Parameter                   | Type  | Description   |
|-----------------------------|-------|---|
| <b>gitems</b><br>(required) | array | Graph <b>items</b> to be created for the graph prototypes. Graph items can reference both items and item prototypes, but at least one item prototype must be present. |

#### Return values

(object) Returns an object containing the IDs of the created graph prototypes under the `graphids` property. The order of the returned IDs matches the order of the passed graph prototypes.

#### Examples

##### Creating a graph prototype

Create a graph prototype with two items.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graphprototype.create",
  "params": {
    "name": "Disk space usage {#FSNAME}",
    "width": 900,
    "height": 200,
    "gitems": [
      {
```

```

        "itemid": "22828",
        "color": "00AA00"
    },
    {
        "itemid": "22829",
        "color": "3333FF"
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "graphids": [
            "652"
        ]
    },
    "id": 1
}

```

See also

- [Graph item](#)

Source

CGraphPrototype::create() in `ui/include/classes/api/services/CGraphPrototype.php`.

## graphprototype.delete

Description

object graphprototype.delete(array graphPrototypeIds)

This method allows to delete graph prototypes.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the graph prototypes to delete.

Return values

(object) Returns an object containing the IDs of the deleted graph prototypes under the `graphids` property.

Examples

Deleting multiple graph prototypes

Delete two graph prototypes.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "graphprototype.delete",
    "params": [
        "652",
        "653"
    ],
    "auth": "3a57200802b24cda67c4e4010b50c065",
}

```

```
}
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "graphids": [
      "652",
      "653"
    ]
  },
  "id": 1
}
```

Source

CGraphPrototype::delete() in *ui/include/classes/api/services/CGraphPrototype.php*.

## graphprototype.get

Description

integer/array graphprototype.get(object parameters)

The method allows to retrieve graph prototypes according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter           | Type         | Description   |
|---------------------|--------------|---|
| discoveryids        | string/array | Return only graph prototypes that belong to the given discovery rules.  |
| graphids            | string/array | Return only graph prototypes with the given IDs.  |
| groupids            | string/array | Return only graph prototypes that belong to hosts in the given host groups.   |
| hostids             | string/array | Return only graph prototypes that belong to the given hosts.  |
| inherited           | boolean      | If set to <code>true</code> return only graph prototypes inherited from a template.   |
| itemids             | string/array | Return only graph prototypes that contain the given item prototypes.  |
| templated           | boolean      | If set to <code>true</code> return only graph prototypes that belong to templates.  |
| templateids         | string/array | Return only graph prototypes that belong to the given templates.  |
| selectDiscoveryRule | query        | Return a <code>discoveryRule</code> property with the LLD rule that the graph prototype belongs to.                             |
| selectGraphItems    | query        | Return a <code>gitems</code> property with the graph items used in the graph prototype.   |
| selectGroups        | query        | Return a <code>groups</code> property with the host groups that the graph prototype belongs to.                                 |
| selectHosts         | query        | Return a <code>hosts</code> property with the hosts that the graph prototype belongs to.  |
| selectItems         | query        | Return an <code>items</code> property with the <code>items</code> and <code>item prototypes</code> used in the graph prototype. |
| selectTemplates     | query        | Return a <code>templates</code> property with the templates that the graph prototype belongs to.                                |

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| filter                 | object       | Return only those results that exactly match the given filter.<br><br>Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.<br><br>Supports additional filters:<br>host - technical name of the host that the graph prototype belongs to;<br>hostid - ID of the host that the graph prototype belongs to.<br>Sort the result by the given properties. |
| sortfield              | string/array | Possible values are: graphid, name and graphtype.<br>These parameters are described in the <a href="#">reference commentary</a> .   |
| countOutput            | boolean      |   |
| editable               | boolean      |   |
| excludeSearch          | boolean      |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieving graph prototypes from an LLD rule

Retrieve all graph prototypes from an LLD rule.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graphprototype.get",
  "params": {
    "output": "extend",
    "discoveryids": "27426"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "graphid": "1017",
      "name": "Disk space usage {#FSNAME}",
      "width": "600",
      "height": "340",
      "yaxismin": "0.0000",
      "yaxismax": "0.0000",
      "templateid": "442",
      "show_work_period": "0",
      "show_triggers": "0",
      "graphtype": "2",

```

```

        "show_legend": "1",
        "show_3d": "1",
        "percent_left": "0.0000",
        "percent_right": "0.0000",
        "ymin_type": "0",
        "ymax_type": "0",
        "ymin_itemid": "0",
        "ymax_itemid": "0",
        "discover": "0"
    }
],
    "id": 1
}

```

See also

- [Discovery rule](#)
- [Graph item](#)
- [Item](#)
- [Host](#)
- [Host group](#)
- [Template](#)

Source

CGraphPrototype::get() in `ui/include/classes/api/services/CGraphPrototype.php`.

## graphprototype.update

Description

object graphprototype.update(object/array graphPrototypes)

This method allows to update existing graph prototypes.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Graph prototype properties to be updated.

The `graphid` property must be defined for each graph prototype, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard graph prototype properties](#), the method accepts the following parameters.

| Parameter | Type  | Description  |
|-----------|-------|--|
| gitems    | array | Graph <a href="#">items</a> to replace existing graph items. If a graph item has the <code>gitemid</code> property defined it will be updated, otherwise a new graph item will be created. |

Return values

(object) Returns an object containing the IDs of the updated graph prototypes under the `graphids` property.

Examples

Changing the size of a graph prototype

Change the size of a graph prototype to 1100 to 400 pixels.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "graphprototype.update",
  "params": {
    "graphid": "439",
    "width": 1100,
    "height": 400
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "graphids": [
      "439"
    ]
  },
  "id": 1
}
```

Source

CGraphPrototype::update() in *ui/include/classes/api/services/CGraphPrototype.php*.

## High availability node

This class is designed to work with server nodes that are part of a High availability cluster, or a standalone server instance.

Object references:

- [High availability node](#)

Available methods:

- [hanode.get](#) - retrieving nodes

### > High availability node object

The following object is related to operating a High availability cluster of Zabbix servers.

High availability node

#### Note:

Nodes are created by the Zabbix server and cannot be modified via the API.

The High availability node object has the following properties.

| Property   | Type    | Description   |
|------------|---------|---|
| ha_nodeid  | string  | ID of the node.   |
| name       | string  | Name assigned to the node, using the HANodeName configuration entry of <code>zabbix_server.conf</code> . Empty for a server running in standalone mode. |
| address    | string  | IP or DNS name where the node connects from.  |
| port       | integer | Port on which the node is running.  |
| lastaccess | integer | Heartbeat time, t.i. time of last update from the node. UTC timestamp.  |

| Property | Type    | Description  |
|----------|---------|--|
| status   | integer | State of the node.<br><br>Possible values:<br>0 - standby;<br>1 - stopped manually;<br>2 - unavailable;<br>3 - active. |

## hanode.get

### Description

integer/array hanode.get(object parameters)

The method allows to retrieve a list of High availability cluster nodes according to the given parameters.

#### Note:

This method is only available to *Super admin* user types. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter    | Type         | Description  |
|--------------|--------------|--|
| ha_nodeids   | string/array | Return only nodes with the given node IDs.   |
| filter       | object       | Return only those results that exactly match the given filter.<br><br>Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.<br><br>Allows filtering by the node properties: <code>name</code> , <code>address</code> , <code>status</code> .<br>Sort the result by the given properties. |
| sortfield    | string/array | Sort the result by the given properties.<br><br>Possible values are: <code>name</code> , <code>lastaccess</code> , <code>status</code> .<br>These parameters are described in the <a href="#">reference commentary</a> .   |
| countOutput  | flag         |  |
| limit        | integer      |  |
| output       | query        |  |
| preservekeys | boolean      |  |
| sortorder    | string/array |  |

### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

### Examples

Get a list of nodes ordered by status

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hanode.get",
  "params": {
    "preservekeys": true,
    "sortfield": "status",
    "sortorder": "DESC"
  },
}
```

```

    "auth": "3a57200802b24cda67c4e4010b50c065",
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "ckuo7i1nw000h0sajj3l3hh8u": {
      "ha_nodeid": "ckuo7i1nw000h0sajj3l3hh8u",
      "name": "node-active",
      "address": "192.168.1.13",
      "port": "10051",
      "lastaccess": "1635335704",
      "status": "3"
    },
    "ckuo7i1nw000e0sajwfttc1mp": {
      "ha_nodeid": "ckuo7i1nw000e0sajwfttc1mp",
      "name": "node6",
      "address": "192.168.1.10",
      "port": "10053",
      "lastaccess": "1635332902",
      "status": "2"
    },
    "ckuo7i1nv000c0sajz85xcrtt": {
      "ha_nodeid": "ckuo7i1nv000c0sajz85xcrtt",
      "name": "node4",
      "address": "192.168.1.8",
      "port": "10052",
      "lastaccess": "1635334214",
      "status": "1"
    },
    "ckuo7i1nv000a0saj1fcdkeu4": {
      "ha_nodeid": "ckuo7i1nv000a0saj1fcdkeu4",
      "name": "node2",
      "address": "192.168.1.6",
      "port": "10051",
      "lastaccess": "1635335705",
      "status": "0"
    }
  },
  "id": 1
}

```

Get a list of specific nodes by their IDs

Request:

```

{
  "jsonrpc": "2.0",
  "method": "hanode.get",
  "params": {
    "ha_nodeids": ["ckuo7i1nw000e0sajwfttc1mp", "ckuo7i1nv000c0sajz85xcrtt"]
  },
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "ha_nodeid": "ckuo7i1nv000c0sajz85xcrtt",

```



```

        "name": "node4",
        "address": "192.168.1.8",
        "port": "10052",
        "lastaccess": "1635334214",
        "status": "1"
    },
    {
        "ha_nodeid": "ckuo7i1nw000e0sajwfttc1mp",
        "name": "node6",
        "address": "192.168.1.10",
        "port": "10053",
        "lastaccess": "1635332902",
        "status": "2"
    }
],
    "id": 1
}

```

Get a list of stopped nodes

Request:

```

{
    "jsonrpc": "2.0",
    "method": "hanode.get",
    "params": {
        "output": ["ha_nodeid", "address", "port"],
        "filter": {
            "status": 1
        }
    },
    "auth": "3a57200802b24cda67c4e4010b50c065",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "ha_nodeid": "ckuo7i1nw000g0sajjsjre7e3",
            "address": "192.168.1.12",
            "port": "10051"
        },
        {
            "ha_nodeid": "ckuo7i1nv000c0sajz85xcrtt",
            "address": "192.168.1.8",
            "port": "10052"
        },
        {
            "ha_nodeid": "ckuo7i1nv000d0sajd95y1b6x",
            "address": "192.168.1.9",
            "port": "10053"
        }
    ],
    "id": 1
}

```

Get a count of standby nodes

Request:

```

{
    "jsonrpc": "2.0",
    "method": "hanode.get",

```

```

    "params": {
      "countOutput": true,
      "filter": {
        "status": 0
      }
    },
    "auth": "3a57200802b24cda67c4e4010b50c065",
    "id": 1
  }
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": "3",
  "id": 1
}

```

Check status of nodes at specific IP addresses

Request:

```

{
  "jsonrpc": "2.0",
  "method": "hanode.get",
  "params": {
    "output": ["name", "status"],
    "filter": {
      "address": ["192.168.1.7", "192.168.1.13"]
    }
  },
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "name": "node3",
      "status": "0"
    },
    {
      "name": "node-active",
      "status": "3"
    }
  ],
  "id": 1
}

```

Source

CHaNode::get() in *ui/include/classes/api/services/CHaNode.php*.

## History

This class is designed to work with history data.

Object references:

- [History](#)

Available methods:

- `history.get` - retrieving history data.

## > History object

The following objects are directly related to the `history` API.

### Note:

History objects differ depending on the item's type of information. They are created by the Zabbix server and cannot be modified via the API.

### Float history

The float history object has the following properties.

| Property | Type      | Description                              |
|----------|-----------|--|
| clock    | timestamp | Time when that value was received.       |
| itemid   | string    | ID of the related item.                  |
| ns       | integer   | Nanoseconds when the value was received. |
| value    | float     | Received value.                          |

### Integer history

The integer history object has the following properties.

| Property | Type      | Description                              |
|----------|-----------|--|
| clock    | timestamp | Time when that value was received.       |
| itemid   | string    | ID of the related item.                  |
| ns       | integer   | Nanoseconds when the value was received. |
| value    | integer   | Received value.                          |

### String history

The string history object has the following properties.

| Property | Type      | Description                              |
|----------|-----------|--|
| clock    | timestamp | Time when that value was received.       |
| itemid   | string    | ID of the related item.                  |
| ns       | integer   | Nanoseconds when the value was received. |
| value    | string    | Received value.                          |

### Text history

The text history object has the following properties.

| Property | Type      | Description                              |
|----------|-----------|--|
| id       | string    | ID of the history entry.                 |
| clock    | timestamp | Time when that value was received.       |
| itemid   | string    | ID of the related item.                  |
| ns       | integer   | Nanoseconds when the value was received. |
| value    | text      | Received value.                          |

### Log history

The log history object has the following properties.

| Property | Type      | Description                        |
|----------|-----------|------------------------------------|
| id       | string    | ID of the history entry.           |
| clock    | timestamp | Time when that value was received. |

| Property   | Type      | Description                              |
|------------|-----------|--|
| itemid     | string    | ID of the related item.                  |
| logeventid | integer   | Windows event log entry ID.              |
| ns         | integer   | Nanoseconds when the value was received. |
| severity   | integer   | Windows event log entry level.           |
| source     | string    | Windows event log entry source.          |
| timestamp  | timestamp | Windows event log entry time.            |
| value      | text      | Received value.                          |

## history.clear

Description

object history.clear(array itemids)

This method allows to clear item history.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of items to clear.

Return values

(object) Returns an object containing the IDs of the cleared items under the `itemids` property.

Examples

Clear history

Request:

```
{
  "jsonrpc": "2.0",
  "method": "history.clear",
  "params": [
    "10325",
    "13205"
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "10325",
      "13205"
    ]
  },
  "id": 1
}
```

Source

CHistory::clear() in `ui/include/classes/api/services/CHistory.php`.

## history.get

Description

`integer/array history.get(object parameters)`

The method allows to retrieve history data according to the given parameters.

**Attention:**

This method may return historical data of a deleted entity if this data has not been removed by the housekeeper yet.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| history                | integer      | History object types to return.<br><br>Possible values:<br>0 - numeric float;<br>1 - character;<br>2 - log;<br>3 - numeric unsigned;<br>4 - text.<br><br>Default: 3. |
| hostids                | string/array | Return only history from the given hosts.  |
| itemids                | string/array | Return only history from the given items.  |
| time_from              | timestamp    | Return only values that have been received after or at the given time.   |
| time_till              | timestamp    | Return only values that have been received before or at the given time.  |
| sortfield              | string/array | Sort the result by the given properties.   |
| countOutput            | boolean      | Possible values are: <code>itemid</code> and <code>clock</code> .<br>These parameters are described in the <a href="#">reference commentary</a> .                    |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

Examples

Retrieving item history data

Return 10 latest values received from a numeric(float) item.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "history.get",
  "params": {
```

```

    "output": "extend",
    "history": 0,
    "itemids": "23296",
    "sortfield": "clock",
    "sortorder": "DESC",
    "limit": 10
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "23296",
      "clock": "1351090996",
      "value": "0.085",
      "ns": "563157632"
    },
    {
      "itemid": "23296",
      "clock": "1351090936",
      "value": "0.16",
      "ns": "549216402"
    },
    {
      "itemid": "23296",
      "clock": "1351090876",
      "value": "0.18",
      "ns": "537418114"
    },
    {
      "itemid": "23296",
      "clock": "1351090816",
      "value": "0.21",
      "ns": "522659528"
    },
    {
      "itemid": "23296",
      "clock": "1351090756",
      "value": "0.215",
      "ns": "507809457"
    },
    {
      "itemid": "23296",
      "clock": "1351090696",
      "value": "0.255",
      "ns": "495509699"
    },
    {
      "itemid": "23296",
      "clock": "1351090636",
      "value": "0.36",
      "ns": "477708209"
    },
    {
      "itemid": "23296",
      "clock": "1351090576",
      "value": "0.375",
      "ns": "463251343"
    }
  ]
}

```

```

    },
    {
      "itemid": "23296",
      "clock": "1351090516",
      "value": "0.315",
      "ns": "447947017"
    },
    {
      "itemid": "23296",
      "clock": "1351090456",
      "value": "0.275",
      "ns": "435307141"
    }
  ],
  "id": 1
}

```

Source

CHistory::get() in *ui/include/classes/api/services/CHistory.php*.

## Host

This class is designed to work with hosts.

Object references:

- [Host](#)
- [Host inventory](#)

Available methods:

- [host.create](#) - creating new hosts
- [host.delete](#) - deleting hosts
- [host.get](#) - retrieving hosts
- [host.massadd](#) - adding related objects to hosts
- [host.massremove](#) - removing related objects from hosts
- [host.massupdate](#) - replacing or removing related objects from hosts
- [host.update](#) - updating hosts

### > Host object

The following objects are directly related to the host API.

Host

The host object has the following properties.

| Property                  | Type    | Description                             |
|---------------------------|---------|---|
| hostid                    | string  | ( <i>readonly</i> ) ID of the host.     |
| <b>host</b><br>(required) | string  | Technical name of the host.             |
| description               | text    | Description of the host.                |
| flags                     | integer | ( <i>readonly</i> ) Origin of the host. |
| Possible values:          |         |   |
| 0 - a plain host;         |         |   |
| 4 - a discovered host.    |         |   |

| Property           | Type      | Description  |
|--------------------|-----------|--|
| inventory_mode     | integer   | Host inventory population mode.<br><br>Possible values are:<br>-1 - <i>(default)</i> disabled;<br>0 - manual;<br>1 - automatic.  |
| ipmi_authtype      | integer   | IPMI authentication algorithm.<br><br>Possible values are:<br>-1 - <i>(default)</i> default;<br>0 - none;<br>1 - MD2;<br>2 - MD5<br>4 - straight;<br>5 - OEM;<br>6 - RMCP+.        |
| ipmi_password      | string    | IPMI password.   |
| ipmi_privilege     | integer   | IPMI privilege level.<br><br>Possible values are:<br>1 - callback;<br>2 - <i>(default)</i> user;<br>3 - operator;<br>4 - admin;<br>5 - OEM.  |
| ipmi_username      | string    | IPMI username.   |
| maintenance_from   | timestamp | <i>(readonly)</i> Starting time of the effective maintenance.  |
| maintenance_status | integer   | <i>(readonly)</i> Effective maintenance status.<br><br>Possible values are:<br>0 - <i>(default)</i> no maintenance;<br>1 - maintenance in effect.                                  |
| maintenance_type   | integer   | <i>(readonly)</i> Effective maintenance type.<br><br>Possible values are:<br>0 - <i>(default)</i> maintenance with data collection;<br>1 - maintenance without data collection.    |
| maintenanceid      | string    | <i>(readonly)</i> ID of the maintenance that is currently in effect on the host.   |
| name               | string    | Visible name of the host.  |
| proxy_hostid       | string    | Default: host property value.  |
| status             | integer   | ID of the proxy that is used to monitor the host.<br>Status and function of the host.<br><br>Possible values are:<br>0 - <i>(default)</i> monitored host;<br>1 - unmonitored host. |
| tls_connect        | integer   | Connections to host.   |
| tls_accept         | integer   | Connections from host.<br><br>Possible values are:<br>1 - <i>(default)</i> No encryption;<br>2 - PSK;<br>4 - certificate.  |
|                    |           | Possible bitmap values are:<br>1 - <i>(default)</i> No encryption;<br>2 - PSK;<br>4 - certificate.   |
|                    |           | This is a bitmask field; any sum of possible bitmap values is acceptable (for example, 6 for PSK and certificate).   |



| Property         | Type   | Description   |
|------------------|--------|---|
| tls_issuer       | string | Certificate issuer.   |
| tls_subject      | string | Certificate subject.  |
| tls_psk_identity | string | (write-only) PSK identity; must be paired with only one PSK (across <b>autoregistration</b> , <b>hosts</b> , and <b>proxies</b> ). Required if either <code>tls_connect</code> or <code>tls_accept</code> has PSK enabled.<br>Do not include sensitive information in the PSK identity, as it is sent unencrypted over the network to inform the receiver which PSK to use. |
| tls_psk          | string | (write-only) Pre-shared key (PSK); must be at least 32 hex digits.<br>Required if either <code>tls_connect</code> or <code>tls_accept</code> has PSK enabled.   |

Note that for some methods (update, delete) the required/optional parameter combination is different.

#### Host inventory

The host inventory object has the following properties.

##### Note:

Each property has it's own unique ID number, which is used to associate host inventory fields with items.

| ID | Property          | Type   | Description                 | Maximum length  |
|----|-------------------|--------|-----------------------------|---|
| 4  | alias             | string | Alias.                      | 128 characters  |
| 11 | asset_tag         | string | Asset tag.                  | 64 characters   |
| 28 | chassis           | string | Chassis.                    | 64 characters   |
| 23 | contact           | string | Contact person.             | Depends on the database used:<br>- 65535 characters for SQL databases<br>- 2048 characters for Oracle databases |
| 32 | contract_number   | string | Contract number.            | 64 characters   |
| 47 | date_hw_decomm    | string | HW decommissioning date.    | 64 characters   |
| 46 | date_hw_expiry    | string | HW maintenance expiry date. | 64 characters   |
| 45 | date_hw_install   | string | HW installation date.       | 64 characters   |
| 44 | date_hw_purchase  | string | HW purchase date.           | 64 characters   |
| 34 | deployment_status | string | Deployment status.          | 64 characters   |
| 14 | hardware          | string | Hardware.                   | 255 characters  |
| 15 | hardware_full     | string | Detailed hardware.          | Depends on the database used:<br>- 65535 characters for SQL databases<br>- 2048 characters for Oracle databases |
| 39 | host_netmask      | string | Host subnet mask.           | 39 characters   |
| 38 | host_networks     | string | Host networks.              | Depends on the database used:<br>- 65535 characters for SQL databases<br>- 2048 characters for Oracle databases |
| 40 | host_router       | string | Host router.                | 39 characters   |
| 30 | hw_arch           | string | HW architecture.            | 32 characters   |
| 33 | installer_name    | string | Installer name.             | 64 characters   |
| 24 | location          | string | Location.                   | Depends on the database used:<br>- 65535 characters for SQL databases<br>- 2048 characters for Oracle databases |
| 25 | location_lat      | string | Location latitude.          | 16 characters   |
| 26 | location_lon      | string | Location longitude.         | 16 characters   |
| 12 | macaddress_a      | string | MAC address A.              | 64 characters   |
| 13 | macaddress_b      | string | MAC address B.              | 64 characters   |
| 29 | model             | string | Model.                      | 64 characters   |
| 3  | name              | string | Name.                       | 128 characters  |
| 27 | notes             | string | Notes.                      | Depends on the database used:<br>- 65535 characters for SQL databases<br>- 2048 characters for Oracle databases |
| 41 | oob_ip            | string | OOB IP address.             | 39 characters   |
| 42 | oob_netmask       | string | OOB host subnet mask.       | 39 characters   |
| 43 | oob_router        | string | OOB router.                 | 39 characters   |
| 5  | os                | string | OS name.                    | 128 characters  |
| 6  | os_full           | string | Detailed OS name.           | 255 characters  |

| ID | Property       | Type   | Description                  | Maximum length  |
|----|----------------|--------|------------------------------|---|
| 7  | os_short       | string | Short OS name.               | 128 characters  |
| 61 | poc_1_cell     | string | Primary POC mobile number.   | 64 characters   |
| 58 | poc_1_email    | string | Primary email.               | 128 characters  |
| 57 | poc_1_name     | string | Primary POC name.            | 128 characters  |
| 63 | poc_1_notes    | string | Primary POC notes.           | Depends on the database used:<br>- 65535 characters for SQL databases<br>- 2048 characters for Oracle databases |
| 59 | poc_1_phone_a  | string | Primary POC phone A.         | 64 characters   |
| 60 | poc_1_phone_b  | string | Primary POC phone B.         | 64 characters   |
| 62 | poc_1_screen   | string | Primary POC screen name.     | 64 characters   |
| 68 | poc_2_cell     | string | Secondary POC mobile number. | 64 characters   |
| 65 | poc_2_email    | string | Secondary POC email.         | 128 characters  |
| 64 | poc_2_name     | string | Secondary POC name.          | 128 characters  |
| 70 | poc_2_notes    | string | Secondary POC notes.         | Depends on the database used:<br>- 65535 characters for SQL databases<br>- 2048 characters for Oracle databases |
| 66 | poc_2_phone_a  | string | Secondary POC phone A.       | 64 characters   |
| 67 | poc_2_phone_b  | string | Secondary POC phone B.       | 64 characters   |
| 69 | poc_2_screen   | string | Secondary POC screen name.   | 64 characters   |
| 8  | serialno_a     | string | Serial number A.             | 64 characters   |
| 9  | serialno_b     | string | Serial number B.             | 64 characters   |
| 48 | site_address_a | string | Site address A.              | 128 characters  |
| 49 | site_address_b | string | Site address B.              | 128 characters  |
| 50 | site_address_c | string | Site address C.              | 128 characters  |
| 51 | site_city      | string | Site city.                   | 128 characters  |
| 53 | site_country   | string | Site country.                | 64 characters   |
| 56 | site_notes     | string | Site notes.                  | Depends on the database used:<br>- 65535 characters for SQL databases<br>- 2048 characters for Oracle databases |
| 55 | site_rack      | string | Site rack location.          | 128 characters  |
| 52 | site_state     | string | Site state.                  | 64 characters   |
| 54 | site_zip       | string | Site ZIP/postal code.        | 64 characters   |
| 16 | software       | string | Software.                    | 255 characters  |
| 18 | software_app_a | string | Software application A.      | 64 characters   |
| 19 | software_app_b | string | Software application B.      | 64 characters   |
| 20 | software_app_c | string | Software application C.      | 64 characters   |
| 21 | software_app_d | string | Software application D.      | 64 characters   |
| 22 | software_app_e | string | Software application E.      | 64 characters   |
| 17 | software_full  | string | Software details.            | Depends on the database used:<br>- 65535 characters for SQL databases<br>- 2048 characters for Oracle databases |
| 10 | tag            | string | Tag.                         | 64 characters   |
| 1  | type           | string | Type.                        | 64 characters   |
| 2  | type_full      | string | Type details.                | 64 characters   |
| 35 | url_a          | string | URL A.                       | 255 characters  |
| 36 | url_b          | string | URL B.                       | 255 characters  |
| 37 | url_c          | string | URL C.                       | 255 characters  |
| 31 | vendor         | string | Vendor.                      | 64 characters   |

## Host tag

The host tag object has the following properties.

| Property                 | Type   | Description     |
|--------------------------|--------|-----------------|
| <b>tag</b><br>(required) | string | Host tag name.  |
| value                    | string | Host tag value. |

## host.create

Description

object `host.create(object/array hosts)`

This method allows to create new hosts.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Hosts to create.

Additionally to the [standard host properties](#), the method accepts the following parameters.

| Parameter                   | Type         | Description   |
|-----------------------------|--------------|---|
| <b>groups</b><br>(required) | object/array | Host <b>groups</b> to add the host to.<br><br>The host groups must have the <code>groupid</code> property defined.      |
| interfaces                  | object/array | <b>Interfaces</b> to be created for the host.   |
| tags                        | object/array | Host <b>tags</b> .  |
| templates                   | object/array | <b>Templates</b> to be linked to the host.<br><br>The templates must have the <code>templateid</code> property defined. |
| macros                      | object/array | <b>User macros</b> to be created for the host.  |
| inventory                   | object       | Host <b>inventory</b> properties.   |

Return values

(object) Returns an object containing the IDs of the created hosts under the `hostids` property. The order of the returned IDs matches the order of the passed hosts.

Examples

Creating a host

Create a host called "Linux server" with an IP interface and tags, add it to a group, link a template to it and set the MAC addresses in the host inventory.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.create",
  "params": {
    "host": "Linux server",
    "interfaces": [
      {
        "type": 1,
        "main": 1,
        "useip": 1,
        "ip": "192.168.3.1",
        "dns": "",
        "port": "10050"
      }
    ],
    "groups": [
      {
        "groupid": "50"
      }
    ],
    "tags": [
      {
        "tag": "Host name",
        "value": "Linux server"
      }
    ]
  }
}
```

```

    }
  ],
  "templates": [
    {
      "templateid": "20045"
    }
  ],
  "macros": [
    {
      "macro": "{$USER_ID}",
      "value": "123321"
    },
    {
      "macro": "{$USER_LOCATION}",
      "value": "0:0:0",
      "description": "latitude, longitude and altitude coordinates"
    }
  ],
  "inventory_mode": 0,
  "inventory": {
    "macaddress_a": "01234",
    "macaddress_b": "56768"
  }
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "107819"
    ]
  },
  "id": 1
}

```

Creating a host with SNMP interface

Create a host called "SNMP host" with an SNMPv3 interface with details.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "host.create",
  "params": {
    "host": "SNMP host",
    "interfaces": [
      {
        "type": 2,
        "main": 1,
        "useip": 1,
        "ip": "127.0.0.1",
        "dns": "",
        "port": "161",
        "details": {
          "version": 3,
          "bulk": 0,
          "securityname": "mysecurityname",
          "contextname": "",
          "securitylevel": 1
        }
      }
    ]
  }
}

```

```

    }
  },
  "groups": [
    {
      "groupid": "4"
    }
  ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10658"
    ]
  },
  "id": 1
}

```

Creating a host with PSK encryption

Create a host called "PSK host" with PSK encryption configured. Note that the host has to be **pre-configured to use PSK**.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "host.create",
  "params": {
    "host": "PSK host",
    "interfaces": [
      {
        "type": 1,
        "ip": "192.168.3.1",
        "dns": "",
        "port": "10050",
        "useip": 1,
        "main": 1
      }
    ],
    "groups": [
      {
        "groupid": "2"
      }
    ],
    "tls_accept": 2,
    "tls_connect": 2,
    "tls_psk_identity": "PSK 001",
    "tls_psk": "1f87b595725ac58dd977beef14b97461a7c1045b9a1c963065002c5473194952"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [

```

```

        "10590"
    ],
    },
    "id": 1
}

```

See also

- [Host group](#)
- [Template](#)
- [User macro](#)
- [Host interface](#)
- [Host inventory](#)
- [Host tag](#)

Source

`CHost::create()` in `ui/include/classes/api/services/CHost.php`.

## host.delete

Description

`object host.delete(array hosts)`

This method allows to delete hosts.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of hosts to delete.

Return values

(object) Returns an object containing the IDs of the deleted hosts under the `hostids` property.

Examples

Deleting multiple hosts

Delete two hosts.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "host.delete",
    "params": [
        "13",
        "32"
    ],
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "hostids": [
            "13",
            "32"
        ]
    },
}

```

```
"id": 1
}
```

#### Source

`CHost::delete()` in `ui/include/classes/api/services/CHost.php`.

### host.get

#### Description

`integer/array host.get(object parameters)`

The method allows to retrieve hosts according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter                                      | Type         | Description  |
|--|--------------|--|
| <code>groupids</code>                          | string/array | Return only hosts that belong to the given groups.   |
| <code>dserviceids</code>                       | string/array | Return only hosts that are related to the given discovered services.   |
| <code>graphids</code>                          | string/array | Return only hosts that have the given graphs.  |
| <code>hostids</code>                           | string/array | Return only hosts with the given host IDs.   |
| <code>httptestids</code>                       | string/array | Return only hosts that have the given web checks.  |
| <code>interfaceids</code>                      | string/array | Return only hosts that use the given interfaces.   |
| <code>itemids</code>                           | string/array | Return only hosts that have the given items.   |
| <code>maintenanceids</code>                    | string/array | Return only hosts that are affected by the given maintenances.   |
| <code>monitored_hosts</code>                   | flag         | Return only monitored hosts.   |
| <code>proxy_hosts</code>                       | flag         | Return only proxies.   |
| <code>proxyids</code>                          | string/array | Return only hosts that are monitored by the given proxies.   |
| <code>templated_hosts</code>                   | flag         | Return both hosts and templates.   |
| <code>templateids</code>                       | string/array | Return only hosts that are linked to the given templates.  |
| <code>triggerids</code>                        | string/array | Return only hosts that have the given triggers.  |
| <code>with_items</code>                        | flag         | Return only hosts that have items.   |
| <code>with_item_prototypes</code>              | flag         | Overrides the <code>with_monitored_items</code> and <code>with_simple_graph_items</code> parameters.<br>Return only hosts that have item prototypes.   |
| <code>with_simple_graph_item_prototypes</code> | flag         | Overrides the <code>with_simple_graph_item_prototypes</code> parameter.<br>Return only hosts that have item prototypes, which are enabled for creation and have numeric type of information. |
| <code>with_graphs</code>                       | flag         | Return only hosts that have graphs.  |
| <code>with_graph_prototypes</code>             | flag         | Return only hosts that have graph prototypes.  |
| <code>with_httptests</code>                    | flag         | Return only hosts that have web checks.  |
| <code>with_monitored_httptests</code>          | flag         | Overrides the <code>with_monitored_httptests</code> parameter.<br>Return only hosts that have enabled web checks.  |
| <code>with_monitored_items</code>              | flag         | Return only hosts that have enabled items.   |
| <code>with_monitored_triggers</code>           | flag         | Overrides the <code>with_simple_graph_items</code> parameter.<br>Return only hosts that have enabled triggers. All of the items used in the trigger must also be enabled.                    |
| <code>with_simple_graph_items</code>           | flag         | Return only hosts that have items with numeric type of information.  |
| <code>with_triggers</code>                     | flag         | Return only hosts that have triggers.  |

Overrides the `with_monitored_triggers` parameter.

| Parameter              | Type          | Description  |
|------------------------|---------------|--|
| withProblemsSuppressed | boolean       | Return hosts that have suppressed problems.<br><br>Possible values:<br>null - (default) all hosts;<br>true - only hosts with suppressed problems;<br>false - only hosts with unsuppressed problems.  |
| evaltype               | integer       | Rules for tag searching.<br><br>Possible values:<br>0 - (default) And/Or;<br>2 - Or.   |
| severities             | integer/array | Return hosts that have only problems with given severities. Applies only if problem object is trigger.   |
| tags                   | object/array  | Return only hosts with given tags. Exact match by tag and case-sensitive or case-insensitive search by tag value depending on operator value.<br>Format: [{"tag": "<tag>", "value": "<value>", "operator": "<operator>"}, ...].<br>An empty array returns all hosts.<br><br>Possible operator values:<br>0 - (default) Contains;<br>1 - Equals;<br>2 - Not like;<br>3 - Not equal<br>4 - Exists;<br>5 - Not exists.  |
| inheritedTags          | boolean       | Return hosts that have given tags also in all of their linked templates.<br>Default:<br><br>Possible values:<br>true - linked templates must also have given tags;<br>false - (default) linked template tags are ignored.  |
| selectDiscoveries      | query         | Return a <b>discoveries</b> property with host low-level discovery rules.  |
| selectDiscoveryRule    | query         | Supports count.<br>Return a <b>discoveryRule</b> property with the low-level discovery rule that created the host (from host prototype in VMware monitoring).  |
| selectGraphs           | query         | Return a <b>graphs</b> property with host graphs.  |
| selectGroups           | query         | Supports count.<br>Return a <b>groups</b> property with host groups data that the host belongs to.   |
| selectHostDiscovery    | query         | Return a <b>hostDiscovery</b> property with host discovery object data.<br><br>The host discovery object links a discovered host to a host prototype or a host prototypes to an LLD rule and has the following properties:<br>host - ( <i>string</i> ) host of the host prototype;<br>hostid - ( <i>string</i> ) ID of the discovered host or host prototype;<br>parent_hostid - ( <i>string</i> ) ID of the host prototype from which the host has been created;<br>parent_itemid - ( <i>string</i> ) ID of the LLD rule that created the discovered host;<br>lastcheck - ( <i>timestamp</i> ) time when the host was last discovered;<br>ts_delete - ( <i>timestamp</i> ) time when a host that is no longer discovered will be deleted. |
| selectHttpTests        | query         | Return an <b>httpTests</b> property with host web scenarios.   |
| selectInterfaces       | query         | Supports count.<br>Return an <b>interfaces</b> property with host interfaces.<br><br>Supports count.   |



| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| selectInventory        | query        | Return an <b>inventory</b> property with host inventory data.  |
| selectItems            | query        | Return an <b>items</b> property with host items.   |
| selectMacros           | query        | Supports count.<br>Return a <b>macros</b> property with host macros.   |
| selectParentTemplates  | query        | Return a <b>parentTemplates</b> property with templates that the host is linked to.  |
| selectDashboards       | query        | Supports count.<br>Return a <b>dashboards</b> property.  |
| selectTags             | query        | Supports count.<br>Return a <b>tags</b> property with host tags.   |
| selectInheritedTags    | query        | Return an <b>inheritedTags</b> property with tags that are on all templates which are linked to host.  |
| selectTriggers         | query        | Return a <b>triggers</b> property with host triggers.  |
| selectValueMaps        | query        | Supports count.<br>Return a <b>valuemaps</b> property with host value maps.  |
| filter                 | object       | Return only those results that exactly match the given filter.<br><br>Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.  |
| limitSelects           | integer      | Allows filtering by interface properties. Doesn't work for text fields.<br>Limits the number of records returned by subselects.<br><br>Applies to the following subselects:<br>selectParentTemplates - results will be sorted by host;<br>selectInterfaces;<br>selectItems - sorted by name;<br>selectDiscoveries - sorted by name;<br>selectTriggers - sorted by description;<br>selectGraphs - sorted by name;<br>selectDashboards - sorted by name. |
| search                 | object       | Return results that match the given pattern (case-insensitive).<br><br>Accepts an array, where the keys are property names, and the values are strings to search for. If no additional options are given, this will perform a LIKE "%...%" search.   |
| searchInventory        | object       | Allows searching by interface properties. Works only for string and text fields.<br>Return only hosts that have inventory data matching the given wildcard search.   |
| sortfield              | string/array | This parameter is affected by the same additional parameters as search.<br>Sort the result by the given properties.  |
| countOutput            | boolean      | Possible values are: hostid, host, name, status.   |
| editable               | boolean      | These parameters are described in the <b>reference commentary</b> .  |
| excludeSearch          | boolean      |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

Examples

Retrieving data by name

Retrieve all data about two hosts named "Zabbix server" and "Linux server".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "filter": {
      "host": [
        "Zabbix server",
        "Linux server"
      ]
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10160",
      "proxy_hostid": "0",
      "host": "Zabbix server",
      "status": "0",
      "lastaccess": "0",
      "ipmi_authtype": "-1",
      "ipmi_privilege": "2",
      "ipmi_username": "",
      "ipmi_password": "",
      "maintenanceid": "0",
      "maintenance_status": "0",
      "maintenance_type": "0",
      "maintenance_from": "0",
      "name": "Zabbix server",
      "flags": "0",
      "description": "The Zabbix monitoring server.",
      "tls_connect": "1",
      "tls_accept": "1",
      "tls_issuer": "",
      "tls_subject": "",
      "inventory_mode": "1"
    },
    {
      "hostid": "10167",
      "proxy_hostid": "0",
      "host": "Linux server",
      "status": "0",
      "lastaccess": "0",
      "ipmi_authtype": "-1",
      "ipmi_privilege": "2",
      "ipmi_username": "",

```

```

        "ipmi_password": "",
        "maintenanceid": "0",
        "maintenance_status": "0",
        "maintenance_type": "0",
        "maintenance_from": "0",
        "name": "Linux server",
        "flags": "0",
        "description": "",
        "tls_connect": "1",
        "tls_accept": "1",
        "tls_issuer": "",
        "tls_subject": "",
        "inventory_mode": "1"
    }
],
    "id": 1
}

```

Retrieving host groups

Retrieve names of the groups host "Zabbix server" is member of, but no host details themselves.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "host.get",
    "params": {
        "output": ["hostid"],
        "selectGroups": "extend",
        "filter": {
            "host": [
                "Zabbix server"
            ]
        }
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 2
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "hostid": "10085",
            "groups": [
                {
                    "groupid": "2",
                    "name": "Linux servers",
                    "internal": "0",
                    "flags": "0"
                },
                {
                    "groupid": "4",
                    "name": "Zabbix servers",
                    "internal": "0",
                    "flags": "0"
                }
            ]
        }
    ],
    "id": 2
}

```

### Retrieving linked templates

Retrieve the IDs and names of templates linked to host "10084".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["hostid"],
    "selectParentTemplates": [
      "templateid",
      "name"
    ],
    "hostids": "10084"
  },
  "id": 1,
  "auth": "70785d2b494a7302309b48afcdb3a401"
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10084",
      "parentTemplates": [
        {
          "name": "Linux",
          "templateid": "10001"
        },
        {
          "name": "Zabbix Server",
          "templateid": "10047"
        }
      ]
    }
  ],
  "id": 1
}
```

### Retrieving hosts by template

Retrieve hosts that have the "10001" (*Linux by Zabbix agent*) template linked to them.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["hostid", "name"],
    "templateids": "10001"
  },
  "auth": "70785d2b494a7302309b48afcdb3a401",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "templateid": "10001",
      "hosts": [
```

```

        {
            "hostid": "10084",
            "name": "Zabbix server"
        },
        {
            "hostid": "10603",
            "name": "Host 1"
        },
        {
            "hostid": "10604",
            "name": "Host 2"
        }
    ]
},
"id": 1
}

```

Searching by host inventory data

Retrieve hosts that contain "Linux" in the host inventory "OS" field.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "host.get",
    "params": {
        "output": [
            "host"
        ],
        "selectInventory": [
            "os"
        ],
        "searchInventory": {
            "os": "Linux"
        }
    },
    "id": 2,
    "auth": "7f9e00124c75e8f25facd5c093f3e9a0"
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "hostid": "10084",
            "host": "Zabbix server",
            "inventory": {
                "os": "Linux Ubuntu"
            }
        },
        {
            "hostid": "10107",
            "host": "Linux server",
            "inventory": {
                "os": "Linux Mint"
            }
        }
    ],
    "id": 1
}

```

Searching by host tags

Retrieve hosts that have tag "Host name" equal to "Linux server".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["hostid"],
    "selectTags": "extend",
    "evaltype": 0,
    "tags": [
      {
        "tag": "Host name",
        "value": "Linux server",
        "operator": 1
      }
    ]
  },
  "auth": "7f9e00124c75e8f25facd5c093f3e9a0",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10085",
      "tags": [
        {
          "tag": "Host name",
          "value": "Linux server"
        },
        {
          "tag": "OS",
          "value": "RHEL 7"
        }
      ]
    }
  ],
  "id": 1
}
```

Retrieve hosts that have these tags not only on host level but also in their linked parent templates.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["name"],
    "tags": [{"tag": "A", "value": "1", "operator": "0"}],
    "inheritedTags": true
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
```

```

        "hostid": "10623",
        "name": "PC room 1"
    },
    {
        "hostid": "10601",
        "name": "Office"
    }
],
"id": 1
}

```

Searching host with tags and template tags

Retrieve a host with tags and all tags that are linked to parent templates.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["name"],
    "hostids": 10502,
    "selectTags": ["tag", "value"],
    "selectInheritedTags": ["tag", "value"]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10502",
      "name": "Desktop",
      "tags": [
        {
          "tag": "A",
          "value": "1"
        }
      ],
      "inheritedTags": [
        {
          "tag": "B",
          "value": "2"
        }
      ]
    }
  ],
  "id": 1
}

```

Searching hosts by problem severity

Retrieve hosts that have "Disaster" problems.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["name"],
    "severities": 5
  }
}

```

```

    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10160",
      "name": "Zabbix server"
    }
  ],
  "id": 1
}

```

Retrieve hosts that have "Average" and "High" problems.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["name"],
    "severities": [3, 4]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "20170",
      "name": "Database"
    },
    {
      "hostid": "20183",
      "name": "workstation"
    }
  ],
  "id": 1
}

```

See also

- [Host group](#)
- [Template](#)
- [User macro](#)
- [Host interface](#)

Source

CHost::get() in *ui/include/classes/api/services/CHost.php*.

## host.massadd

Description

object `host.massadd(object parameters)`

This method allows to simultaneously add multiple related objects to all the given hosts.



**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters containing the IDs of the hosts to update and the objects to add to all the hosts.

The method accepts the following parameters.

| Parameter                  | Type         | Description  |
|----------------------------|--------------|--|
| <b>hosts</b><br>(required) | object/array | Hosts to be updated.<br><br>The hosts must have the <code>hostid</code> property defined.                          |
| groups                     | object/array | Host groups to add to the given hosts.<br><br>The host groups must have the <code>groupid</code> property defined. |
| interfaces                 | object/array | <b>Host interfaces</b> to be created for the given hosts.  |
| macros                     | object/array | <b>User macros</b> to be created for the given hosts.  |
| templates                  | object/array | Templates to link to the given hosts.<br><br>The templates must have the <code>templateid</code> property defined. |

**Return values**

(object) Returns an object containing the IDs of the updated hosts under the `hostids` property.

**Examples****Adding macros**

Add two new macros to two hosts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.massadd",
  "params": {
    "hosts": [
      {
        "hostid": "10160"
      },
      {
        "hostid": "10167"
      }
    ],
    "macros": [
      {
        "macro": "${TEST1}",
        "value": "MACROTEST1"
      },
      {
        "macro": "${TEST2}",
        "value": "MACROTEST2",
        "description": "Test description"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10160",
      "10167"
    ]
  },
  "id": 1
}
```

See also

- [host.update](#)
- [Host group](#)
- [Template](#)
- [User macro](#)
- [Host interface](#)

Source

`CHost::massAdd()` in `ui/include/classes/api/services/CHost.php`.

## host.massremove

Description

`object host.massremove(object parameters)`

This method allows to remove related objects from multiple hosts.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the hosts to update and the objects that should be removed.

| Parameter                    | Type         | Description   |
|------------------------------|--------------|---|
| <b>hostids</b><br>(required) | string/array | IDs of the hosts to be updated.   |
| groupids                     | string/array | Host groups to remove the given hosts from.   |
| interfaces                   | object/array | Host interfaces to remove from the given hosts.<br><br>The host interface object must have the <code>ip</code> , <code>dns</code> and <code>port</code> properties defined. |
| macros                       | string/array | User macros to delete from the given hosts.   |
| templateids                  | string/array | Templates to unlink from the given hosts.   |
| templateids_clear            | string/array | Templates to unlink and clear from the given hosts.   |

Return values

(object) Returns an object containing the IDs of the updated hosts under the `hostids` property.

Examples

Unlinking templates

Unlink a template from two hosts and delete all of the templated entities.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.massremove",
```

```

    "params": {
      "hostids": ["69665", "69666"],
      "templateids_clear": "325"
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
  }

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "69665",
      "69666"
    ]
  },
  "id": 1
}

```

See also

- [host.update](#)
- [User macro](#)
- [Host interface](#)

Source

`CHost::massRemove()` in `ui/include/classes/api/services/CHost.php`.

## host.massupdate

Description

`object host.massupdate(object parameters)`

This method allows to simultaneously replace or remove related objects and update properties on multiple hosts.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the hosts to update and the properties that should be updated.

Additionally to the [standard host properties](#), the method accepts the following parameters.

| Parameter                  | Type         | Description   |
|----------------------------|--------------|---|
| <b>hosts</b><br>(required) | object/array | <b>Hosts</b> to be updated.<br><br>The hosts must have the <code>hostid</code> property defined.  |
| groups                     | object/array | Host <b>groups</b> to replace the current host groups the hosts belong to.<br><br>The host groups must have the <code>groupid</code> property defined.              |
| interfaces                 | object/array | Host <b>interfaces</b> to replace the current host interfaces on the given hosts.   |
| inventory                  | object       | Host <b>inventory</b> properties.<br><br>Host inventory mode cannot be updated using the <code>inventory</code> parameter, use <code>inventory_mode</code> instead. |
| macros                     | object/array | <b>User macros</b> to replace the current user macros on the given hosts.   |
| templates                  | object/array | <b>Templates</b> to replace the currently linked templates on the given hosts.<br><br>The templates must have the <code>templateid</code> property defined.         |

| Parameter   | Type         | Description  |
|---|--------------|--|
| templates_clear   | object/array | <b>Templates</b> to unlink and clear from the given hosts. |
| The templates must have the <code>templateid</code> property defined. |              |  |

#### Return values

(object) Returns an object containing the IDs of the updated hosts under the `hostids` property.

#### Examples

##### Enabling multiple hosts

Enable monitoring of two hosts, i.e., set their status to 0.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.massupdate",
  "params": {
    "hosts": [
      {
        "hostid": "69665"
      },
      {
        "hostid": "69666"
      }
    ],
    "status": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "69665",
      "69666"
    ]
  },
  "id": 1
}
```

#### See also

- [host.update](#)
- [host.massadd](#)
- [host.massremove](#)
- [Host group](#)
- [Template](#)
- [User macro](#)
- [Host interface](#)

#### Source

`CHost::massUpdate()` in `ui/include/classes/api/services/CHost.php`.

### **host.update**

#### Description

object `host.update(object/array hosts)`

This method allows to update existing hosts.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Host properties to be updated.

The `hostid` property must be defined for each host, all other properties are optional. Only the given properties will be updated, all others will remain unchanged.

Note, however, that updating the host technical name will also update the host’s visible name (if not given or empty) by the host’s technical name value.

Additionally to the **standard host properties**, the method accepts the following parameters.

| Parameter       | Type         | Description   |
|-----------------|--------------|---|
| groups          | object/array | Host <b>groups</b> to replace the current host groups the host belongs to.<br><br>The host groups must have the <code>groupid</code> property defined. All host groups that are not listed in the request will be unlinked. |
| interfaces      | object/array | Host <b>interfaces</b> to replace the current host interfaces.<br><br>All interfaces that are not listed in the request will be removed.  |
| tags            | object/array | Host <b>tags</b> to replace the current host tags.<br><br>All tags that are not listed in the request will be removed.  |
| inventory       | object       | Host <b>inventory</b> properties.   |
| macros          | object/array | <b>User macros</b> to replace the current user macros.<br><br>All macros that are not listed in the request will be removed.  |
| templates       | object/array | <b>Templates</b> to replace the currently linked templates. All templates that are not listed in the request will be only unlinked.   |
| templates_clear | object/array | The templates must have the <code>templateid</code> property defined.<br><b>Templates</b> to unlink and clear from the host.<br><br>The templates must have the <code>templateid</code> property defined.                   |

**Note:**

As opposed to the Zabbix frontend, when `name` (visible host name) is the same as `host` (technical host name), updating `host` via API will not automatically update `name`. Both properties need to be updated explicitly.

Return values

(object) Returns an object containing the IDs of the updated hosts under the `hostids` property.

Examples

Enabling a host

Enable host monitoring, i.e. set its status to 0.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.update",
  "params": {
    "hostid": "10126",
    "status": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
}
```

```
    "id": 1
  }
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10126"
    ]
  },
  "id": 1
}
```

Unlinking templates

Unlink and clear two templates from host.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.update",
  "params": {
    "hostid": "10126",
    "templates_clear": [
      {
        "templateid": "10124"
      },
      {
        "templateid": "10125"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10126"
    ]
  },
  "id": 1
}
```

Updating host macros

Replace all host macros with two new ones.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.update",
  "params": {
    "hostid": "10126",
    "macros": [
      {
        "macro": "${PASS}",
        "value": "password"
      },
      {

```

```

        "macro": "${DISC}",
        "value": "sda",
        "description": "Updated description"
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10126"
    ]
  },
  "id": 1
}

```

Updating host inventory

Change inventory mode and add location

Request:

```

{
  "jsonrpc": "2.0",
  "method": "host.update",
  "params": {
    "hostid": "10387",
    "inventory_mode": 0,
    "inventory": {
      "location": "Latvia, Riga"
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10387"
    ]
  },
  "id": 1
}

```

Updating host tags

Replace all host tags with a new one.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "host.update",
  "params": {
    "hostid": "10387",
    "tags": {
      "tag": "OS",
      "value": "RHEL 7"
    }
  }
}

```

```

    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10387"
    ]
  },
  "id": 1
}

```

Updating host encryption

Update the host "10590" to use PSK encryption only for connections from host to Zabbix server, and change the PSK identity and PSK key. Note that the host has to be **pre-configured to use PSK**.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "host.update",
  "params": {
    "hostid": "10590",
    "tls_connect": 1,
    "tls_accept": 2,
    "tls_psk_identity": "PSK 002",
    "tls_psk": "e560cb0d918d26d31b4f642181f5f570ad89a390931102e5391d08327ba434e9"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10590"
    ]
  },
  "id": 1
}

```

See also

- [host.massadd](#)
- [host.massupdate](#)
- [host.massremove](#)
- [Host group](#)
- [Template](#)
- [User macro](#)
- [Host interface](#)
- [Host inventory](#)
- [Host tag](#)

Source

`CHost::update()` in `ui/include/classes/api/services/CHost.php`.



## Host group

This class is designed to work with host groups.

Object references:

- [Host group](#)

Available methods:

- [hostgroup.create](#) - creating new host groups
- [hostgroup.delete](#) - deleting host groups
- [hostgroup.get](#) - retrieving host groups
- [hostgroup.massadd](#) - adding related objects to host groups
- [hostgroup.massremove](#) - removing related objects from host groups
- [hostgroup.massupdate](#) - replacing or removing related objects from host groups
- [hostgroup.update](#) - updating host groups

### > Host group object

The following objects are directly related to the `hostgroup` API.

Host group

The host group object has the following properties.

| Property                  | Type    | Description   |
|---------------------------|---------|---|
| groupid                   | string  | <i>(readonly)</i> ID of the host group.   |
| <b>name</b><br>(required) | string  | Name of the host group.   |
| flags                     | integer | <i>(readonly)</i> Origin of the host group.<br><br>Possible values:<br>0 - a plain host group;<br>4 - a discovered host group.  |
| internal                  | integer | <i>(readonly)</i> Whether the group is used internally by the system. An internal group cannot be deleted.<br><br>Possible values:<br>0 - <i>(default)</i> not internal;<br>1 - internal. |
| uuid                      | string  | Universal unique identifier, used for linking imported host groups to already existing ones. Auto-generated, if not given.  |

Note that for some methods (update, delete) the required/optional parameter combination is different.

### **hostgroup.create**

Description

`object hostgroup.create(object/array hostGroups)`

This method allows to create new host groups.

#### **Note:**

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Host groups to create. The method accepts host groups with the **standard host group properties**.

Return values

(object) Returns an object containing the IDs of the created host groups under the `groupids` property. The order of the returned IDs matches the order of the passed host groups.

#### Examples

##### Creating a host group

Create a host group called "Linux servers".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostgroup.create",
  "params": {
    "name": "Linux servers"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "groupids": [
      "107819"
    ]
  },
  "id": 1
}
```

#### Source

`CHostGroup::create()` in `ui/include/classes/api/services/CHostGroup.php`.

## hostgroup.delete

#### Description

object `hostgroup.delete(array hostGroupIds)`

This method allows to delete host groups.

A host group can not be deleted if:

- it contains hosts that belong to this group only;
- it is marked as internal;
- it is used by a host prototype;
- it is used in a global script;
- it is used in a correlation condition.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(array) IDs of the host groups to delete.

#### Return values

(object) Returns an object containing the IDs of the deleted host groups under the `groupids` property.

#### Examples

##### Deleting multiple host groups

Delete two host groups.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostgroup.delete",
  "params": [
    "107824",
    "107825"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "groupids": [
      "107824",
      "107825"
    ]
  },
  "id": 1
}
```

Source

CHostGroup::delete() in *ui/include/classes/api/services/CHostGroup.php*.

## hostgroup.get

Description

integer/array hostgroup.get(object parameters)

The method allows to retrieve host groups according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter                | Type         | Description  |
|--------------------------|--------------|--|
| graphids                 | string/array | Return only host groups that contain hosts or templates with the given graphs.   |
| groupids                 | string/array | Return only host groups with the given host group IDs.                           |
| hostids                  | string/array | Return only host groups that contain the given hosts.                            |
| maintenanceids           | string/array | Return only host groups that are affected by the given maintenances.             |
| monitored_hosts          | flag         | Return only host groups that contain monitored hosts.                            |
| real_hosts               | flag         | Return only host groups that contain hosts.                                      |
| templated_hosts          | flag         | Return only host groups that contain templates.                                  |
| templateids              | string/array | Return only host groups that contain the given templates.                        |
| triggerids               | string/array | Return only host groups that contain hosts or templates with the given triggers. |
| with_graphs              | flag         | Return only host groups that contain hosts with graphs.                          |
| with_graph_prototypes    | flag         | Return only host groups that contain hosts with graph prototypes.                |
| with_hosts_and_templates | flag         | Return only host groups that contain hosts or templates.                         |
| with_httptests           | flag         | Return only host groups that contain hosts with web checks.                      |

Overrides the `with_monitored_httptests` parameter.

| Parameter                         | Type         | Description  |
|-----------------------------------|--------------|--|
| with_items                        | flag         | Return only host groups that contain hosts or templates with items.  |
| with_item_prototypes              | flag         | Overrides the with_monitored_items and with_simple_graph_items parameters.<br>Return only host groups that contain hosts with item prototypes.   |
| with_simple_graph_item_prototypes | flag         | Overrides the with_simple_graph_item_prototypes parameter.<br>Return only host groups that contain hosts with item prototypes, which are enabled for creation and have numeric type of information.  |
| with_monitored_httptests          | flag         | Return only host groups that contain hosts with enabled web checks.  |
| with_monitored_items              | flag         | Return only host groups that contain hosts or templates with enabled items.  |
| with_monitored_triggers           | flag         | Overrides the with_simple_graph_items parameter.<br>Return only host groups that contain hosts with enabled triggers. All of the items used in the trigger must also be enabled.   |
| with_simple_graph_items           | flag         | Return only host groups that contain hosts with numeric items.   |
| with_triggers                     | flag         | Return only host groups that contain hosts with triggers.  |
| selectDiscoveryRule               | query        | Overrides the with_monitored_triggers parameter.<br>Return a <b>discoveryRule</b> property with the LLD rule that created the host group.  |
| selectGroupDiscovery              | query        | Return a groupDiscovery property with the host group discovery object.   |
|                                   |              | The host group discovery object links a discovered host group to a host group prototype and has the following properties:<br>groupid - (string) ID of the discovered host group;<br>lastcheck - (timestamp) time when the host group was last discovered;<br>name - (string) name of the host group prototype;<br>parent_group_prototypeid - (string) ID of the host group prototype from which the host group has been created;<br>ts_delete - (timestamp) time when a host group that is no longer discovered will be deleted. |
| selectHosts                       | query        | Return a <b>hosts</b> property with the hosts that belong to the host group.   |
| selectTemplates                   | query        | Supports count.<br>Return a <b>templates</b> property with the templates that belong to the host group.  |
| limitSelects                      | integer      | Supports count.<br>Limits the number of records returned by subselects.  |
| sortfield                         | string/array | Applies to the following subselects:<br>selectHosts - results will be sorted by host;<br>selectTemplates - results will be sorted by host.<br>Sort the result by the given properties.   |
| countOutput                       | boolean      | Possible values are: groupid, name.  |
| editable                          | boolean      | These parameters are described in the <b>reference commentary</b> .  |
| excludeSearch                     | boolean      |  |
| filter                            | object       |  |
| limit                             | integer      |  |
| output                            | query        |  |
| preservekeys                      | boolean      |  |
| search                            | object       |  |
| searchByAny                       | boolean      |  |
| searchWildcardsEnabled            | boolean      |  |
| sortorder                         | string/array |  |

| Parameter   | Type    | Description |
|-------------|---------|-------------|
| startSearch | boolean |             |

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

Examples

Retrieving data by name

Retrieve all data about two host groups named "Zabbix servers" and "Linux servers".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostgroup.get",
  "params": {
    "output": "extend",
    "filter": {
      "name": [
        "Zabbix servers",
        "Linux servers"
      ]
    }
  },
  "auth": "6f38cddc44cfbb6c1bd186f9a220b5a0",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "groupid": "2",
      "name": "Linux servers",
      "internal": "0"
    },
    {
      "groupid": "4",
      "name": "Zabbix servers",
      "internal": "0"
    }
  ],
  "id": 1
}
```

See also

- [Host](#)
- [Template](#)

Source

CHostGroup::get() in *ui/include/classes/api/services/CHostGroup.php*.

## hostgroup.massadd

Description

object hostgroup.massadd(object parameters)

This method allows to simultaneously add multiple related objects to all the given host groups.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the host groups to update and the objects to add to all the host groups.

The method accepts the following parameters.

| Parameter                   | Type         | Description   |
|-----------------------------|--------------|---|
| <b>groups</b><br>(required) | object/array | Host groups to be updated.<br><br>The host groups must have the <code>groupid</code> property defined.            |
| hosts                       | object/array | Hosts to add to all host groups.<br><br>The hosts must have the <code>hostid</code> property defined.             |
| templates                   | object/array | Templates to add to all host groups.<br><br>The templates must have the <code>templateid</code> property defined. |

Return values

(object) Returns an object containing the IDs of the updated host groups under the `groupids` property.

Examples

Adding hosts to host groups

Add two hosts to host groups with IDs 5 and 6.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostgroup.massadd",
  "params": {
    "groups": [
      {
        "groupid": "5"
      },
      {
        "groupid": "6"
      }
    ],
    "hosts": [
      {
        "hostid": "30050"
      },
      {
        "hostid": "30001"
      }
    ]
  },
  "auth": "f223adf833b2bf2ff38574a67bba6372",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "groupids": [
```

```

        "5",
        "6"
    ],
    },
    "id": 1
}

```

See also

- [Host](#)
- [Template](#)

Source

`CHostGroup::massAdd()` in `ui/include/classes/api/services/CHostGroup.php`.

## hostgroup.massremove

Description

`object hostgroup.massremove(object parameters)`

This method allows to remove related objects from multiple host groups.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the host groups to update and the objects that should be removed.

| Parameter                     | Type         | Description                               |
|-------------------------------|--------------|---|
| <b>groupids</b><br>(required) | string/array | IDs of the host groups to be updated.     |
| hostids                       | string/array | Hosts to remove from all host groups.     |
| templateids                   | string/array | Templates to remove from all host groups. |

Return values

(object) Returns an object containing the IDs of the updated host groups under the `groupids` property.

Examples

Removing hosts from host groups

Remove two hosts from the given host groups.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "hostgroup.massremove",
  "params": {
    "groupids": [
      "5",
      "6"
    ],
    "hostids": [
      "30050",
      "30001"
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "groupids": [
      "5",
      "6"
    ]
  },
  "id": 1
}
```

Source

CHostGroup::massRemove() in *ui/include/classes/api/services/CHostGroup.php*.

## hostgroup.massupdate

Description

object hostgroup.massupdate(object parameters)

This method allows to replace hosts and templates with the specified ones in multiple host groups.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the host groups to update and the objects that should be updated.

| Parameter                      | Type         | Description  |
|--------------------------------|--------------|--|
| <b>groups</b><br>(required)    | object/array | Host groups to be updated.   |
| <b>hosts</b><br>(required)     | object/array | The host groups must have the <code>groupid</code> property defined.<br>Hosts to replace the current hosts on the given host groups.<br>All other hosts, except the ones mentioned, will be excluded from host groups.<br>Discovered hosts will not be affected.   |
| <b>templates</b><br>(required) | object/array | The hosts must have the <code>hostid</code> property defined.<br>Templates to replace the current templates on the given host groups.<br>All other templates, except the ones mentioned, will be excluded from host groups.<br><br>The templates must have the <code>templateid</code> property defined. |

Return values

(object) Returns an object containing the IDs of the updated host groups under the `groupids` property.

Examples

Replacing hosts and templates in a host group

Replace all hosts in a host group to ones mentioned host and unlink all templates from host group.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostgroup.massupdate",
  "params": {
    "groups": [
```



```

        {
            "groupid": "6"
        }
    ],
    "hosts": [
        {
            "hostid": "30050"
        }
    ],
    "templates": []
},
"auth": "f223adf833b2bf2ff38574a67bba6372",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "groupids": [
            "6",
        ]
    },
    "id": 1
}

```

See also

- [hostgroup.update](#)
- [hostgroup.massadd](#)
- [Host](#)
- [Template](#)

Source

`CHostGroup::massUpdate()` in `ui/include/classes/api/services/CHostGroup.php`.

## hostgroup.update

Description

`object hostgroup.update(object/array hostGroups)`

This method allows to update existing hosts groups.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) **Host group properties** to be updated.

The `groupid` property must be defined for each host group, all other properties are optional. Only the given properties will be updated, all others will remain unchanged.

Return values

(object) Returns an object containing the IDs of the updated host groups under the `groupids` property.

Examples

Renaming a host group

Rename a host group to "Linux hosts."

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostgroup.update",
  "params": {
    "groupid": "7",
    "name": "Linux hosts"
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "groupids": [
      "7"
    ]
  },
  "id": 1
}
```

Source

`CHostGroup::update()` in `ui/include/classes/api/services/CHostGroup.php`.

## Host interface

This class is designed to work with host interfaces.

Object references:

- [Host interface](#)

Available methods:

- [hostinterface.create](#) - creating new host interfaces
- [hostinterface.delete](#) - deleting host interfaces
- [hostinterface.get](#) - retrieving host interfaces
- [hostinterface.massadd](#) - adding host interfaces to hosts
- [hostinterface.massremove](#) - removing host interfaces from hosts
- [hostinterface.replacehostinterfaces](#) - replacing host interfaces on a host
- [hostinterface.update](#) - updating host interfaces

## > Host interface object

The following objects are directly related to the `hostinterface` API.

Host interface

The host interface object has the following properties.

### Attention:

Note that both IP and DNS are required. If you do not want to use DNS, set it to an empty string.

| Property                    | Type      | Description   |
|-----------------------------|-----------|---|
| available                   | integer   | <i>(readonly)</i> Availability of host interface.<br><br>Possible values are:<br>0 - <i>(default)</i> unknown;<br>1 - available;<br>2 - unavailable.  |
| details                     | array     | Additional object for interface. <b>Required</b> if interface 'type' is SNMP.   |
| disable_until               | timestamp | <i>(readonly)</i> The next polling time of an unavailable host interface.   |
| <b>dns</b><br>(required)    | string    | DNS name used by the interface.   |
| error                       | string    | Can be empty if the connection is made via IP.<br><i>(readonly)</i> Error text if host interface is unavailable.  |
| errors_from                 | timestamp | <i>(readonly)</i> Time when host interface became unavailable.  |
| <b>hostid</b><br>(required) | string    | ID of the host the interface belongs to.  |
| interfaceid                 | string    | <i>(readonly)</i> ID of the interface.  |
| <b>ip</b><br>(required)     | string    | IP address used by the interface.   |
| <b>main</b><br>(required)   | integer   | Can be empty if the connection is made via DNS.<br>Whether the interface is used as default on the host. Only one interface of some type can be set as default on a host.<br><br>Possible values are:<br>0 - not default;<br>1 - default. |
| <b>port</b><br>(required)   | string    | Port number used by the interface. Can contain user macros.   |
| <b>type</b><br>(required)   | integer   | Interface type.<br><br>Possible values are:<br>1 - agent;<br>2 - SNMP;<br>3 - IPMI;<br>4 - JMX.   |
| <b>useip</b><br>(required)  | integer   | Whether the connection should be made via IP.<br><br>Possible values are:<br>0 - connect using host DNS name;<br>1 - connect using host IP address for this host interface.   |

Note that for some methods (update, delete) the required/optional parameter combination is different.

Details tag

The details object has the following properties.

| Property                     | Type    | Description  |
|------------------------------|---------|--|
| <b>version</b><br>(required) | integer | SNMP interface version.<br><br>Possible values are:<br>1 - SNMPv1;<br>2 - SNMPv2c;<br>3 - SNMPv3                                     |
| bulk                         | integer | Whether to use bulk SNMP requests.<br><br>Possible values are:<br>0 - don't use bulk requests;<br>1 - (default) - use bulk requests. |
| community                    | string  | SNMP community (required). Used only by SNMPv1 and SNMPv2 interfaces.  |

| Property       | Type    | Description  |
|----------------|---------|--|
| securityname   | string  | SNMPv3 security name. Used only by SNMPv3 interfaces.  |
| securitylevel  | integer | SNMPv3 security level. Used only by SNMPv3 interfaces.<br><br>Possible values are:<br>0 - (default) - noAuthNoPriv;<br>1 - authNoPriv;<br>2 - authPriv.                                      |
| authpassphrase | string  | SNMPv3 authentication passphrase. Used only by SNMPv3 interfaces.  |
| privpassphrase | string  | SNMPv3 privacy passphrase. Used only by SNMPv3 interfaces.   |
| authprotocol   | integer | SNMPv3 authentication protocol. Used only by SNMPv3 interfaces.<br><br>Possible values are:<br>0 - (default) - MD5;<br>1 - SHA1;<br>2 - SHA224;<br>3 - SHA256;<br>4 - SHA384;<br>5 - SHA512. |
| privprotocol   | integer | SNMPv3 privacy protocol. Used only by SNMPv3 interfaces.<br><br>Possible values are:<br>0 - (default) - DES;<br>1 - AES128;<br>2 - AES192;<br>3 - AES256;<br>4 - AES192C;<br>5 - AES256C.    |
| contextname    | string  | SNMPv3 context name. Used only by SNMPv3 interfaces.   |

## hostinterface.create

### Description

`object hostinterface.create(object/array hostInterfaces)`

This method allows to create new host interfaces.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Host interfaces to create. The method accepts host interfaces with the [standard host interface properties](#).

### Return values

(object) Returns an object containing the IDs of the created host interfaces under the `interfaceids` property. The order of the returned IDs matches the order of the passed host interfaces.

### Examples

Create a new interface

Create a secondary IP agent interface on host "30052."

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.create",
  "params": {
    "hostid": "30052",
    "main": "0",
    "type": "1",
```

```

        "useip": "1",
        "ip": "127.0.0.1",
        "dns": "",
        "port": "10050"
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "interfaceids": [
            "30062"
        ]
    },
    "id": 1
}

```

Create an interface with SNMP details

Request:

```

{
    "jsonrpc": "2.0",
    "method": "hostinterface.create",
    "params": {
        "hostid": "10456",
        "main": "0",
        "type": "2",
        "useip": "1",
        "ip": "127.0.0.1",
        "dns": "",
        "port": "1601",
        "details": {
            "version": "2",
            "bulk": "1",
            "community": "{$SNMP_COMMUNITY}"
        }
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "interfaceids": [
            "30063"
        ]
    },
    "id": 1
}

```

See also

- [hostinterface.massadd](#)
- [host.massadd](#)

Source

`CHostInterface::create()` in `ui/include/classes/api/services/CHostInterface.php`.

## hostinterface.delete

### Description

object hostinterface.delete(array hostInterfaceIds)

This method allows to delete host interfaces.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(array) IDs of the host interfaces to delete.

### Return values

(object) Returns an object containing the IDs of the deleted host interfaces under the `interfaceids` property.

### Examples

Delete a host interface

Delete the host interface with ID 30062.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.delete",
  "params": [
    "30062"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "interfaceids": [
      "30062"
    ]
  },
  "id": 1
}
```

See also

- [hostinterface.massremove](#)
- [host.massremove](#)

Source

CHostInterface::delete() in `ui/include/classes/api/services/CHostInterface.php`.

## hostinterface.get

### Description

integer/array hostinterface.get(object parameters)

The method allows to retrieve host interfaces according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

## Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| hostids                | string/array | Return only host interfaces used by the given hosts.  |
| interfaceids           | string/array | Return only host interfaces with the given IDs.   |
| itemids                | string/array | Return only host interfaces used by the given items.  |
| triggerids             | string/array | Return only host interfaces used by items in the given triggers.  |
| selectItems            | query        | Return an <b>items</b> property with the items that use the interface.  |
|                        |              | Supports count.   |
| selectHosts            | query        | Return a <b>hosts</b> property with an array of hosts that use the interface.   |
| limitSelects           | integer      | Limits the number of records returned by subselects.  |
|                        |              | Applies to the following subselects:<br><b>selectItems</b> .  |
| sortfield              | string/array | Sort the result by the given properties.  |
|                        |              | Possible values are: <b>interfaceid</b> , <b>dns</b> , <b>ip</b> .<br>These parameters are described in the <b>reference commentary</b> . |
| countOutput            | boolean      |   |
| editable               | boolean      |   |
| excludeSearch          | boolean      |   |
| filter                 | object       |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

## Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the **countOutput** parameter has been used.

## Examples

### Retrieve host interfaces

Retrieve all data about the interfaces used by host "30057."

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.get",
  "params": {
    "output": "extend",
    "hostids": "30057"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
```

```

        "interfaceid": "50039",
        "hostid": "30057",
        "main": "1",
        "type": "1",
        "useip": "0",
        "ip": "",
        "dns": "localhost",
        "port": "10050",
        "available": "0",
        "error": "",
        "errors_from": "0",
        "disable_until": "0",
        "details": []
    },
    {
        "interfaceid": "55082",
        "hostid": "30057",
        "main": "1",
        "type": "2",
        "useip": "1",
        "ip": "127.0.0.1",
        "dns": "",
        "port": "161",
        "available": "0",
        "error": "",
        "errors_from": "0",
        "disable_until": "0",
        "details": {
            "version": "2",
            "bulk": "0",
            "community": "${SNMP_COMMUNITY}"
        }
    }
],
    "id": 1
}

```

See also

- [Host](#)
- [Item](#)

Source

`CHostInterface::get()` in `ui/include/classes/api/services/CHostInterface.php`.

## hostinterface.massadd

Description

object `hostinterface.massadd(object parameters)`

This method allows to simultaneously add host interfaces to multiple hosts.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the host interfaces to be created on the given hosts.

The method accepts the following parameters.



| Parameter                       | Type         | Description   |
|---------------------------------|--------------|---|
| <b>hosts</b><br>(required)      | object/array | Hosts to be updated.<br><br>The hosts must have the <code>hostid</code> property defined. |
| <b>interfaces</b><br>(required) | object/array | <b>Host interfaces</b> to create on the given hosts.                                      |

#### Return values

(object) Returns an object containing the IDs of the created host interfaces under the `interfaceids` property.

#### Examples

##### Creating interfaces

Create an interface on two hosts.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.massadd",
  "params": {
    "hosts": [
      {
        "hostid": "30050"
      },
      {
        "hostid": "30052"
      }
    ],
    "interfaces": {
      "dns": "",
      "ip": "127.0.0.1",
      "main": 0,
      "port": "10050",
      "type": 1,
      "useip": 1
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "interfaceids": [
      "30069",
      "30070"
    ]
  },
  "id": 1
}
```

#### See also

- [hostinterface.create](#)
- [host.massadd](#)
- [Host](#)

#### Source

`CHostInterface::massAdd()` in `ui/include/classes/api/services/CHostInterface.php`.

hostinterface.massremove

Description

object hostinterface.massremove(object parameters)

This method allows to remove host interfaces from the given hosts.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the hosts to be updated and the interfaces to be removed.

| Parameter                       | Type         | Description  |
|---------------------------------|--------------|--|
| <b>hostids</b><br>(required)    | string/array | IDs of the hosts to be updated.  |
| <b>interfaces</b><br>(required) | object/array | Host interfaces to remove from the given hosts.<br><br>The host interface object must have the ip, dns and port properties defined |

Return values

(object) Returns an object containing the IDs of the deleted host interfaces under the `interfaceids` property.

Examples

Removing interfaces

Remove the "127.0.0.1" SNMP interface from two hosts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.massremove",
  "params": {
    "hostids": [
      "30050",
      "30052"
    ],
    "interfaces": {
      "dns": "",
      "ip": "127.0.0.1",
      "port": "161"
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "interfaceids": [
      "30069",
      "30070"
    ]
  },
  "id": 1
}
```

See also

- `hostinterface.delete`
- `host.massremove`

Source

`CHostInterface::massRemove()` in `ui/include/classes/api/services/CHostInterface.php`.

**hostinterface.replacehostinterfaces**

Description

`object hostinterface.replacehostinterfaces(object parameters)`

This method allows to replace all host interfaces on a given host.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the ID of the host to be updated and the new host interfaces.

| Parameter                       | Type         | Description   |
|---------------------------------|--------------|---|
| <b>hostid</b><br>(required)     | string       | ID of the host to be updated.                                       |
| <b>interfaces</b><br>(required) | object/array | <b>Host interfaces</b> to replace the current host interfaces with. |

Return values

(object) Returns an object containing the IDs of the created host interfaces under the `interfaceids` property.

Examples

Replacing host interfaces

Replace all host interfaces with a single agent interface.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostinterface.replacehostinterfaces",
  "params": {
    "hostid": "30052",
    "interfaces": {
      "dns": "",
      "ip": "127.0.0.1",
      "main": 1,
      "port": "10050",
      "type": 1,
      "useip": 1
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "interfaceids": [
```

```

        "30081"
    ],
    },
    "id": 1
}

```

See also

- [host.update](#)
- [host.massupdate](#)

Source

`CHostInterface::replaceHostInterfaces()` in `ui/include/classes/api/services/CHostInterface.php`.

## hostinterface.update

Description

`object hostinterface.update(object/array hostInterfaces)`

This method allows to update existing host interfaces.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) **Host interface properties** to be updated.

The `interfaceid` property must be defined for each host interface, all other properties are optional. Only the given properties will be updated, all others will remain unchanged.

Return values

(object) Returns an object containing the IDs of the updated host interfaces under the `interfaceids` property.

Examples

Changing a host interface port

Change the port of a host interface.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "hostinterface.update",
    "params": {
        "interfaceid": "30048",
        "port": "30050"
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "interfaceids": [
            "30048"
        ]
    },
    "id": 1
}

```

Source

CHostInterface::update() in *ui/include/classes/api/services/CHostInterface.php*.

## Host prototype

This class is designed to work with host prototypes.

Object references:

- [Host prototype](#)
- [Host prototype inventory](#)
- [Group link](#)
- [Group prototype](#)

Available methods:

- [hostprototype.create](#) - creating new host prototypes
- [hostprototype.delete](#) - deleting host prototypes
- [hostprototype.get](#) - retrieving host prototypes
- [hostprototype.update](#) - updating host prototypes

### > Host prototype object

The following objects are directly related to the `hostprototype` API.

Host prototype

The host prototype object has the following properties.

| Property          | Type    | Description   |
|-------------------|---------|---|
| hostid            | string  | ( <i>readonly</i> ) ID of the host prototype.   |
| <b>host</b>       | string  | Technical name of the host prototype.   |
| (required)        |         |   |
| name              | string  | Visible name of the host prototype.   |
| status            | integer | Default: <code>host</code> property value.<br>Status of the host prototype.<br><br>Possible values are:<br>0 - ( <i>default</i> ) monitored host;<br>1 - unmonitored host.                          |
| inventory_mode    | integer | Host inventory population mode.<br><br>Possible values are:<br>-1 - ( <i>default</i> ) disabled;<br>0 - manual;<br>1 - automatic.   |
| templateid        | string  | ( <i>readonly</i> ) ID of the parent template host prototype.   |
| discover          | integer | Host prototype discovery status.<br><br>Possible values:<br>0 - ( <i>default</i> ) new hosts will be discovered;<br>1 - new hosts will not be discovered and existing hosts will be marked as lost. |
| custom_interfaces | integer | Source of interfaces for hosts created by the host prototype.<br><br>Possible values:<br>0 - ( <i>default</i> ) inherit interfaces from parent host;<br>1 - use host prototypes custom interfaces.  |

| Property | Type   | Description  |
|----------|--------|--|
| uuid     | string | Universal unique identifier, used for linking imported host prototypes to already existing ones. Used only for host prototypes on templates. Auto-generated, if not given. |

Note that for some methods (update, delete) the required/optional parameter combination is different.

#### Group link

The group link object links a host prototype with a host group and has the following properties.

| Property                     | Type   | Description           |
|------------------------------|--------|-----------------------|
| <b>groupid</b><br>(required) | string | ID of the host group. |

#### Group prototype

The group prototype object defines a group that will be created for a discovered host and has the following properties.

| Property                  | Type   | Description                                  |
|---------------------------|--------|--|
| <b>group_prototypeid</b>  | string | <i>(readonly)</i> ID of the group prototype. |
| <b>name</b><br>(required) | string | Name of the group prototype.                 |

#### Host prototype tag

The host prototype tag object has the following properties.

| Property                 | Type   | Description               |
|--------------------------|--------|---------------------------|
| <b>tag</b><br>(required) | string | Host prototype tag name.  |
| value                    | string | Host prototype tag value. |

#### Custom interface

The custom interface object has the following properties.

| Property                  | Type    | Description   |
|---------------------------|---------|---|
| dns                       | string  | DNS name used by the interface.   |
| ip                        | string  | <b>Required</b> if the connection is made via DNS. Can contain macros.<br>IP address used by the interface.   |
| <b>main</b><br>(required) | integer | <b>Required</b> if the connection is made via IP. Can contain macros.<br>Whether the interface is used as default on the host. Only one interface of some type can be set as default on a host.<br><br>Possible values are:<br>0 - not default;<br>1 - default. |
| <b>port</b><br>(required) | string  | Port number used by the interface. Can contain user and LLD macros.   |

| Property                   | Type    | Description   |
|----------------------------|---------|---|
| <b>type</b><br>(required)  | integer | Interface type.<br><br>Possible values are:<br>1 - agent;<br>2 - SNMP;<br>3 - IPMI;<br>4 - JMX.   |
| <b>useip</b><br>(required) | integer | Whether the connection should be made via IP.<br><br>Possible values are:<br>0 - connect using host DNS name;<br>1 - connect using host IP address for this host interface. |
| details                    | array   | Additional object for interface. <b>Required</b> if interface 'type' is SNMP.   |

#### Custom interface details

The details object has the following properties.

| Property                     | Type    | Description   |
|------------------------------|---------|---|
| <b>version</b><br>(required) | integer | SNMP interface version.<br><br>Possible values are:<br>1 - SNMPv1;<br>2 - SNMPv2c;<br>3 - SNMPv3  |
| bulk                         | integer | Whether to use bulk SNMP requests.<br><br>Possible values are:<br>0 - don't use bulk requests;<br>1 - <i>(default)</i> - use bulk requests.   |
| community                    | string  | SNMP community. Used only by SNMPv1 and SNMPv2 interfaces.  |
| securityname                 | string  | SNMPv3 security name. Used only by SNMPv3 interfaces.   |
| securitylevel                | integer | SNMPv3 security level. Used only by SNMPv3 interfaces.<br><br>Possible values are:<br>0 - <i>(default)</i> - noAuthNoPriv;<br>1 - authNoPriv;<br>2 - authPriv.                                      |
| authpassphrase               | string  | SNMPv3 authentication passphrase. Used only by SNMPv3 interfaces.   |
| privpassphrase               | string  | SNMPv3 privacy passphrase. Used only by SNMPv3 interfaces.  |
| authprotocol                 | integer | SNMPv3 authentication protocol. Used only by SNMPv3 interfaces.<br><br>Possible values are:<br>0 - <i>(default)</i> - MD5;<br>1 - SHA1;<br>2 - SHA224;<br>3 - SHA256;<br>4 - SHA384;<br>5 - SHA512. |
| privprotocol                 | integer | SNMPv3 privacy protocol. Used only by SNMPv3 interfaces.<br><br>Possible values are:<br>0 - <i>(default)</i> - DES;<br>1 - AES128;<br>2 - AES192;<br>3 - AES256;<br>4 - AES192C;<br>5 - AES256C.    |
| contextname                  | string  | SNMPv3 context name. Used only by SNMPv3 interfaces.  |

hostprototype.create

Description

object hostprototype.create(object/array hostPrototypes)

This method allows to create new host prototypes.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Host prototypes to create.

Additionally to the [standard host prototype properties](#), the method accepts the following parameters.

| Parameter                       | Type         | Description  |
|---------------------------------|--------------|--|
| <b>groupLinks</b><br>(required) | array        | Group <a href="#">links</a> to be created for the host prototype.      |
| <b>ruleid</b><br>(required)     | string       | ID of the LLD rule that the host prototype belongs to.                 |
| groupPrototypes                 | array        | Group <a href="#">prototypes</a> to be created for the host prototype. |
| macros                          | object/array | <a href="#">User macros</a> to be created for the host prototype.      |
| tags                            | object/array | Host prototype <a href="#">tags</a> .                                  |
| interfaces                      | object/array | Host prototype <a href="#">custom interfaces</a> .                     |
| templates                       | object/array | <a href="#">Templates</a> to be linked to the host prototype.          |
|                                 |              | The templates must have the <code>templateid</code> property defined.  |

Return values

(object) Returns an object containing the IDs of the created host prototypes under the `hostids` property. The order of the returned IDs matches the order of the passed host prototypes.

Examples

Creating a host prototype

Create a host prototype `"{#VM.NAME}"` on LLD rule `"23542"` with a group prototype `"{#HV.NAME}"`, tag pair `"Datacenter": "{#DATACENTER.NAME}"` and custom SNMPv2 interface `127.0.0.1:161` with community `{$SNMP_COMMUNITY}`. Link it to host group `"2"`.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostprototype.create",
  "params": {
    "host": "{#VM.NAME}",
    "ruleid": "23542",
    "custom_interfaces": "1",
    "groupLinks": [
      {
        "groupid": "2"
      }
    ],
    "groupPrototypes": [
      {
        "name": "{#HV.NAME}"
      }
    ],
    "tags": [
      {
        "tag": "Datacenter",
```



```

        "value": "#{DATACENTER.NAME}"
    }
],
"interfaces": [
    {
        "main": "1",
        "type": "2",
        "useip": "1",
        "ip": "127.0.0.1",
        "dns": "",
        "port": "161",
        "details": {
            "version": "2",
            "bulk": "1",
            "community": "{$SNMP_COMMUNITY}"
        }
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "hostids": [
            "10103"
        ]
    },
    "id": 1
}

```

See also

- [Group link](#)
- [Group prototype](#)
- [Host prototype tag](#)
- [Custom interface](#)
- [User macro](#)

Source

`CHostPrototype::create()` in `ui/include/classes/api/services/CHostPrototype.php`.

## hostprototype.delete

Description

object `hostprototype.delete(array hostPrototypeIds)`

This method allows to delete host prototypes.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the host prototypes to delete.

Return values

(object) Returns an object containing the IDs of the deleted host prototypes under the `hostids` property.

## Examples

### Deleting multiple host prototypes

Delete two host prototypes.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostprototype.delete",
  "params": [
    "10103",
    "10105"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10103",
      "10105"
    ]
  },
  "id": 1
}
```

### Source

CHostPrototype::delete() in *ui/include/classes/api/services/CHostPrototype.php*.

## hostprototype.get

### Description

integer/array hostprototype.get(object parameters)

The method allows to retrieve host prototypes according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter             | Type         | Description  |
|-----------------------|--------------|--|
| hostids               | string/array | Return only host prototypes with the given IDs.  |
| discoveryids          | string/array | Return only host prototype that belong to the given LLD rules.                               |
| inherited             | boolean      | If set to true return only items inherited from a template.                                  |
| selectDiscoveryRule   | query        | Return a <b>discoveryRule</b> property with the LLD rule that the host prototype belongs to. |
| selectInterfaces      | query        | Return an <b>interfaces</b> property with host prototype custom interfaces.                  |
| selectGroupLinks      | query        | Return a <b>groupLinks</b> property with the group links of the host prototype.              |
| selectGroupPrototypes | query        | Return a <b>groupPrototypes</b> property with the group prototypes of the host prototype.    |
| selectMacros          | query        | Return a <b>macros</b> property with host prototype macros.                                  |
| selectParentHost      | query        | Return a <b>parentHost</b> property with the host that the host prototype belongs to.        |

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| selectTags             | query        | Return a <b>tags</b> property with host prototype tags.  |
| selectTemplates        | query        | Return a <b>templates</b> property with the templates linked to the host prototype.  |
| sortfield              | string/array | Supports count.<br>Sort the result by the given properties.<br><br>Possible values are: <b>hostid</b> , <b>host</b> , <b>name</b> and <b>status</b> .<br>These parameters are described in the <b>reference commentary</b> . |
| countOutput            | boolean      |  |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the **countOutput** parameter has been used.

#### Examples

Retrieving host prototypes from an LLD rule

Retrieve all host prototypes, their group links, group prototypes and tags from an LLD rule.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostprototype.get",
  "params": {
    "output": "extend",
    "selectInterfaces": "extend",
    "selectGroupLinks": "extend",
    "selectGroupPrototypes": "extend",
    "selectTags": "extend",
    "discoveryids": "23554"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10092",
      "host": "{#HV.UUID}",
      "name": "{#HV.UUID}",
      "status": "0",
      "templateid": "0",
      "discover": "0",
      "custom_interfaces": "1",
      "inventory_mode": "-1",

```

```

        "groupLinks": [
            {
                "group_prototypeid": "4",
                "hostid": "10092",
                "groupid": "7",
                "templateid": "0"
            }
        ],
        "groupPrototypes": [
            {
                "group_prototypeid": "7",
                "hostid": "10092",
                "name": "{#CLUSTER.NAME}",
                "templateid": "0"
            }
        ],
        "tags": [
            {
                "tag": "Datacenter",
                "value": "{#DATACENTER.NAME}"
            },
            {
                "tag": "Instance type",
                "value": "{#INSTANCE_TYPE}"
            }
        ],
        "interfaces": [
            {
                "main": "1",
                "type": "2",
                "useip": "1",
                "ip": "127.0.0.1",
                "dns": "",
                "port": "161",
                "details": {
                    "version": "2",
                    "bulk": "1",
                    "community": "{$SNMP_COMMUNITY}"
                }
            }
        ]
    },
    "id": 1
}

```

See also

- [Group link](#)
- [Group prototype](#)
- [User macro](#)

Source

`CHostPrototype::get()` in `ui/include/classes/api/services/CHostPrototype.php`.

## hostprototype.update

Description

`object hostprototype.update(object/array hostPrototypes)`

This method allows to update existing host prototypes.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object/array) Host prototype properties to be updated.

The `hostid` property must be defined for each host prototype, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard host prototype properties](#), the method accepts the following parameters.

| Parameter       | Type         | Description  |
|-----------------|--------------|--|
| groupLinks      | array        | Group <a href="#">links</a> to replace the current group links on the host prototype.  |
| groupPrototypes | array        | Group <a href="#">prototypes</a> to replace the existing group prototypes on the host prototype.   |
| macros          | object/array | All group prototypes that are not listed in the request will be removed.<br><a href="#">User macros</a> to replace the current user macros.  |
| tags            | object/array | All macros that are not listed in the request will be removed.<br>Host prototype <a href="#">tags</a> to replace the current tags.   |
| interfaces      | object/array | All tags that are not listed in the request will be removed.<br>Host prototype <a href="#">custom interfaces</a> to replace the current interfaces.  |
| templates       | object/array | Custom interface object should contain all its parameters.<br>All interfaces that are not listed in the request will be removed.<br><a href="#">Templates</a> to replace the currently linked templates. |
|                 |              | The templates must have the <code>templateid</code> property defined.  |

**Return values**

(object) Returns an object containing the IDs of the updated host prototypes under the `hostids` property.

**Examples****Disabling a host prototype**

Disable a host prototype, that is, set its status to 1.

**Request:**

```
{
  "jsonrpc": "2.0",
  "method": "hostprototype.update",
  "params": {
    "hostid": "10092",
    "status": 1
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

**Response:**

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10092"
    ]
  },
}
```

```
    "id": 1
}
```

Updating host prototype tags

Replace host prototype tags with new ones.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostprototype.update",
  "params": {
    "hostid": "10092",
    "tags": [
      {
        "tag": "Datacenter",
        "value": "#{DATACENTER.NAME}"
      },
      {
        "tag": "Instance type",
        "value": "#{INSTANCE_TYPE}"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10092"
    ]
  },
  "id": 1
}
```

Updating host prototype custom interfaces

Replace inherited interfaces with host prototype custom interfaces.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "hostprototype.update",
  "params": {
    "hostid": "10092",
    "custom_interfaces": "1",
    "interfaces": [
      {
        "main": "1",
        "type": "2",
        "useip": "1",
        "ip": "127.0.0.1",
        "dns": "",
        "port": "161",
        "details": {
          "version": "2",
          "bulk": "1",
          "community": "${SNMP_COMMUNITY}"
        }
      }
    ]
  }
}
```

```

    ],
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "hostids": [
      "10092"
    ]
  },
  "id": 1
}

```

See also

- [Group link](#)
- [Group prototype](#)
- [Host prototype tag](#)
- [Custom interface](#)
- [User macro](#)

Source

`CHostPrototype::update()` in `ui/include/classes/api/services/CHostPrototype.php`.

## Housekeeping

This class is designed to work with housekeeping.

Object references:

- [Housekeeping](#)

Available methods:

- [housekeeping.get](#) - retrieve housekeeping
- [housekeeping.update](#) - update housekeeping

## > Housekeeping object

The following objects are directly related to the housekeeping API.

Housekeeping

The settings object has the following properties.

| Property          | Type    | Description   |
|-------------------|---------|---|
| hk_events_mode    | integer | Enable internal housekeeping for events and alerts.<br><br>Possible values:<br>0 - Disable;<br>1 - <i>(default)</i> Enable. |
| hk_events_trigger | string  | Trigger data storage period. Accepts seconds and time unit with suffix.   |
| hk_events_service | string  | Default: 365d.<br>Service data storage period. Accepts seconds and time unit with suffix.<br><br>Default: 1d.               |

| Property            | Type    | Description   |
|---------------------|---------|---|
| hk_events_internal  | string  | Internal data storage period. Accepts seconds and time unit with suffix.  |
| hk_events_discovery | string  | Default: 1d.<br>Network discovery data storage period. Accepts seconds and time unit with suffix.   |
| hk_events_autoreg   | string  | Default: 1d.<br>Autoregistration data storage period. Accepts seconds and time unit with suffix.  |
| hk_services_mode    | integer | Default: 1d.<br>Enable internal housekeeping for services.  |
| hk_services         | string  | Possible values:<br>0 - Disable;<br>1 - <i>(default)</i> Enable.<br>Services data storage period. Accepts seconds and time unit with suffix.          |
| hk_audit_mode       | integer | Default: 365d.<br>Enable internal housekeeping for audit.   |
| hk_audit            | string  | Possible values:<br>0 - Disable;<br>1 - <i>(default)</i> Enable.<br>Audit data storage period. Accepts seconds and time unit with suffix.             |
| hk_sessions_mode    | integer | Default: 365d.<br>Enable internal housekeeping for sessions.  |
| hk_sessions         | string  | Possible values:<br>0 - Disable;<br>1 - <i>(default)</i> Enable.<br>Sessions data storage period. Accepts seconds and time unit with suffix.          |
| hk_history_mode     | integer | Default: 365d.<br>Enable internal housekeeping for history.   |
| hk_history_global   | integer | Possible values:<br>0 - Disable;<br>1 - <i>(default)</i> Enable.<br>Override item history period.   |
| hk_history          | string  | Possible values:<br>0 - Do not override;<br>1 - <i>(default)</i> Override.<br>History data storage period. Accepts seconds and time unit with suffix. |
| hk_trends_mode      | integer | Default: 90d.<br>Enable internal housekeeping for trends.   |
| hk_trends_global    | integer | Possible values:<br>0 - Disable;<br>1 - <i>(default)</i> Enable.<br>Override item trend period.   |
|                     |         | Possible values:<br>0 - Do not override;<br>1 - <i>(default)</i> Override.  |



| Property                 | Type    | Description   |
|--------------------------|---------|---|
| hk_trends                | string  | Trends data storage period. Accepts seconds and time unit with suffix.  |
| db_extension             | string  | Default: 365d.<br>(readonly) Configuration flag DB extension. If this flag is set to "timescaledb" then the server changes its behavior for housekeeping and item deletion. |
| compression_status       | integer | Enable TimescaleDB compression for history and trends.<br><br>Possible values:<br>0 - (default) Off;<br>1 - On.   |
| compress_older           | string  | Compress history and trends records older than specified period. Accepts seconds and time unit with suffix.   |
| compression_availability | integer | Default: 7d.<br>(readonly) Compression availability.<br><br>Possible values:<br>0 - Unavailable;<br>1 - Available.  |

## housekeeping.get

### Description

object housekeeping.get(object parameters)

The method allows to retrieve housekeeping object according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports only one parameter.

| Parameter | Type  | Description   |
|-----------|-------|---|
| output    | query | This parameter is described in the <a href="#">reference commentary</a> . |

### Return values

(object) Returns housekeeping object.

### Examples

Request:

```
{
  "jsonrpc": "2.0",
  "method": "housekeeping.get",
  "params": {
    "output": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hk_events_mode": "1",
    "hk_events_trigger": "365d",
    "hk_events_service": "1d",
    "hk_events_internal": "1d",
    "hk_events_discovery": "1d",
    "hk_events_autoreg": "1d",
    "hk_services_mode": "1",
    "hk_services": "365d",
    "hk_audit_mode": "1",
    "hk_audit": "365d",
    "hk_sessions_mode": "1",
    "hk_sessions": "365d",
    "hk_history_mode": "1",
    "hk_history_global": "0",
    "hk_history": "90d",
    "hk_trends_mode": "1",
    "hk_trends_global": "0",
    "hk_trends": "365d",
    "db_extension": "",
    "compression_status": "0",
    "compress_older": "7d"
  },
  "id": 1
}
```

Source

CHousekeeping ::get() in *ui/include/classes/api/services/CHousekeeping.php*.

## housekeeping.update

Description

object housekeeping.update(object housekeeping)

This method allows to update existing housekeeping settings.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Housekeeping properties to be updated.

Return values

(array) Returns array with the names of updated parameters.

Examples

Request:

```
{
  "jsonrpc": "2.0",
  "method": "housekeeping.update",
  "params": {
    "hk_events_mode": "1",
    "hk_events_trigger": "200d",
    "hk_events_internal": "2d",
    "hk_events_discovery": "2d"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
}
```

```
    "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    "hk_events_mode",
    "hk_events_trigger",
    "hk_events_internal",
    "hk_events_discovery"
  ],
  "id": 1
}
```

Source

CHousekeeping::update() in *ui/include/classes/api/services/CHousekeeping.php*.

## Icon map

This class is designed to work with icon maps.

Object references:

- [Icon map](#)
- [Icon mapping](#)

Available methods:

- [iconmap.create](#) - create new icon maps
- [iconmap.delete](#) - delete icon maps
- [iconmap.get](#) - retrieve icon maps
- [iconmap.update](#) - update icon maps

## > Icon map object

The following objects are directly related to the `iconmap` API.

Icon map

The icon map object has the following properties.

| Property   | Type   | Description                             |
|--|--------|---|
| <code>iconmapid</code>                           | string | ( <i>readonly</i> ) ID of the icon map. |
| <b><code>default_iconid</code></b><br>(required) | string | ID of the default icon.                 |
| <b><code>name</code></b><br>(required)           | string | Name of the icon map.                   |

Note that for some methods (update, delete) the required/optional parameter combination is different.

Icon mapping

The icon mapping object defines a specific icon to be used for hosts with a certain inventory field value. It has the following properties.

| Property                                 | Type   | Description                              |
|--|--------|--|
| <code>iconmappingid</code>               | string | ( <i>readonly</i> ) ID of the icon map.  |
| <b><code>iconid</code></b><br>(required) | string | ID of the icon used by the icon mapping. |

| Property                            | Type    | Description   |
|-------------------------------------|---------|---|
| <b>expression</b><br>(required)     | string  | Expression to match the inventory field against.  |
| <b>inventory_link</b><br>(required) | integer | ID of the host inventory field.<br><br>Refer to the <a href="#">host inventory object</a> for a list of supported inventory fields. |
| iconmapid                           | string  | ( <i>readonly</i> ) ID of the icon map that the icon mapping belongs to.  |
| sortorder                           | integer | ( <i>readonly</i> ) Position of the icon mapping in the icon map.   |

## iconmap.create

### Description

object iconmap.create(object/array iconMaps)

This method allows to create new icon maps.

#### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Icon maps to create.

Additionally to the [standard icon map properties](#), the method accepts the following parameters.

| Parameter                     | Type  | Description   |
|-------------------------------|-------|---|
| <b>mappings</b><br>(required) | array | <a href="#">Icon mappings</a> to be created for the icon map. |

### Return values

(object) Returns an object containing the IDs of the created icon maps under the `iconmapids` property. The order of the returned IDs matches the order of the passed icon maps.

### Examples

Create an icon map

Create an icon map to display hosts of different types.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "iconmap.create",
  "params": {
    "name": "Type icons",
    "default_iconid": "2",
    "mappings": [
      {
        "inventory_link": 1,
        "expression": "server",
        "iconid": "3"
      },
      {
        "inventory_link": 1,
        "expression": "switch",
        "iconid": "4"
      }
    ]
  }
},
```

```
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "iconmapids": [
      "2"
    ]
  },
  "id": 1
}
```

See also

- [Icon mapping](#)

Source

ClconMap::create() in *ui/include/classes/api/services/ClconMap.php*.

### iconmap.delete

Description

object iconmap.delete(array iconMapIds)

This method allows to delete icon maps.

#### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the icon maps to delete.

Return values

(object) Returns an object containing the IDs of the deleted icon maps under the `iconmapids` property.

Examples

Delete multiple icon maps

Delete two icon maps.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "iconmap.delete",
  "params": [
    "2",
    "5"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "iconmapids": [
      "2",

```

```

    ],
    "id": 1
}

```

Source

ClconMap::delete() in *ui/include/classes/api/services/ClconMap.php*.

## iconmap.get

Description

integer/array iconmap.get(object parameters)

The method allows to retrieve icon maps according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| iconmapids             | string/array | Return only icon maps with the given IDs.                                    |
| sysmapids              | string/array | Return only icon maps that are used in the given maps.                       |
| selectMappings         | query        | Return a <b>mappings</b> property with the icon mappings used.               |
| sortfield              | string/array | Sort the result by the given properties.                                     |
|                        |              | Possible values are: <b>iconmapid</b> and <b>name</b> .                      |
| countOutput            | boolean      | These parameters are described in the <a href="#">reference commentary</a> . |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the **countOutput** parameter has been used.

Examples

Retrieve an icon map

Retrieve all data about icon map "3".

Request:

```

{
  "jsonrpc": "2.0",
  "method": "iconmap.get",
  "params": {

```

```

        "iconmapids": "3",
        "output": "extend",
        "selectMappings": "extend"
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "mappings": [
                {
                    "iconmappingid": "3",
                    "iconmapid": "3",
                    "iconid": "6",
                    "inventory_link": "1",
                    "expression": "server",
                    "sortorder": "0"
                },
                {
                    "iconmappingid": "4",
                    "iconmapid": "3",
                    "iconid": "10",
                    "inventory_link": "1",
                    "expression": "switch",
                    "sortorder": "1"
                }
            ],
            "iconmapid": "3",
            "name": "Host type icons",
            "default_iconid": "2"
        }
    ],
    "id": 1
}

```

See also

- [Icon mapping](#)

Source

ClconMap::get() in *ui/include/classes/api/services/ClconMap.php*.

## iconmap.update

Description

object iconmap.update(object/array iconMaps)

This method allows to update existing icon maps.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Icon map properties to be updated.

The `iconmapid` property must be defined for each icon map, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard icon map properties](#), the method accepts the following parameters.

| Parameter | Type  | Description  |
|-----------|-------|--|
| mappings  | array | <a href="#">Icon mappings</a> to replace the existing icon mappings. |

Return values

(object) Returns an object containing the IDs of the updated icon maps under the `iconmapids` property.

Examples

Rename icon map

Rename an icon map to "OS icons".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "iconmap.update",
  "params": {
    "iconmapid": "1",
    "name": "OS icons"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "iconmapids": [
      "1"
    ]
  },
  "id": 1
}
```

See also

- [Icon mapping](#)

Source

`ClconMap::update()` in `ui/include/classes/api/services/ClconMap.php`.

## Image

This class is designed to work with images.

Object references:

- [Image](#)

Available methods:

- [image.create](#) - create new images
- [image.delete](#) - delete images
- [image.get](#) - retrieve images
- [image.update](#) - update images



## > Image object

The following objects are directly related to the `image` API.

Image

The image object has the following properties.

| Property                               | Type    | Description   |
|--|---------|---|
| <code>imageid</code>                   | string  | ( <i>readonly</i> ) ID of the image.  |
| <b><code>name</code></b><br>(required) | string  | Name of the image.  |
| <code>imagetype</code>                 | integer | Type of image.<br><br>Possible values:<br>1 - ( <i>default</i> ) icon;<br>2 - background image. |

Note that for some methods (update, delete) the required/optional parameter combination is different.

### **image.create**

Description

`object image.create(object/array images)`

This method allows to create new images.

#### **Note:**

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Images to create.

Additionally to the [standard image properties](#), the method accepts the following parameters.

| Parameter                                   | Type    | Description   |
|---|---------|---|
| <b><code>name</code></b><br>(required)      | string  | Name of the image.  |
| <b><code>imagetype</code></b><br>(required) | integer | Type of image.<br><br>Possible values:<br>1 - ( <i>default</i> ) icon;<br>2 - background image.   |
| <b><code>image</code></b><br>(required)     | string  | Base64 encoded image. The maximum size of the encoded image is 1 MB. Maximum size can be adjusted by changing <code>ZBX_MAX_IMAGE_SIZE</code> constant value.<br>Supported image formats are: PNG, JPEG, GIF. |

Return values

(object) Returns an object containing the IDs of the created images under the `imageids` property. The order of the returned IDs matches the order of the passed images.

Examples

Create an image

Create a cloud icon.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "image.create",
  "params": {
    "imagetype": 1,
    "name": "Cloud_(24)",
    "image": "iVBORw0KGgoAAAANSUhEUgAAABgAAAANCAYAAACzbK7QAAAABHNCSVQICAgIfAhkiAAAAAlwSFlzAAACmAAAAPgE
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "imageids": [
      "188"
    ]
  },
  "id": 1
}
```

Source

CImage::create() in `ui/include/classes/api/services/CImage.php`.

## image.delete

Description

object image.delete(array imageIds)

This method allows to delete images.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the images to delete.

Return values

(object) Returns an object containing the IDs of the deleted images under the `imageids` property.

Examples

Delete multiple images

Delete two images.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "image.delete",
  "params": [
    "188",
    "192"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "imageids": [
      "188",
      "192"
    ]
  },
  "id": 1
}
```

Source

CImage::delete() in *ui/include/classes/api/services/CImage.php*.

## image.get

Description

integer/array image.get(object parameters)

The method allows to retrieve images according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| imageids               | string/array | Return only images with the given IDs.                                       |
| sysmapids              | string/array | Return images that are used on the given maps.                               |
| select_image           | flag         | Return an <code>image</code> property with the Base64 encoded image.         |
| sortfield              | string/array | Sort the result by the given properties.                                     |
|                        |              | Possible values are: <code>imageid</code> and <code>name</code> .            |
| countOutput            | boolean      | These parameters are described in the <a href="#">reference commentary</a> . |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

Examples

Retrieve an image

Retrieve all data for image with ID "2".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "image.get",
  "params": {
    "output": "extend",
    "select_image": true,
    "imageids": "2"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "imageid": "2",
      "imagetype": "1",
      "name": "Cloud_(24)",
      "image": "iVBORwOKGgoAAAANSUhEUgAAABgAAAANCAYAAACzbK7QAAAABHNCSVQICAgIfAhkiAAAAAlwSFlzAAACmAA"
    }
  ],
  "id": 1
}
```

Source

CImage::get() in `ui/include/classes/api/services/CImage.php`.

## image.update

Description

object image.update(object/array images)

This method allows to update existing images.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Image properties to be updated.

The `imageid` property must be defined for each image, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard image properties](#), the method accepts the following parameters.

| Parameter | Type   | Description   |
|-----------|--------|---|
| image     | string | Base64 encoded image. The maximum size of the encoded image is 1 MB. Maximum size can be adjusted by changing <code>ZBX_MAX_IMAGE_SIZE</code> constant value.<br>Supported image formats are: PNG, JPEG, GIF. |

Return values

(object) Returns an object containing the IDs of the updated images under the `imageids` property.

Examples

Rename image

Rename image to "Cloud icon".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "image.update",
  "params": {
    "imageid": "2",
    "name": "Cloud icon"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "imageids": [
      "2"
    ]
  },
  "id": 1
}
```

Source

CImage::update() in *ui/include/classes/api/services/CImage.php*.

## Item

This class is designed to work with items.

Object references:

- [Item](#)

Available methods:

- [item.create](#) - creating new items
- [item.delete](#) - deleting items
- [item.get](#) - retrieving items
- [item.update](#) - updating items

### > Item object

The following objects are directly related to the `item` API.

Item

#### Note:

Web items cannot be directly created, updated or deleted via the Zabbix API.

The item object has the following properties.

| Property | Type   | Description                         |
|----------|--------|-------------------------------------|
| itemid   | string | ( <i>readonly</i> ) ID of the item. |

| Property                         | Type    | Description  |
|----------------------------------|---------|--|
| <b>delay</b><br>(required)       | string  | <p>Update interval of the item. Accepts seconds or a time unit with suffix (30s,1m,2h,1d).</p> <p>Optionally one or more <b>custom intervals</b> can be specified either as flexible intervals or scheduling.</p> <p>Multiple intervals are separated by a semicolon.</p> <p>User macros may be used. A single macro has to fill the whole field.</p> <p>Multiple macros in a field or macros mixed with text are not supported.</p> <p>Flexible intervals may be written as two macros separated by a forward slash (e.g. {\$FLEX_INTERVAL}/{FLEX_PERIOD}).</p> <p>Optional for Zabbix trapper, dependent items and for Zabbix agent (active) with <code>mqtt.get</code> key.</p> |
| <b>hostid</b><br>(required)      | string  | ID of the host or template that the item belongs to.   |
| <b>interfaceid</b><br>(required) | string  | <p>For update operations this field is <i>readonly</i>.</p> <p>ID of the item's host interface.</p> <p>Used only for host items. Not required for Zabbix agent (active), Zabbix internal, Zabbix trapper, calculated, dependent, database monitor and script items. Optional for HTTP agent items.</p>   |
| <b>key_</b><br>(required)        | string  | Item key.  |
| <b>name</b><br>(required)        | string  | Name of the item.  |
| <b>type</b><br>(required)        | integer | <p>Type of the item.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>0 - Zabbix agent;</li> <li>2 - Zabbix trapper;</li> <li>3 - Simple check;</li> <li>5 - Zabbix internal;</li> <li>7 - Zabbix agent (active);</li> <li>9 - Web item;</li> <li>10 - External check;</li> <li>11 - Database monitor;</li> <li>12 - IPMI agent;</li> <li>13 - SSH agent;</li> <li>14 - Telnet agent;</li> <li>15 - Calculated;</li> <li>16 - JMX agent;</li> <li>17 - SNMP trap;</li> <li>18 - Dependent item;</li> <li>19 - HTTP agent;</li> <li>20 - SNMP agent;</li> <li>21 - Script</li> </ul>  |
| <b>url</b><br>(required)         | string  | URL string, required only for HTTP agent item type. Supports user macros, {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}.   |
| <b>value_type</b><br>(required)  | integer | <p>Type of information of the item.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>0 - numeric float;</li> <li>1 - character;</li> <li>2 - log;</li> <li>3 - numeric unsigned;</li> <li>4 - text.</li> </ul>   |
| <b>allow_traps</b>               | integer | <p>HTTP agent item field. Allow to populate value as in trapper item type also.</p> <p>0 - (<i>default</i>) Do not allow to accept incoming data.<br/>1 - Allow to accept incoming data.</p>   |

| Property         | Type      | Description   |
|------------------|-----------|---|
| authtype         | integer   | Used only by SSH agent items or HTTP agent items.<br><br>SSH agent authentication method possible values:<br>0 - <i>(default)</i> password;<br>1 - public key.<br><br>HTTP agent authentication method possible values:<br>0 - <i>(default)</i> none<br>1 - basic<br>2 - NTLM<br>3 - Kerberos                                       |
| description      | string    | Description of the item.  |
| error            | string    | <i>(readonly)</i> Error text if there are problems updating the item value.   |
| flags            | integer   | <i>(readonly)</i> Origin of the item.<br><br>Possible values:<br>0 - a plain item;<br>4 - a discovered item.  |
| follow_redirects | integer   | HTTP agent item field. Follow response redirects while polling data.<br><br>0 - Do not follow redirects.<br>1 - <i>(default)</i> Follow redirects.  |
| headers          | object    | HTTP agent item field. Object with HTTP(S) request headers, where header name is used as key and header value as value.<br><br>Example:<br>{ "User-Agent": "Zabbix" }   |
| history          | string    | A time unit of how long the history data should be stored. Also accepts user macro.   |
| http_proxy       | string    | Default: 90d.<br>HTTP agent item field. HTTP(S) proxy connection string.  |
| inventory_link   | integer   | ID of the host inventory field that is populated by the item.<br><br>Refer to the <a href="#">host inventory page</a> for a list of supported host inventory fields and their IDs.  |
| ipmi_sensor      | string    | Default: 0.<br>IPMI sensor. Used only by IPMI items.  |
| jmx_endpoint     | string    | JMX agent custom connection string.   |
| lastclock        | timestamp | Default value:<br>service:jmx:rmi:///jndi/rmi://{HOST.CONN}:{HOST.PORT}/jmxrmi<br><i>(readonly)</i> Time when the item value was last updated.  |
| lastns           | integer   | By default, only values that fall within the last 24 hours are displayed. You can extend this time period by changing the value of <i>Max history display period</i> parameter in the <a href="#">Administration</a> → <a href="#">General</a> menu section.<br><i>(readonly)</i> Nanoseconds when the item value was last updated. |
| lastvalue        | string    | By default, only values that fall within the last 24 hours are displayed. You can extend this time period by changing the value of <i>Max history display period</i> parameter in the <a href="#">Administration</a> → <a href="#">General</a> menu section.<br><i>(readonly)</i> Last value of the item.                           |
|                  |           | By default, only values that fall within the last 24 hours are displayed. You can extend this time period by changing the value of <i>Max history display period</i> parameter in the <a href="#">Administration</a> → <a href="#">General</a> menu section.  |

| Property         | Type    | Description  |
|------------------|---------|--|
| logtimefmt       | string  | Format of the time in log entries. Used only by log items.   |
| master_itemid    | integer | Master item ID.<br>Recursion up to 3 dependent items and maximum count of dependent items equal to 29999 are allowed.  |
| output_format    | integer | Required by dependent items.<br>HTTP agent item field. Should response be converted to JSON.<br><br>0 - <i>(default)</i> Store raw.<br>1 - Convert to JSON.  |
| params           | string  | Additional parameters depending on the type of the item:<br>- executed script for SSH and Telnet items;<br>- SQL query for database monitor items;<br>- formula for calculated items;<br>- the script for script item.                     |
| parameters       | array   | Additional parameters for script items. Array of objects with 'name' and 'value' properties, where name must be unique.  |
| password         | string  | Password for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent items.<br>When used by JMX, username should also be specified together with password or both properties should be left blank.         |
| post_type        | integer | HTTP agent item field. Type of post data body stored in posts property.<br><br>0 - <i>(default)</i> Raw data.<br>2 - JSON data.<br>3 - XML data.   |
| posts            | string  | HTTP agent item field. HTTP(S) request body data. Used with post_type.   |
| prevvalue        | string  | <i>(readonly)</i> Previous value of the item.  |
|                  |         | By default, only values that fall within the last 24 hours are displayed. You can extend this time period by changing the value of <i>Max history display period</i> parameter in the <i>Administration</i> → <i>General</i> menu section. |
| privatekey       | string  | Name of the private key file.  |
| publickey        | string  | Name of the public key file.   |
| query_fields     | array   | HTTP agent item field. Query parameters. Array of objects with 'key': 'value' pairs, where value can be empty string.  |
| request_method   | integer | HTTP agent item field. Type of request method.<br><br>0 - <i>(default)</i> GET<br>1 - POST<br>2 - PUT<br>3 - HEAD  |
| retrieve_mode    | integer | HTTP agent item field. What part of response should be stored.<br><br>0 - <i>(default)</i> Body.<br>1 - Headers.<br>2 - Both body and headers will be stored.  |
| snmp_oid         | string  | For request_method HEAD only 1 is allowed value.<br>SNMP OID.  |
| ssl_cert_file    | string  | HTTP agent item field. Public SSL Key file path.   |
| ssl_key_file     | string  | HTTP agent item field. Private SSL Key file path.  |
| ssl_key_password | string  | HTTP agent item field. Password for SSL Key file.  |
| state            | integer | <i>(readonly)</i> State of the item.<br><br>Possible values:<br>0 - <i>(default)</i> normal;<br>1 - not supported.   |



| Property      | Type    | Description   |
|---------------|---------|---|
| status        | integer | Status of the item.<br><br>Possible values:<br>0 - ( <i>default</i> ) enabled item;<br>1 - disabled item.   |
| status_codes  | string  | HTTP agent item field. Ranges of required HTTP status codes separated by commas. Also supports user macros as part of comma separated list.<br><br>Example: 200,200-{\$M},{M},200-400   |
| templateid    | string  | (readonly) ID of the parent template item.<br><br><i>Hint:</i> Use the <code>hostid</code> property to specify the template that the item belongs to.   |
| timeout       | string  | Item data polling request timeout. Used for HTTP agent and script items. Supports user macros.<br><br>default: 3s<br>maximum value: 60s   |
| trapper_hosts | string  | Allowed hosts. Used by trapper items or HTTP agent items.   |
| trends        | string  | A time unit of how long the trends data should be stored. Also accepts user macro.<br><br>Default: 365d.  |
| units         | string  | Value units.  |
| username      | string  | Username for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent items.   |
| uuid          | string  | Required by SSH and Telnet items.<br>When used by JMX, password should also be specified together with username or both properties should be left blank.<br>Universal unique identifier, used for linking imported item to already existing ones. Used only for items on templates. Auto-generated, if not given. |
| valuemapid    | string  | ID of the associated value map.   |
| verify_host   | integer | HTTP agent item field. Whether to validate that the host name for the connection matches the one in the host's certificate.<br><br>0 - ( <i>default</i> ) Do not validate.<br>1 - Validate.   |
| verify_peer   | integer | HTTP agent item field. Whether to validate that the host's certificate is authentic.<br><br>0 - ( <i>default</i> ) Do not validate.<br>1 - Validate.  |

Note that for some methods (update, delete) the required/optional parameter combination is different.

#### Item tag

The item tag object has the following properties.

| Property                 | Type   | Description     |
|--------------------------|--------|-----------------|
| <b>tag</b><br>(required) | string | Item tag name.  |
| value                    | string | Item tag value. |

#### Item preprocessing

The item preprocessing object has the following properties.

| Property                                  | Type    | Description  |
|---|---------|--|
| <b>type</b><br>(required)                 | integer | <p>The preprocessing option type.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>1 - Custom multiplier;</li> <li>2 - Right trim;</li> <li>3 - Left trim;</li> <li>4 - Trim;</li> <li>5 - Regular expression matching;</li> <li>6 - Boolean to decimal;</li> <li>7 - Octal to decimal;</li> <li>8 - Hexadecimal to decimal;</li> <li>9 - Simple change;</li> <li>10 - Change per second;</li> <li>11 - XML XPath;</li> <li>12 - JSONPath;</li> <li>13 - In range;</li> <li>14 - Matches regular expression;</li> <li>15 - Does not match regular expression;</li> <li>16 - Check for error in JSON;</li> <li>17 - Check for error in XML;</li> <li>18 - Check for error using regular expression;</li> <li>19 - Discard unchanged;</li> <li>20 - Discard unchanged with heartbeat;</li> <li>21 - JavaScript;</li> <li>22 - Prometheus pattern;</li> <li>23 - Prometheus to JSON;</li> <li>24 - CSV to JSON;</li> <li>25 - Replace;</li> <li>26 - Check unsupported;</li> <li>27 - XML to JSON.</li> </ul> |
| <b>params</b><br>(required)               | string  | Additional parameters used by preprocessing option. Multiple parameters are separated by LF (\n) character.  |
| <b>error_handler</b><br>(required)        | integer | <p>Action type used in case of preprocessing step failure.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>0 - Error message is set by Zabbix server;</li> <li>1 - Discard value;</li> <li>2 - Set custom value;</li> <li>3 - Set custom error message.</li> </ul>  |
| <b>error_handler_params</b><br>(required) | string  | <p>Error handler parameters. Used with <code>error_handler</code>.</p> <p>Must be empty, if <code>error_handler</code> is 0 or 1.<br/>Can be empty if, <code>error_handler</code> is 2.<br/>Cannot be empty, if <code>error_handler</code> is 3.</p>   |

The following parameters and error handlers are supported for each preprocessing type.

| Preprocessing type | Name                     | Parameter 1                        | Parameter 2 | Parameter 3 | Supported error handlers |
|--------------------|--------------------------|------------------------------------|-------------|-------------|--------------------------|
| 1                  | Custom number multiplier | list of characters <sup>1, 6</sup> |             |             | 0, 1, 2, 3               |
| 2                  | Right trim               | list of characters <sup>2</sup>    |             |             |                          |
| 3                  | Left trim                | list of characters <sup>2</sup>    |             |             |                          |
| 4                  | Trim                     | list of characters <sup>2</sup>    |             |             |                          |

| Preprocessing type | Name   | Parameter 1 | Parameter 2         | Parameter 3 | Supported error handlers |
|--------------------|--|-------------|---------------------|-------------|--------------------------|
| 5                  | Regular pattern <sup>3</sup><br>ex-<br>pres-<br>sion   |             | output <sup>2</sup> |             | 0, 1, 2, 3               |
| 6                  | Boolean<br>to<br>deci-<br>mal  |             |                     |             | 0, 1, 2, 3               |
| 7                  | Octal<br>to<br>deci-<br>mal  |             |                     |             | 0, 1, 2, 3               |
| 8                  | Hexadecimal<br>to<br>deci-<br>mal  |             |                     |             | 0, 1, 2, 3               |
| 9                  | Simple<br>change   |             |                     |             | 0, 1, 2, 3               |
| 10                 | Change<br>per<br>sec-<br>ond   |             |                     |             | 0, 1, 2, 3               |
| 11                 | XML path <sup>4</sup><br>XPath   |             |                     |             | 0, 1, 2, 3               |
| 12                 | JSONPath <sup>4</sup>  |             |                     |             | 0, 1, 2, 3               |
| 13                 | In min <sup>1, 6</sup><br>range  |             | max <sup>1, 6</sup> |             | 0, 1, 2, 3               |
| 14                 | Matchespattern <sup>3</sup><br>regu-<br>lar<br>ex-<br>pres-<br>sion                              |             |                     |             | 0, 1, 2, 3               |
| 15                 | Does pattern <sup>3</sup><br>not<br>match<br>regu-<br>lar<br>ex-<br>pres-<br>sion                |             |                     |             | 0, 1, 2, 3               |
| 16                 | Check path <sup>4</sup><br>for<br>error<br>in<br>JSON  |             |                     |             | 0, 1, 2, 3               |
| 17                 | Check path <sup>4</sup><br>for<br>error<br>in<br>XML   |             |                     |             | 0, 1, 2, 3               |
| 18                 | Check pattern <sup>3</sup><br>for<br>error<br>us-<br>ing<br>regu-<br>lar<br>ex-<br>pres-<br>sion |             | output <sup>2</sup> |             | 0, 1, 2, 3               |

| Preprocessing type | Name  | Parameter 1            | Parameter 2               | Parameter 3            | Supported error handlers |
|--------------------|---|------------------------|---------------------------|------------------------|--------------------------|
| 19                 | Discard<br>un-<br>changed   |                        |                           |                        |                          |
| 20                 | Discard seconds <sup>5, 6</sup><br>un-<br>changed<br>with<br>heart-<br>beat |                        |                           |                        |                          |
| 21                 | JavaScript <sup>2</sup>   |                        |                           |                        |                          |
| 22                 | Prometheus <sup>6, 7</sup><br>pat-<br>tern                                  |                        | value, label,<br>function | output <sup>8, 9</sup> | 0, 1, 2, 3               |
| 23                 | Prometheus <sup>6, 7</sup><br>to<br>JSON                                    |                        |                           |                        | 0, 1, 2, 3               |
| 24                 | CSV<br>to<br>JSON   | character <sup>2</sup> | character <sup>2</sup>    | 0,1                    | 0, 1, 2, 3               |
| 25                 | Replace search string <sup>2</sup>  |                        | replacement <sup>2</sup>  |                        |                          |
| 26                 | Check<br>un-<br>sup-<br>ported  |                        |                           |                        | 1, 2, 3                  |
| 27                 | XML<br>to<br>JSON   |                        |                           |                        | 0, 1, 2, 3               |

<sup>1</sup> integer or floating-point number

<sup>2</sup> string

<sup>3</sup> regular expression

<sup>4</sup> JSONPath or XML XPath

<sup>5</sup> positive integer (with support of time suffixes, e.g. 30s, 1m, 2h, 1d)

<sup>6</sup> user macro

<sup>7</sup> Prometheus pattern following the syntax: <metric name>{<label name>=<label value>, ...} == <value>. Each Prometheus pattern component (metric, label name, label value and metric value) can be user macro.

<sup>8</sup> Prometheus output following the syntax: <label name> (can be a user macro) if label is selected as the second parameter.

<sup>9</sup> One of the aggregation functions: sum, min, max, avg, count if function is selected as the second parameter.

## item.create

### Description

object item.create(object/array items)

This method allows to create new items.

#### Note:

Web items cannot be created via the Zabbix API.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Items to create.

Additionally to the [standard item properties](#), the method accepts the following parameters.

| Parameter     | Type  | Description                        |
|---------------|-------|------------------------------------|
| preprocessing | array | Item <b>preprocessing</b> options. |
| tags          | array | Item <b>tags</b> .                 |

#### Return values

(object) Returns an object containing the IDs of the created items under the `itemids` property. The order of the returned IDs matches the order of the passed items.

#### Examples

##### Creating an item

Create a numeric Zabbix agent item with 2 item tags to monitor free disk space on host with ID "30074".

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.create",
  "params": {
    "name": "Free disk space on /home/joe/",
    "key_": "vfs.fs.size[/home/joe/,free]",
    "hostid": "30074",
    "type": 0,
    "value_type": 3,
    "interfaceid": "30084",
    "tags": [
      {
        "tag": "Disk usage"
      },
      {
        "tag": "Equipment",
        "value": "Workstation"
      }
    ],
    "delay": "30s"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "24758"
    ]
  },
  "id": 1
}
```

##### Creating a host inventory item

Create a Zabbix agent item to populate the host's "OS" inventory field.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.create",
  "params": {
    "name": "uname",
    "key_": "system.uname",
    "hostid": "30021",

```

```

        "type": 0,
        "interfaceid": "30007",
        "value_type": 1,
        "delay": "10s",
        "inventory_link": 5
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "itemids": [
            "24759"
        ]
    },
    "id": 1
}

```

Creating an item with preprocessing

Create an item using custom multiplier.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "item.create",
    "params": {
        "name": "Device uptime",
        "key_": "sysUpTime",
        "hostid": "11312",
        "type": 4,
        "snmp_oid": "SNMPv2-MIB::sysUpTime.0",
        "value_type": 1,
        "delay": "60s",
        "units": "uptime",
        "interfaceid": "1156",
        "preprocessing": [
            {
                "type": 1,
                "params": "0.01",
                "error_handler": 1,
                "error_handler_params": ""
            }
        ]
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "itemids": [
            "44210"
        ]
    },
    "id": 1
}

```

### Creating dependent item

Create a dependent item for the master item with ID 24759. Only dependencies on the same host are allowed, therefore master and the dependent item should have the same hostid.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.create",
  "params": {
    "hostid": "30074",
    "name": "Dependent test item",
    "key_": "dependent.item",
    "type": 18,
    "master_itemid": "24759",
    "value_type": 2
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "44211"
    ]
  },
  "id": 1
}
```

### Create HTTP agent item

Create POST request method item with JSON response preprocessing.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.create",
  "params": {
    "url": "http://127.0.0.1/http.php",
    "query_fields": [
      {
        "mode": "json"
      },
      {
        "min": "10"
      },
      {
        "max": "100"
      }
    ],
    "interfaceid": "1",
    "type": 19,
    "hostid": "10254",
    "delay": "5s",
    "key_": "json",
    "name": "HTTP agent example JSON",
    "value_type": 0,
    "output_format": 1,
    "preprocessing": [
      {
        "type": 12,

```

```

        "params": "$.random",
        "error_handler": 0,
        "error_handler_params": ""
    }
    ],
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 2
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23865"
    ]
  },
  "id": 3
}

```

Create script item

Create a simple data collection using a script item.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "item.create",
  "params": {
    "name": "Script example",
    "key_": "custom.script.item",
    "hostid": "12345",
    "type": 21,
    "value_type": 4,
    "params": "var request = new CurlHttpRequest();\nreturn request.Post(\"https://postman-echo.com/post\");",
    "parameters": [
      {
        "name": "host",
        "value": "{HOST.CONN}"
      }
    ]
  },
  "timeout": "6s",
  "delay": "30s"
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 2
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23865"
    ]
  },
  "id": 3
}

```

Source

Cltem::create() in *ui/include/classes/api/services/Cltem.php*.



## item.delete

### Description

object item.delete(array itemIds)

This method allows to delete items.

#### Note:

Web items cannot be deleted via the Zabbix API.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(array) IDs of the items to delete.

### Return values

(object) Returns an object containing the IDs of the deleted items under the `itemids` property.

### Examples

#### Deleting multiple items

Delete two items.

Dependent items and item prototypes are removed automatically if master item is deleted.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.delete",
  "params": [
    "22982",
    "22986"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "22982",
      "22986"
    ]
  },
  "id": 1
}
```

### Source

CItem::delete() in `ui/include/classes/api/services/CItem.php`.

## item.get

### Description

integer/array item.get(object parameters)

The method allows to retrieve items according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter           | Type             | Description   |
|---------------------|------------------|---|
| itemids             | string/array     | Return only items with the given IDs.   |
| groupids            | string/array     | Return only items that belong to the hosts from the given groups.   |
| templateids         | string/array     | Return only items that belong to the given templates.   |
| hostids             | string/array     | Return only items that belong to the given hosts.   |
| proxyids            | string/array     | Return only items that are monitored by the given proxies.  |
| interfaceids        | string/array     | Return only items that use the given host interfaces.   |
| graphids            | string/array     | Return only items that are used in the given graphs.  |
| triggerids          | string/array     | Return only items that are used in the given triggers.  |
| webitems            | flag             | Include web items in the result.  |
| inherited           | boolean          | If set to true return only items inherited from a template.   |
| templated           | boolean          | If set to true return only items that belong to templates.  |
| monitored           | boolean          | If set to true return only enabled items that belong to monitored hosts.  |
| group               | string           | Return only items that belong to a group with the given name.   |
| host                | string           | Return only items that belong to a host with the given name.  |
| evaltype            | integer          | Rules for tag searching.<br><br>Possible values:<br>0 - (default) And/Or;<br>2 - Or.  |
| tags                | array of objects | Return only items with given tags. Exact match by tag and case-sensitive or case-insensitive search by tag value depending on operator value.<br>Format: [{"tag": "<tag>", "value": "<value>", "operator": "<operator>"}, ...].<br>An empty array returns all items.<br><br>Possible operator types:<br>0 - (default) Like;<br>1 - Equal;<br>2 - Not like;<br>3 - Not equal<br>4 - Exists;<br>5 - Not exists. |
| with_triggers       | boolean          | If set to true return only items that are used in triggers.   |
| selectHosts         | query            | Return a <b>hosts</b> property with an array of hosts that the item belongs to.   |
| selectInterfaces    | query            | Return an <b>interfaces</b> property with an array of host interfaces used by the item.   |
| selectTriggers      | query            | Return a <b>triggers</b> property with the triggers that the item is used in.   |
| selectGraphs        | query            | Supports count.<br>Return a <b>graphs</b> property with the graphs that contain the item.   |
| selectDiscoveryRule | query            | Supports count.<br>Return a <b>discoveryRule</b> property with the LLD rule that created the item.  |

| Parameter           | Type  | Description   |
|---------------------|-------|---|
| selectItemDiscovery | query | <p>Return an <code>itemDiscovery</code> property with the item discovery object. The item discovery object links the item to an item prototype from which it was created.</p> <p>It has the following properties:</p> <ul style="list-style-type: none"> <li><code>itemdiscoveryid</code> - (string) ID of the item discovery;</li> <li><code>itemid</code> - (string) ID of the discovered item;</li> <li><code>parent_itemid</code> - (string) ID of the item prototype from which the item has been created;</li> <li><code>key_</code> - (string) key of the item prototype;</li> <li><code>lastcheck</code> - (timestamp) time when the item was last discovered;</li> <li><code>ts_delete</code> - (timestamp) time when an item that is no longer discovered will be deleted.</li> </ul>   |
| selectPreprocessing | query | <p>Return a <code>preprocessing</code> property with item preprocessing options.</p> <p>It has the following properties:</p> <ul style="list-style-type: none"> <li><code>type</code> - (string) The preprocessing option type: <ul style="list-style-type: none"> <li>1 - Custom multiplier;</li> <li>2 - Right trim;</li> <li>3 - Left trim;</li> <li>4 - Trim;</li> <li>5 - Regular expression matching;</li> <li>6 - Boolean to decimal;</li> <li>7 - Octal to decimal;</li> <li>8 - Hexadecimal to decimal;</li> <li>9 - Simple change;</li> <li>10 - Change per second;</li> <li>11 - XML XPath;</li> <li>12 - JSONPath;</li> <li>13 - In range;</li> <li>14 - Matches regular expression;</li> <li>15 - Does not match regular expression;</li> <li>16 - Check for error in JSON;</li> <li>17 - Check for error in XML;</li> <li>18 - Check for error using regular expression;</li> <li>19 - Discard unchanged;</li> <li>20 - Discard unchanged with heartbeat;</li> <li>21 - JavaScript;</li> <li>22 - Prometheus pattern;</li> <li>23 - Prometheus to JSON;</li> <li>24 - CSV to JSON;</li> <li>25 - Replace;</li> <li>26 - Check for not supported value;</li> <li>27 - XML to JSON.</li> </ul> </li> <li><code>params</code> - (string) Additional parameters used by preprocessing option. Multiple parameters are separated by LF (\n) character.</li> <li><code>error_handler</code> - (string) Action type used in case of preprocessing step failure: <ul style="list-style-type: none"> <li>0 - Error message is set by Zabbix server;</li> <li>1 - Discard value;</li> <li>2 - Set custom value;</li> <li>3 - Set custom error message.</li> </ul> </li> <li><code>error_handler_params</code> - (string) Error handler parameters.</li> </ul> |
| selectTags          | query | Return the item tags in <code>tags</code> property.   |
| selectValueMap      | query | Return a <code>valuemap</code> property with item value map.  |

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| filter                 | object       | Return only those results that exactly match the given filter.<br><br>Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.<br><br>Supports additional filters:<br>host - technical name of the host that the item belongs to. |
| limitSelects           | integer      | Limits the number of records returned by subselects.   |
| sortfield              | string/array | Applies to the following subselects:<br>selectGraphs - results will be sorted by name;<br>selectTriggers - results will be sorted by description.<br>Sort the result by the given properties.<br><br>Possible values are: itemid, name, key_, delay, history, trends, type and status.                         |
| countOutput            | boolean      | These parameters are described in the <a href="#">reference commentary</a> .   |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Finding items by key

Retrieve all items used in triggers specific host ID that have word "system.cpu" in the item key and sort results by name.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.get",
  "params": {
    "output": "extend",
    "hostids": "10084",
    "with_triggers": true,
    "search": {
      "key_": "system.cpu"
    },
    "sortfield": "name"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
```

```

    "itemid": "42269",
    "type": "18",
    "snmp_oid": "",
    "hostid": "10084",
    "name": "CPU utilization",
    "key_": "system.cpu.util",
    "delay": "0",
    "history": "7d",
    "trends": "365d",
    "status": "0",
    "value_type": "0",
    "trapper_hosts": "",
    "units": "%",
    "logtimefmt": "",
    "templateid": "42267",
    "valuemapid": "0",
    "params": "",
    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "flags": "0",
    "interfaceid": "0",
    "description": "CPU utilization in %.",
    "inventory_link": "0",
    "evaltype": "0",
    "jmx_endpoint": "",
    "master_itemid": "42264",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "output_format": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "uuid": "",
    "state": "0",
    "error": "",
    "parameters": [],
    "lastclock": "0",
    "lastns": "0",
    "lastvalue": "0",
    "prevvalue": "0"
  },
  {
    "itemid": "42259",
    "type": "0",
    "snmp_oid": "",
    "hostid": "10084",

```

```

"name": "Load average (15m avg)",
"key_": "system.cpu.load[all,avg15]",
"delay": "1m",
"history": "7d",
"trends": "365d",
"status": "0",
"value_type": "0",
"trapper_hosts": "",
"units": "",
"logtimefmt": "",
"templateid": "42219",
"valuemapid": "0",
"params": "",
"ipmi_sensor": "",
"authtype": "0",
"username": "",
"password": "",
"publickey": "",
"privatekey": "",
"flags": "0",
"interfaceid": "1",
"description": "",
"inventory_link": "0",
"evaltype": "0",
"jmx_endpoint": "",
"master_itemid": "0",
"timeout": "3s",
"url": "",
"query_fields": [],
"posts": "",
"status_codes": "200",
"follow_redirects": "1",
"post_type": "0",
"http_proxy": "",
"headers": [],
"retrieve_mode": "0",
"request_method": "0",
"output_format": "0",
"ssl_cert_file": "",
"ssl_key_file": "",
"ssl_key_password": "",
"verify_peer": "0",
"verify_host": "0",
"allow_traps": "0",
"uuid": "",
"state": "0",
"error": "",
"parameters": [],
"lastclock": "0",
"lastns": "0",
"lastvalue": "0",
"prevvalue": "0"
},
{
  "itemid": "42249",
  "type": "0",
  "snmp_oid": "",
  "hostid": "10084",
  "name": "Load average (1m avg)",
  "key_": "system.cpu.load[all,avg1]",
  "delay": "1m",
  "history": "7d",

```

```

    "trends": "365d",
    "status": "0",
    "value_type": "0",
    "trapper_hosts": "",
    "units": "",
    "logtimefmt": "",
    "templateid": "42209",
    "valuemapid": "0",
    "params": "",
    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "flags": "0",
    "interfaceid": "1",
    "description": "",
    "inventory_link": "0",
    "evaltype": "0",
    "jmx_endpoint": "",
    "master_itemid": "0",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "output_format": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "uuid": "",
    "state": "0",
    "error": "",
    "parameters": [],
    "lastclock": "0",
    "lastns": "0",
    "lastvalue": "0",
    "prevvalue": "0"
  },
  {
    "itemid": "42257",
    "type": "0",
    "snmp_oid": "",
    "hostid": "10084",
    "name": "Load average (5m avg)",
    "key_": "system.cpu.load[all,avg5]",
    "delay": "1m",
    "history": "7d",
    "trends": "365d",
    "status": "0",
    "value_type": "0",
    "trapper_hosts": "",

```

```

    "units": "",
    "logtimefmt": "",
    "templateid": "42217",
    "valuemapid": "0",
    "params": "",
    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "flags": "0",
    "interfaceid": "1",
    "description": "",
    "inventory_link": "0",
    "evaltype": "0",
    "jmx_endpoint": "",
    "master_itemid": "0",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "output_format": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "uuid": "",
    "state": "0",
    "error": "",
    "parameters": [],
    "lastclock": "0",
    "lastns": "0",
    "lastvalue": "0",
    "prevvalue": "0"
  },
  {
    "itemid": "42260",
    "type": "0",
    "snmp_oid": "",
    "hostid": "10084",
    "name": "Number of CPUs",
    "key_": "system.cpu.num",
    "delay": "1m",
    "history": "7d",
    "trends": "365d",
    "status": "0",
    "value_type": "3",
    "trapper_hosts": "",
    "units": "",
    "logtimefmt": "",
    "templateid": "42220",
    "valuemapid": "0",

```



```

    "params": "",
    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "flags": "0",
    "interfaceid": "1",
    "description": "",
    "inventory_link": "0",
    "evaltype": "0",
    "jmx_endpoint": "",
    "master_itemid": "0",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "output_format": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "uuid": "",
    "state": "0",
    "error": "",
    "parameters": [],
    "lastclock": "0",
    "lastns": "0",
    "lastvalue": "0",
    "prevvalue": "0"
  }
],
  "id": 1
}

```

Finding dependent items by key

Retrieve all dependent items from host with ID "10116" that have the word "apache" in the key.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "item.get",
  "params": {
    "output": "extend",
    "hostids": "10116",
    "search": {
      "key_": "apache"
    },
    "filter": {
      "type": 18
    }
  }
},

```

```
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "25550",
      "type": "18",
      "snmp_oid": "",
      "hostid": "10116",
      "name": "Days",
      "key_": "apache.status.uptime.days",
      "delay": "0",
      "history": "90d",
      "trends": "365d",
      "status": "0",
      "value_type": "3",
      "trapper_hosts": "",
      "units": "",
      "logtimefmt": "",
      "templateid": "0",
      "valuemapid": "0",
      "params": "",
      "ipmi_sensor": "",
      "authtype": "0",
      "username": "",
      "password": "",
      "publickey": "",
      "privatekey": "",
      "flags": "0",
      "interfaceid": "0",
      "description": "",
      "inventory_link": "0",
      "evaltype": "0",
      "jmx_endpoint": "",
      "master_itemid": "25545",
      "timeout": "3s",
      "url": "",
      "query_fields": [],
      "posts": "",
      "status_codes": "200",
      "follow_redirects": "1",
      "post_type": "0",
      "http_proxy": "",
      "headers": [],
      "retrieve_mode": "0",
      "request_method": "0",
      "output_format": "0",
      "ssl_cert_file": "",
      "ssl_key_file": "",
      "ssl_key_password": "",
      "verify_peer": "0",
      "verify_host": "0",
      "allow_traps": "0",
      "uuid": "",
      "state": "0",
      "error": "",
      "parameters": [],
      "lastclock": "0",
    }
  ]
}
```

```

        "lastns": "0",
        "lastvalue": "0",
        "prevvalue": "0"
    },
    {
        "itemid": "25555",
        "type": "18",
        "snmp_oid": "",
        "hostid": "10116",
        "name": "Hours",
        "key_": "apache.status.uptime.hours",
        "delay": "0",
        "history": "90d",
        "trends": "365d",
        "status": "0",
        "value_type": "3",
        "trapper_hosts": "",
        "units": "",
        "logtimefmt": "",
        "templateid": "0",
        "valuemapid": "0",
        "params": "",
        "ipmi_sensor": "",
        "authtype": "0",
        "username": "",
        "password": "",
        "publickey": "",
        "privatekey": "",
        "flags": "0",
        "interfaceid": "0",
        "description": "",
        "inventory_link": "0",
        "evaltype": "0",
        "jmx_endpoint": "",
        "master_itemid": "25545",
        "timeout": "3s",
        "url": "",
        "query_fields": [],
        "posts": "",
        "status_codes": "200",
        "follow_redirects": "1",
        "post_type": "0",
        "http_proxy": "",
        "headers": [],
        "retrieve_mode": "0",
        "request_method": "0",
        "output_format": "0",
        "ssl_cert_file": "",
        "ssl_key_file": "",
        "ssl_key_password": "",
        "verify_peer": "0",
        "verify_host": "0",
        "allow_traps": "0",
        "uuid": "",
        "state": "0",
        "error": "",
        "parameters": [],
        "lastclock": "0",
        "lastns": "0",
        "lastvalue": "0",
        "prevvalue": "0"
    }
}

```

```

    ],
    "id": 1
}

```

Find HTTP agent item

Find HTTP agent item with post body type XML for specific host ID.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "item.get",
  "params": {
    "hostids": "10255",
    "filter": {
      "type": 19,
      "post_type": 3
    }
  },
  "id": 3,
  "auth": "d678e0b85688ce578ff061bd29a20d3b"
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "28252",
      "type": "19",
      "snmp_oid": "",
      "hostid": "10255",
      "name": "template item",
      "key_": "ti",
      "delay": "30s",
      "history": "90d",
      "trends": "365d",
      "status": "0",
      "value_type": "3",
      "trapper_hosts": "",
      "units": "",
      "logtimefmt": "",
      "templateid": "0",
      "valuemapid": "0",
      "params": "",
      "ipmi_sensor": "",
      "authtype": "0",
      "username": "",
      "password": "",
      "publickey": "",
      "privatekey": "",
      "flags": "0",
      "interfaceid": "0",
      "description": "",
      "inventory_link": "0",
      "evaltype": "0",
      "jmx_endpoint": "",
      "master_itemid": "0",
      "timeout": "3s",
      "url": "localhost",
      "query_fields": [
        {
          "mode": "xml"
        }
      ]
    }
  ]
}

```

```

    }
  ],
  "posts": "<body>\r\n<![CDATA[{$MACRO}<foo></bar>]]>\r\n</body>",
  "status_codes": "200",
  "follow_redirects": "0",
  "post_type": "3",
  "http_proxy": "",
  "headers": [],
  "retrieve_mode": "1",
  "request_method": "3",
  "output_format": "0",
  "ssl_cert_file": "",
  "ssl_key_file": "",
  "ssl_key_password": "",
  "verify_peer": "0",
  "verify_host": "0",
  "allow_traps": "0",
  "uuid": "",
  "state": "0",
  "error": "",
  "parameters": [],
  "lastclock": "0",
  "lastns": "0",
  "lastvalue": "",
  "prevvalue": ""
}
],
"id": 3
}

```

Retrieving items with preprocessing rules

Retrieve all items and their preprocessing rules for specific host ID.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "item.get",
  "params": {
    "output": ["itemid", "name", "key_"],
    "selectPreprocessing": "extend",
    "hostids": "10254"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemid": "23865",
    "name": "HTTP agent example JSON",
    "key_": "json",
    "preprocessing": [
      {
        "type": "12",
        "params": "$.random",
        "error_handler": "1",
        "error_handler_params": ""
      }
    ]
  },
  "id": 1
}

```

```
"id": 1
}
```

See also

- [Discovery rule](#)
- [Graph](#)
- [Host](#)
- [Host interface](#)
- [Trigger](#)

Source

CItem::get() in *ui/include/classes/api/services/CItem.php*.

## item.update

Description

object item.update(object/array items)

This method allows to update existing items.

### Note:

Web items cannot be updated via the Zabbix API.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Item properties to be updated.

The *itemid* property must be defined for each item, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard item properties](#), the method accepts the following parameters.

| Parameter     | Type  | Description  |
|---------------|-------|--|
| preprocessing | array | <a href="#">Item preprocessing</a> options to replace the current preprocessing options. |
| tags          | array | Item <a href="#">tags</a> .  |

Return values

(object) Returns an object containing the IDs of the updated items under the *itemids* property.

Examples

Enabling an item

Enable an item, that is, set its status to "0".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.update",
  "params": {
    "itemid": "10092",
    "status": 0
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "10092"
    ]
  },
  "id": 1
}
```

Update dependent item

Update Dependent item name and Master item ID. Only dependencies on same host are allowed, therefore Master and Dependent item should have same hostid.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.update",
  "params": {
    "name": "Dependent item updated name",
    "master_itemid": "25562",
    "itemid": "189019"
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "189019"
    ]
  },
  "id": 1
}
```

Update HTTP agent item

Enable item value trapping.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.update",
  "params": {
    "itemid": "23856",
    "allow_traps": 1
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23856"
    ]
  },
  "id": 1
}
```

```
    "id": 1
}
```

Updating an item with preprocessing

Update an item with item preprocessing rule "In range".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.update",
  "params": {
    "itemid": "23856",
    "preprocessing": [
      {
        "type": 13,
        "params": "\n100",
        "error_handler": 1,
        "error_handler_params": ""
      }
    ]
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23856"
    ]
  },
  "id": 1
}
```

Updating a script item

Update a script item with a different script and remove unnecessary parameters that were used by previous script.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "item.update",
  "params": {
    "itemid": "23865",
    "parameters": [],
    "script": "Zabbix.Log(3, 'Log test');\nreturn 1;"
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23865"
    ]
  },
  "id": 1
}
```



Source

CItem::update() in *ui/include/classes/api/services/CItem.php*.

## Item prototype

This class is designed to work with item prototypes.

Object references:

- [Item prototype](#)

Available methods:

- [itemprototype.create](#) - creating new item prototypes
- [itemprototype.delete](#) - deleting item prototypes
- [itemprototype.get](#) - retrieving item prototypes
- [itemprototype.update](#) - updating item prototypes

## > Item prototype object

The following objects are directly related to the `itemprototype` API.

Item prototype

The item prototype object has the following properties.

| Property                         | Type   | Description  |
|----------------------------------|--------|--|
| <b>itemid</b>                    | string | ( <i>readonly</i> ) ID of the item prototype.  |
| <b>delay</b><br>(required)       | string | Update interval of the item prototype. Accepts seconds or a time unit with suffix (30s,1m,2h,1d).<br>Optionally one or more <a href="#">custom intervals</a> can be specified either as flexible intervals or scheduling.<br>Multiple intervals are separated by a semicolon.<br>User macros and LLD macros may be used. A single macro has to fill the whole field. Multiple macros in a field or macros mixed with text are not supported.<br>Flexible intervals may be written as two macros separated by a forward slash (e.g. <code>{FLEX_INTERVAL}/{FLEX_PERIOD}</code> ). |
| <b>hostid</b><br>(required)      | string | Optional for Zabbix trapper, dependent items and for Zabbix agent (active) with <code>mqtt.get</code> key.<br>ID of the host that the item prototype belongs to.   |
| <b>ruleid</b><br>(required)      | string | For update operations this field is <i>readonly</i> .<br>ID of the LLD rule that the item belongs to.  |
| <b>interfaceid</b><br>(required) | string | For update operations this field is <i>readonly</i> .<br>ID of the item prototype's host interface. Used only for host item prototypes.  |
| <b>key_</b><br>(required)        | string | Not required for Zabbix agent (active), Zabbix internal, Zabbix trapper, calculated, dependent, database monitor and script item prototypes.<br>Optional for HTTP agent item prototypes.<br>Item prototype key.  |
| <b>name</b><br>(required)        | string | Name of the item prototype.  |

| Property                        | Type    | Description   |
|---------------------------------|---------|---|
| <b>type</b><br>(required)       | integer | Type of the item prototype.<br><br>Possible values:<br>0 - Zabbix agent;<br>2 - Zabbix trapper;<br>3 - simple check;<br>5 - Zabbix internal;<br>7 - Zabbix agent (active);<br>10 - external check;<br>11 - database monitor;<br>12 - IPMI agent;<br>13 - SSH agent;<br>14 - TELNET agent;<br>15 - calculated;<br>16 - JMX agent;<br>17 - SNMP trap;<br>18 - Dependent item;<br>19 - HTTP agent;<br>20 - SNMP agent;<br>21 - Script. |
| <b>url</b><br>(required)        | string  | URL string required only for HTTP agent item prototypes. Supports LLD macros, user macros, {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}.   |
| <b>value_type</b><br>(required) | integer | Type of information of the item prototype.<br><br>Possible values:<br>0 - numeric float;<br>1 - character;<br>2 - log;<br>3 - numeric unsigned;<br>4 - text.  |
| allow_traps                     | integer | HTTP agent item prototype field. Allow to populate value as in trapper item type also.<br><br>0 - ( <i>default</i> ) Do not allow to accept incoming data.<br>1 - Allow to accept incoming data.  |
| authtype                        | integer | Used only by SSH agent item prototypes or HTTP agent item prototypes.<br><br>SSH agent authentication method possible values:<br>0 - ( <i>default</i> ) password;<br>1 - public key.<br><br>HTTP agent authentication method possible values:<br>0 - ( <i>default</i> ) none<br>1 - basic<br>2 - NTLM<br>3 - Kerberos   |
| description                     | string  | Description of the item prototype.  |
| follow_redirects                | integer | HTTP agent item prototype field. Follow response redirects while polling data.<br><br>0 - Do not follow redirects.<br>1 - ( <i>default</i> ) Follow redirects.  |
| headers                         | object  | HTTP agent item prototype field. Object with HTTP(S) request headers, where header name is used as key and header value as value.<br><br>Example:<br>{ "User-Agent": "Zabbix" }   |

| Property         | Type    | Description   |
|------------------|---------|---|
| history          | string  | A time unit of how long the history data should be stored. Also accepts user macro and LLD macro.<br><br>Default: 90d.  |
| http_proxy       | string  | HTTP agent item prototype field. HTTP(S) proxy connection string.   |
| ipmi_sensor      | string  | IPMI sensor. Used only by IPMI item prototypes.   |
| jmx_endpoint     | string  | JMX agent custom connection string.<br><br>Default value:<br>service:jmx:rmi:///jndi/rmi://{HOST.CONN}:{HOST.PORT}/jmxrmi   |
| logtimefmt       | string  | Format of the time in log entries. Used only by log item prototypes.  |
| master_itemid    | integer | Master item ID.<br>Recursion up to 3 dependent items and item prototypes and maximum count of dependent items and item prototypes equal to 29999 are allowed.   |
| output_format    | integer | Required by Dependent items.<br>HTTP agent item prototype field. Should response be converted to JSON.<br><br>0 - ( <i>default</i> ) Store raw.<br>1 - Convert to JSON.   |
| params           | string  | Additional parameters depending on the type of the item prototype:<br>- executed script for SSH and Telnet item prototypes;<br>- SQL query for database monitor item prototypes;<br>- formula for calculated item prototypes. |
| parameters       | array   | Additional parameters for script item prototypes. Array of objects with 'name' and 'value' properties, where name must be unique.   |
| password         | string  | Password for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent item prototypes.   |
| post_type        | integer | HTTP agent item prototype field. Type of post data body stored in posts property.<br><br>0 - ( <i>default</i> ) Raw data.<br>2 - JSON data.<br>3 - XML data.  |
| posts            | string  | HTTP agent item prototype field. HTTP(S) request body data. Used with post_type.  |
| privatekey       | string  | Name of the private key file.   |
| publickey        | string  | Name of the public key file.  |
| query_fields     | array   | HTTP agent item prototype field. Query parameters. Array of objects with 'key':'value' pairs, where value can be empty string.  |
| request_method   | integer | HTTP agent item prototype field. Type of request method.<br><br>0 - ( <i>default</i> ) GET<br>1 - POST<br>2 - PUT<br>3 - HEAD   |
| retrieve_mode    | integer | HTTP agent item prototype field. What part of response should be stored.<br><br>0 - ( <i>default</i> ) Body.<br>1 - Headers.<br>2 - Both body and headers will be stored.   |
| snmp_oid         | string  | For request_method HEAD only 1 is allowed value.<br>SNMP OID.   |
| ssl_cert_file    | string  | HTTP agent item prototype field. Public SSL Key file path.  |
| ssl_key_file     | string  | HTTP agent item prototype field. Private SSL Key file path.   |
| ssl_key_password | string  | HTTP agent item prototype field. Password for SSL Key file.   |

| Property      | Type    | Description  |
|---------------|---------|--|
| status        | integer | Status of the item prototype.<br><br>Possible values:<br>0 - ( <i>default</i> ) enabled item prototype;<br>1 - disabled item prototype;<br>3 - unsupported item prototype.   |
| status_codes  | string  | HTTP agent item prototype field. Ranges of required HTTP status codes separated by commas. Also supports user macros or LLD macros as part of comma separated list.<br><br>Example: 200,200-{\$M},{M},200-400                |
| templateid    | string  | (readonly) ID of the parent template item prototype.   |
| timeout       | string  | Item data polling request timeout. Used for HTTP agent and script item prototypes. Supports user macros and LLD macros.<br><br>default: 3s<br>maximum value: 60s   |
| trapper_hosts | string  | Allowed hosts. Used by trapper item prototypes or HTTP item prototypes.  |
| trends        | string  | A time unit of how long the trends data should be stored. Also accepts user macro and LLD macro.   |
| units         | string  | Default: 365d.<br>Value units.   |
| username      | string  | Username for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent item prototypes.  |
| uuid          | string  | Required by SSH and Telnet item prototypes.<br>Universal unique identifier, used for linking imported item prototypes to already existing ones. Used only for item prototypes on templates.<br>Auto-generated, if not given. |
| valuemapid    | string  | ID of the associated value map.  |
| verify_host   | integer | HTTP agent item prototype field. Whether to validate that the host name for the connection matches the one in the host's certificate.<br><br>0 - ( <i>default</i> ) Do not validate.<br>1 - Validate.                        |
| verify_peer   | integer | HTTP agent item prototype field. Whether to validate that the host's certificate is authentic.<br><br>0 - ( <i>default</i> ) Do not validate.<br>1 - Validate.   |
| discover      | integer | Item prototype discovery status.<br><br>Possible values:<br>0 - ( <i>default</i> ) new items will be discovered;<br>1 - new items will not be discovered and existing items will be marked as lost.                          |

Note that for some methods (update, delete) the required/optional parameter combination is different.

Item prototype tag

The item prototype tag object has the following properties.

| Property                 | Type   | Description               |
|--------------------------|--------|---------------------------|
| <b>tag</b><br>(required) | string | Item prototype tag name.  |
| value                    | string | Item prototype tag value. |

## Item prototype preprocessing

The item prototype preprocessing object has the following properties.

| Property                                  | Type    | Description  |
|---|---------|--|
| <b>type</b><br>(required)                 | integer | <p>The preprocessing option type.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>1 - Custom multiplier;</li> <li>2 - Right trim;</li> <li>3 - Left trim;</li> <li>4 - Trim;</li> <li>5 - Regular expression matching;</li> <li>6 - Boolean to decimal;</li> <li>7 - Octal to decimal;</li> <li>8 - Hexadecimal to decimal;</li> <li>9 - Simple change;</li> <li>10 - Change per second;</li> <li>11 - XML XPath;</li> <li>12 - JSONPath;</li> <li>13 - In range;</li> <li>14 - Matches regular expression;</li> <li>15 - Does not match regular expression;</li> <li>16 - Check for error in JSON;</li> <li>17 - Check for error in XML;</li> <li>18 - Check for error using regular expression;</li> <li>19 - Discard unchanged;</li> <li>20 - Discard unchanged with heartbeat;</li> <li>21 - JavaScript;</li> <li>22 - Prometheus pattern;</li> <li>23 - Prometheus to JSON;</li> <li>24 - CSV to JSON;</li> <li>25 - Replace;</li> <li>26 - Check unsupported;</li> <li>27 - XML to JSON.</li> </ul> |
| <b>params</b><br>(required)               | string  | Additional parameters used by preprocessing option. Multiple parameters are separated by LF (\n) character.  |
| <b>error_handler</b><br>(required)        | integer | <p>Action type used in case of preprocessing step failure.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>0 - Error message is set by Zabbix server;</li> <li>1 - Discard value;</li> <li>2 - Set custom value;</li> <li>3 - Set custom error message.</li> </ul>  |
| <b>error_handler_params</b><br>(required) | string  | <p>Error handler parameters. Used with <code>error_handler</code>.</p> <p>Must be empty, if <code>error_handler</code> is 0 or 1.<br/>Can be empty if, <code>error_handler</code> is 2.<br/>Cannot be empty, if <code>error_handler</code> is 3.</p>   |

The following parameters and error handlers are supported for each preprocessing type.

| Preprocessing type | Name                     | Parameter 1                        | Parameter 2 | Parameter 3 | Supported error handlers |
|--------------------|--------------------------|------------------------------------|-------------|-------------|--------------------------|
| 1                  | Custom number multiplier | list of characters <sup>1, 6</sup> |             |             | 0, 1, 2, 3               |
| 2                  | Right trim               | list of characters <sup>2</sup>    |             |             |                          |
| 3                  | Left trim                | list of characters <sup>2</sup>    |             |             |                          |

| Preprocessing type | Name                              | Parameter 1                     | Parameter 2         | Parameter 3 | Supported error handlers |
|--------------------|-----------------------------------|---------------------------------|---------------------|-------------|--------------------------|
| 4                  | Trim                              | list of characters <sup>2</sup> |                     |             |                          |
| 5                  | Regular expression                | pattern <sup>3</sup>            | output <sup>2</sup> |             | 0, 1, 2, 3               |
| 6                  | Boolean to decimal                |                                 |                     |             | 0, 1, 2, 3               |
| 7                  | Octal to decimal                  |                                 |                     |             | 0, 1, 2, 3               |
| 8                  | Hexadecimal to decimal            |                                 |                     |             | 0, 1, 2, 3               |
| 9                  | Simple change                     |                                 |                     |             | 0, 1, 2, 3               |
| 10                 | Change per second                 |                                 |                     |             | 0, 1, 2, 3               |
| 11                 | XML XPath                         | path <sup>4</sup>               |                     |             | 0, 1, 2, 3               |
| 12                 | JSONPath                          | path <sup>4</sup>               |                     |             | 0, 1, 2, 3               |
| 13                 | In range                          | min <sup>1, 6</sup>             | max <sup>1, 6</sup> |             | 0, 1, 2, 3               |
| 14                 | Matches regular expression        | pattern <sup>3</sup>            |                     |             | 0, 1, 2, 3               |
| 15                 | Does not match regular expression | pattern <sup>3</sup>            |                     |             | 0, 1, 2, 3               |
| 16                 | Check for error in JSON           | path <sup>4</sup>               |                     |             | 0, 1, 2, 3               |
| 17                 | Check for error in XML            | path <sup>4</sup>               |                     |             | 0, 1, 2, 3               |

| Preprocessing type | Name  | Parameter 1            | Parameter 2              | Parameter 3            | Supported error handlers |
|--------------------|---|------------------------|--------------------------|------------------------|--------------------------|
| 18                 | Check for error using regular expression                  | pattern <sup>3</sup>   | output <sup>2</sup>      |                        | 0, 1, 2, 3               |
| 19                 | Discard unchanged   |                        |                          |                        |                          |
| 20                 | Discard seconds <sup>5, 6</sup> unchanged with heart-beat |                        |                          |                        |                          |
| 21                 | JavaScript <sup>2</sup>                                   |                        |                          |                        |                          |
| 22                 | Prometheus pattern <sup>6, 7</sup>                        |                        | value, label, function   | output <sup>8, 9</sup> | 0, 1, 2, 3               |
| 23                 | Prometheus pattern <sup>6, 7</sup> to JSON                |                        |                          |                        | 0, 1, 2, 3               |
| 24                 | CSV character <sup>2</sup> to JSON                        | character <sup>2</sup> | character <sup>2</sup>   | 0,1                    | 0, 1, 2, 3               |
| 25                 | Replace search string <sup>2</sup>                        |                        | replacement <sup>2</sup> |                        |                          |
| 26                 | Check unsupported   |                        |                          |                        | 1, 2, 3                  |
| 27                 | XML to JSON   |                        |                          |                        | 0, 1, 2, 3               |

<sup>1</sup> integer or floating-point number

<sup>2</sup> string

<sup>3</sup> regular expression

<sup>4</sup> JSONPath or XML XPath

<sup>5</sup> positive integer (with support of time suffixes, e.g. 30s, 1m, 2h, 1d)

<sup>6</sup> user macro, LLD macro

<sup>7</sup> Prometheus pattern following the syntax: <metric name>{<label name>=<label value>, ...} == <value>. Each Prometheus pattern component (metric, label name, label value and metric value) can be user macro or LLD macro.

<sup>8</sup> Prometheus output following the syntax: <label name> (can be a user macro or an LLD macro) if label is selected as the second parameter.

<sup>9</sup> One of the aggregation functions: sum, min, max, avg, count if function is selected as the second parameter.

## itemprototype.create

### Description

object itemprototype.create(object/array itemPrototypes)

This method allows to create new item prototypes.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object/array) Item prototype to create.

Additionally to the [standard item prototype properties](#), the method accepts the following parameters.

| Parameter                   | Type   | Description   |
|-----------------------------|--------|---|
| <b>ruleid</b><br>(required) | string | ID of the LLD rule that the item belongs to.          |
| preprocessing               | array  | Item prototype <a href="#">preprocessing</a> options. |
| tags                        | array  | Item prototype <a href="#">tags</a> .                 |

**Return values**

(object) Returns an object containing the IDs of the created item prototypes under the `itemids` property. The order of the returned IDs matches the order of the passed item prototypes.

**Examples****Creating an item prototype**

Create an item prototype to monitor free disk space on a discovered file system. Discovered items should be numeric Zabbix agent items updated every 30 seconds.

**Request:**

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.create",
  "params": {
    "name": "Free disk space on {#FSNAME}",
    "key_": "vfs.fs.size[{#FSNAME},free]",
    "hostid": "10197",
    "ruleid": "27665",
    "type": 0,
    "value_type": 3,
    "interfaceid": "112",
    "delay": "30s"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

**Response:**

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "27666"
    ]
  },
  "id": 1
}
```

**Creating an item prototype with preprocessing**

Create an item using change per second and a custom multiplier as a second step.

**Request:**

```
{
  "jsonrpc": "2.0",
```



```

"method": "itemprototype.create",
"params": {
  "name": "Incoming network traffic on {#IFNAME}",
  "key_": "net.if.in[{#IFNAME}]",
  "hostid": "10001",
  "ruleid": "27665",
  "type": 0,
  "value_type": 3,
  "delay": "60s",
  "units": "bps",
  "interfaceid": "1155",
  "preprocessing": [
    {
      "type": 10,
      "params": "",
      "error_handler": 0,
      "error_handler_params": ""
    },
    {
      "type": 1,
      "params": "8",
      "error_handler": 2,
      "error_handler_params": "10"
    }
  ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "44211"
    ]
  },
  "id": 1
}

```

Creating dependent item prototype

Create Dependent item prototype for Master item prototype with ID 44211. Only dependencies on same host (template/discovery rule) are allowed, therefore Master and Dependent item should have same hostid and ruleid.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "itemprototype.create",
  "params": {
    "hostid": "10001",
    "ruleid": "27665",
    "name": "Dependent test item prototype",
    "key_": "dependent.prototype",
    "type": 18,
    "master_itemid": "44211",
    "value_type": 3
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "44212"
    ]
  },
  "id": 1
}
```

Create HTTP agent item prototype

Create item prototype with URL using user macro, query fields and custom headers.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.create",
  "params": {
    "type": "19",
    "hostid": "10254",
    "ruleid": "28256",
    "interfaceid": "2",
    "name": "api item prototype example",
    "key_": "api_http_item",
    "value_type": 3,
    "url": "${URL_PROTOTYPE}",
    "query_fields": [
      {
        "min": "10"
      },
      {
        "max": "100"
      }
    ],
    "headers": {
      "X-Source": "api"
    },
    "delay": "35"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "28305"
    ]
  },
  "id": 1
}
```

Create script item prototype

Create a simple data collection using a script item prototype.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.create",
  "params": {
```

```

    "name": "Script example",
    "key_": "custom.script.itemprototype",
    "hostid": "12345",
    "type": 21,
    "value_type": 4,
    "params": "var request = new CurlHttpRequest();\nreturn request.Post(\"https://postman-echo.com/post\");",
    "parameters": [
        {
            "name": "host",
            "value": "{HOST.CONN}"
        }
    ],
    "timeout": "6s",
    "delay": "30s"
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 2
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "itemids": [
            "23865"
        ]
    },
    "id": 3
}

```

Source

CItemPrototype::create() in `ui/include/classes/api/services/CItemPrototype.php`.

## itemprototype.delete

Description

object itemprototype.delete(array itemPrototypeIds)

This method allows to delete item prototypes.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the item prototypes to delete.

Return values

(object) Returns an object containing the IDs of the deleted item prototypes under the `prototypeids` property.

Examples

Deleting multiple item prototypes

Delete two item prototypes.

Dependent item prototypes are removed automatically if master item or item prototype is deleted.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "itemprototype.delete",
    "params": [

```

```

        "27352",
        "27356"
    ],
    "auth": "3a57200802b24cda67c4e4010b50c065",
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "prototypeids": [
      "27352",
      "27356"
    ]
  },
  "id": 1
}

```

Source

CItemPrototype::delete() in *ui/include/classes/api/services/CItemPrototype.php*.

## itemprototype.get

Description

integer/array itemprototype.get(object parameters)

The method allows to retrieve item prototypes according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter           | Type         | Description  |
|---------------------|--------------|--|
| discoveryids        | string/array | Return only item prototypes that belong to the given LLD rules.  |
| graphids            | string/array | Return only item prototypes that are used in the given graph prototypes.   |
| hostids             | string/array | Return only item prototypes that belong to the given hosts.  |
| inherited           | boolean      | If set to <code>true</code> return only item prototypes inherited from a template.                                 |
| itemids             | string/array | Return only item prototypes with the given IDs.  |
| monitored           | boolean      | If set to <code>true</code> return only enabled item prototypes that belong to monitored hosts.                    |
| templated           | boolean      | If set to <code>true</code> return only item prototypes that belong to templates.                                  |
| templateids         | string/array | Return only item prototypes that belong to the given templates.  |
| triggerids          | string/array | Return only item prototypes that are used in the given trigger prototypes.   |
| selectDiscoveryRule | query        | Return a <code>discoveryRule</code> property with the low-level discovery rule that the item prototype belongs to. |
| selectGraphs        | query        | Return a <code>graphs</code> property with graph prototypes that the item prototype is used in.                    |
|                     |              | Supports count.  |
| selectHosts         | query        | Return a <code>hosts</code> property with an array of hosts that the item prototype belongs to.                    |
| selectTags          | query        | Return the item prototype tags in <code>tags</code> property.  |

| Parameter           | Type         | Description   |
|---------------------|--------------|---|
| selectTriggers      | query        | Return a <b>triggers</b> property with trigger prototypes that the item prototype is used in.   |
| selectPreprocessing | query        | <p>Supports count.</p> <p>Return a <b>preprocessing</b> property with item preprocessing options.</p> <p>It has the following properties:</p> <p><b>type</b> - (string) The preprocessing option type:</p> <ul style="list-style-type: none"> <li>1 - Custom multiplier;</li> <li>2 - Right trim;</li> <li>3 - Left trim;</li> <li>4 - Trim;</li> <li>5 - Regular expression matching;</li> <li>6 - Boolean to decimal;</li> <li>7 - Octal to decimal;</li> <li>8 - Hexadecimal to decimal;</li> <li>9 - Simple change;</li> <li>10 - Change per second;</li> <li>11 - XML XPath;</li> <li>12 - JSONPath;</li> <li>13 - In range;</li> <li>14 - Matches regular expression;</li> <li>15 - Does not match regular expression;</li> <li>16 - Check for error in JSON;</li> <li>17 - Check for error in XML;</li> <li>18 - Check for error using regular expression;</li> <li>19 - Discard unchanged;</li> <li>20 - Discard unchanged with heartbeat;</li> <li>21 - JavaScript;</li> <li>22 - Prometheus pattern;</li> <li>23 - Prometheus to JSON;</li> <li>24 - CSV to JSON;</li> <li>25 - Replace;</li> <li>26 - Check for not supported value;</li> <li>27- XML to JSON.</li> </ul> <p><b>params</b> - (string) Additional parameters used by preprocessing option. Multiple parameters are separated by LF (\n)character.</p> <p><b>error_handler</b> - (string) Action type used in case of preprocessing step failure:</p> <ul style="list-style-type: none"> <li>0 - Error message is set by Zabbix server;</li> <li>1 - Discard value;</li> <li>2 - Set custom value;</li> <li>3 - Set custom error message.</li> </ul> <p><b>error_handler_params</b> - (string) Error handler parameters.</p> |
| selectValueMap      | query        | Return a <b>valuemap</b> property with item prototype value map.  |
| filter              | object       | Return only those results that exactly match the given filter.  |
|                     |              | Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.   |
| limitSelects        | integer      | <p>Supports additional filters:</p> <p><b>host</b> - technical name of the host that the item prototype belongs to.</p> <p>Limits the number of records returned by subselects.</p>   |
| sortfield           | string/array | <p>Applies to the following subselects:</p> <p><b>selectGraphs</b> - results will be sorted by name;</p> <p><b>selectTriggers</b> - results will be sorted by description.</p> <p>Sort the result by the given properties.</p> <p>Possible values are: itemid, name, key_, delay, type and status.</p>  |

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| countOutput            | boolean      | These parameters are described in the <a href="#">reference commentary</a> . |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieving item prototypes from an LLD rule

Retrieve all item prototypes for specific LLD rule ID.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.get",
  "params": {
    "output": "extend",
    "discoveryids": "27426"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "23077",
      "type": "0",
      "snmp_oid": "",
      "hostid": "10079",
      "name": "Incoming network traffic on en0",
      "key_": "net.if.in[en0]",
      "delay": "1m",
      "history": "1w",
      "trends": "365d",
      "status": "0",
      "value_type": "3",
      "trapper_hosts": "",
      "units": "bps",
      "logtimefmt": "",
      "templateid": "0",
      "valuemapid": "0",
      "params": "",
      "ipmi_sensor": "",
      "authtype": "0",
      "username": "",
      "password": "",

```

```

    "publickey": "",
    "privatekey": "",
    "interfaceid": "0",
    "description": "",
    "evaltype": "0",
    "jmx_endpoint": "",
    "master_itemid": "0",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "output_format": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "discover": "0",
    "uuid": "",
    "parameters": []
  },
  {
    "itemid": "10010",
    "type": "0",
    "snmp_oid": "",
    "hostid": "10001",
    "name": "Processor load (1 min average per core)",
    "key_": "system.cpu.load[percpu,avg1]",
    "delay": "1m",
    "history": "1w",
    "trends": "365d",
    "status": "0",
    "value_type": "0",
    "trapper_hosts": "",
    "units": "",
    "logtimefmt": "",
    "templateid": "0",
    "valuemapid": "0",
    "params": "",
    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "interfaceid": "0",
    "description": "The processor load is calculated as system CPU load divided by number of CPU c",
    "evaltype": "0",
    "jmx_endpoint": "",
    "master_itemid": "0",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",

```

```

        "status_codes": "200",
        "follow_redirects": "1",
        "post_type": "0",
        "http_proxy": "",
        "headers": [],
        "retrieve_mode": "0",
        "request_method": "0",
        "output_format": "0",
        "ssl_cert_file": "",
        "ssl_key_file": "",
        "ssl_key_password": "",
        "verify_peer": "0",
        "verify_host": "0",
        "allow_traps": "0",
        "lastclock": "0",
        "lastns": "0",
        "lastvalue": "0",
        "prevvalue": "0",
        "discover": "0",
        "uuid": "",
        "parameters": []
    }
],
    "id": 1
}

```

Finding dependent item

Find one Dependent item for item with ID "25545".

Request:

```

{
    "jsonrpc": "2.0",
    "method": "item.get",
    "params": {
        "output": "extend",
        "filter": {
            "type": "18",
            "master_itemid": "25545"
        },
        "limit": "1"
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "itemid": "25547",
            "type": "18",
            "snmp_oid": "",
            "hostid": "10116",
            "name": "Seconds",
            "key_": "apache.status.uptime.seconds",
            "delay": "0",
            "history": "90d",
            "trends": "365d",
            "status": "0",
            "value_type": "3",
            "trapper_hosts": "",

```



```

        "units": "",
        "logtimefmt": "",
        "templateid": "0",
        "valuemapid": "0",
        "params": "",
        "ipmi_sensor": "",
        "authtype": "0",
        "username": "",
        "password": "",
        "publickey": "",
        "privatekey": "",
        "interfaceid": "0",
        "description": "",
        "evaltype": "0",
        "master_itemid": "25545",
        "jmx_endpoint": "",
        "timeout": "3s",
        "url": "",
        "query_fields": [],
        "posts": "",
        "status_codes": "200",
        "follow_redirects": "1",
        "post_type": "0",
        "http_proxy": "",
        "headers": [],
        "retrieve_mode": "0",
        "request_method": "0",
        "output_format": "0",
        "ssl_cert_file": "",
        "ssl_key_file": "",
        "ssl_key_password": "",
        "verify_peer": "0",
        "verify_host": "0",
        "allow_traps": "0",
        "discover": "0",
        "uuid": "",
        "parameters": []
    }
],
    "id": 1
}

```

Find HTTP agent item prototype

Find HTTP agent item prototype with request method HEAD for specific host ID.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "itemprototype.get",
    "params": {
        "hostids": "10254",
        "filter": {
            "type": "19",
            "request_method": "3"
        }
    },
    "id": 17,
    "auth": "d678e0b85688ce578ff061bd29a20d3b"
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "28257",
      "type": "19",
      "snmp_oid": "",
      "hostid": "10254",
      "name": "discovered",
      "key_": "item[#{INAME}]",
      "delay": "#{IUPDATE}",
      "history": "90d",
      "trends": "30d",
      "status": "0",
      "value_type": "3",
      "trapper_hosts": "",
      "units": "",
      "logtimefmt": "",
      "templateid": "28255",
      "valuemapid": "0",
      "params": "",
      "ipmi_sensor": "",
      "authtype": "0",
      "username": "",
      "password": "",
      "publickey": "",
      "privatekey": "",
      "interfaceid": "2",
      "description": "",
      "evaltype": "0",
      "jmx_endpoint": "",
      "master_itemid": "0",
      "timeout": "3s",
      "url": "#{IURL}",
      "query_fields": [],
      "posts": "",
      "status_codes": "",
      "follow_redirects": "0",
      "post_type": "0",
      "http_proxy": "",
      "headers": [],
      "retrieve_mode": "0",
      "request_method": "3",
      "output_format": "0",
      "ssl_cert_file": "",
      "ssl_key_file": "",
      "ssl_key_password": "",
      "verify_peer": "0",
      "verify_host": "0",
      "allow_traps": "0",
      "discover": "0",
      "uuid": "",
      "parameters": []
    }
  ],
  "id": 17
}

```

See also

- [Host](#)
- [Graph prototype](#)
- [Trigger prototype](#)

Source

CItemPrototype::get() in *ui/include/classes/api/services/CItemPrototype.php*.

## itemprototype.update

Description

object itemprototype.update(object/array itemPrototypes)

This method allows to update existing item prototypes.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Item prototype properties to be updated.

The *itemid* property must be defined for each item prototype, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard item prototype properties](#), the method accepts the following parameters.

| Parameter     | Type  | Description  |
|---------------|-------|--|
| preprocessing | array | Item prototype <a href="#">preprocessing</a> options to replace the current preprocessing options. |
| tags          | array | Item prototype <a href="#">tags</a> .  |

Return values

(object) Returns an object containing the IDs of the updated item prototypes under the *itemids* property.

Examples

Changing the interface of an item prototype

Change the host interface that will be used by discovered items.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.update",
  "params": {
    "itemid": "27428",
    "interfaceid": "132"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "27428"
    ]
  },
  "id": 1
}
```

Update dependent item prototype

Update Dependent item prototype with new Master item prototype ID. Only dependencies on same host (template/discovery rule) are allowed, therefore Master and Dependent item should have same *hostid* and *ruleid*.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.update",
  "params": {
    "master_itemid": "25570",
    "itemid": "189030"
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "189030"
    ]
  },
  "id": 1
}
```

Update HTTP agent item prototype

Change query fields and remove all custom headers.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.update",
  "params": {
    "itemid": "28305",
    "query_fields": [
      {
        "random": "qwertyuiopasdfghjklzxcvbnm"
      }
    ],
    "headers": []
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "28305"
    ]
  },
  "id": 1
}
```

Updating item preprocessing options

Update an item prototype with item preprocessing rule “Custom multiplier”.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "itemprototype.update",
  "params": {
```

```

        "itemid": "44211",
        "preprocessing": [
            {
                "type": 1,
                "params": "4",
                "error_handler": 2,
                "error_handler_params": "5"
            }
        ]
    },
    "auth": "700ca65537074ec963db7efabda78259",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "itemids": [
            "44211"
        ]
    },
    "id": 1
}

```

Updating a script item prototype

Update a script item prototype with a different script and remove unnecessary parameters that were used by previous script.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "itemprototype.update",
    "params": {
        "itemid": "23865",
        "parameters": [],
        "script": "Zabbix.Log(3, 'Log test');\nreturn 1;"
    },
    "auth": "700ca65537074ec963db7efabda78259",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "itemids": [
            "23865"
        ]
    },
    "id": 1
}

```

Source

CltemPrototype::update() in *ui/include/classes/api/services/CltemPrototype.php*.

## LLD rule

This class is designed to work with low level discovery rules.

Object references:

- **LLD rule**

Available methods:

- **discoveryrule.copy** - copying LLD rules
- **discoveryrule.create** - creating new LLD rules
- **discoveryrule.delete** - deleting LLD rules
- **discoveryrule.get** - retrieving LLD rules
- **discoveryrule.update** - updating LLD rules

## > LLD rule object

The following objects are directly related to the `discoveryrule` API.

LLD rule

The low-level discovery rule object has the following properties.

| Property                         | Type    | Description  |
|----------------------------------|---------|--|
| <b>itemid</b>                    | string  | ( <i>readonly</i> ) ID of the LLD rule.  |
| <b>delay</b><br>(required)       | string  | Update interval of the LLD rule. Accepts seconds or time unit with suffix and with or without one or more <b>custom intervals</b> that consist of either flexible intervals and scheduling intervals as serialized strings. Also accepts user macros. Flexible intervals could be written as two macros separated by a forward slash. Intervals are separated by a semicolon.          |
| <b>hostid</b><br>(required)      | string  | Optional for Zabbix trapper, dependent items and for Zabbix agent (active) with <code>mqtt.get</code> key. ID of the host that the LLD rule belongs to.  |
| <b>interfaceid</b><br>(required) | string  | ID of the LLD rule's host interface. Used only for host LLD rules.   |
| <b>key_</b><br>(required)        | string  | Not required for Zabbix agent (active), Zabbix internal, Zabbix trapper, dependent, database monitor and script LLD rules. Optional for HTTP agent LLD rules. LLD rule key.  |
| <b>name</b><br>(required)        | string  | Name of the LLD rule.  |
| <b>type</b><br>(required)        | integer | Type of the LLD rule.<br><br>Possible values:<br>0 - Zabbix agent;<br>2 - Zabbix trapper;<br>3 - simple check;<br>5 - Zabbix internal;<br>7 - Zabbix agent (active);<br>10 - external check;<br>11 - database monitor;<br>12 - IPMI agent;<br>13 - SSH agent;<br>14 - TELNET agent;<br>16 - JMX agent;<br>18 - Dependent item;<br>19 - HTTP agent;<br>20 - SNMP agent;<br>21 - Script. |
| <b>url</b><br>(required)         | string  | URL string, required for HTTP agent LLD rule. Supports user macros, {HOST.IP}, {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.NAME}, {ITEM.ID}, {ITEM.KEY}.   |

| Property         | Type    | Description  |
|------------------|---------|--|
| allow_traps      | integer | HTTP agent LLD rule field. Allow to populate value as in trapper item type also.   |
| authtype         | integer | <p>0 - <i>(default)</i> Do not allow to accept incoming data.<br/> 1 - Allow to accept incoming data.</p> <p>Used only by SSH agent or HTTP agent LLD rules.</p> <p>SSH agent authentication method possible values:<br/> 0 - <i>(default)</i> password;<br/> 1 - public key.</p> <p>HTTP agent authentication method possible values:<br/> 0 - <i>(default)</i> none<br/> 1 - basic<br/> 2 - NTLM</p> |
| description      | string  | Description of the LLD rule.   |
| error            | string  | <i>(readonly)</i> Error text if there are problems updating the LLD rule value.  |
| follow_redirects | integer | <p>HTTP agent LLD rule field. Follow response redirects while polling data.</p> <p>0 - Do not follow redirects.<br/> 1 - <i>(default)</i> Follow redirects.</p>  |
| headers          | object  | <p>HTTP agent LLD rule field. Object with HTTP(S) request headers, where header name is used as key and header value as value.</p> <p>Example:<br/> { "User-Agent": "Zabbix" }</p>   |
| http_proxy       | string  | HTTP agent LLD rule field. HTTP(S) proxy connection string.  |
| ipmi_sensor      | string  | IPMI sensor. Used only by IPMI LLD rules.  |
| jmx_endpoint     | string  | JMX agent custom connection string.  |
| lifetime         | string  | <p>Default value:<br/> service:jmx:rmi:///jndi/rmi://{HOST.CONN}:{HOST.PORT}/jmxrmi</p> <p>Time period after which items that are no longer discovered will be deleted. Accepts seconds, time unit with suffix and user macro.</p>   |
| master_itemid    | integer | <p>Default: 30d.</p> <p>Master item ID.</p> <p>Recursion up to 3 dependent items and maximum count of dependent items equal to 999 are allowed.</p> <p>Discovery rule cannot be master item for another discovery rule.</p>  |
| output_format    | integer | <p>Required for Dependent item.</p> <p>HTTP agent LLD rule field. Should response be converted to JSON.</p> <p>0 - <i>(default)</i> Store raw.<br/> 1 - Convert to JSON.</p>   |
| params           | string  | <p>Additional parameters depending on the type of the LLD rule:</p> <ul style="list-style-type: none"> <li>- executed script for SSH and Telnet LLD rules;</li> <li>- SQL query for database monitor LLD rules;</li> <li>- formula for calculated LLD rules.</li> </ul>  |
| parameters       | array   | Additional parameters for script type LLD rule. Array of objects with 'name' and 'value' properties, where name must be unique.  |
| password         | string  | Password for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent LLD rules.  |
| post_type        | integer | <p>HTTP agent LLD rule field. Type of post data body stored in posts property.</p> <p>0 - <i>(default)</i> Raw data.<br/> 2 - JSON data.<br/> 3 - XML data.</p>  |
| posts            | string  | HTTP agent LLD rule field. HTTP(S) request body data. Used with post_type.   |

| Property         | Type    | Description  |
|------------------|---------|--|
| privatekey       | string  | Name of the private key file.  |
| publickey        | string  | Name of the public key file.   |
| query_fields     | array   | HTTP agent LLD rule field. Query parameters. Array of objects with 'key': 'value' pairs, where value can be empty string.  |
| request_method   | integer | HTTP agent LLD rule field. Type of request method.<br><br>0 - <i>(default)</i> GET<br>1 - POST<br>2 - PUT<br>3 - HEAD  |
| retrieve_mode    | integer | HTTP agent LLD rule field. What part of response should be stored.<br><br>0 - <i>(default)</i> Body.<br>1 - Headers.<br>2 - Both body and headers will be stored.  |
| snmp_oid         | string  | For request_method HEAD only 1 is allowed value.<br>SNMP OID.  |
| ssl_cert_file    | string  | HTTP agent LLD rule field. Public SSL Key file path.   |
| ssl_key_file     | string  | HTTP agent LLD rule field. Private SSL Key file path.  |
| ssl_key_password | string  | HTTP agent LLD rule field. Password for SSL Key file.  |
| state            | integer | <i>(readonly)</i> State of the LLD rule.<br><br>Possible values:<br>0 - <i>(default)</i> normal;<br>1 - not supported.   |
| status           | integer | Status of the LLD rule.<br><br>Possible values:<br>0 - <i>(default)</i> enabled LLD rule;<br>1 - disabled LLD rule.  |
| status_codes     | string  | HTTP agent LLD rule field. Ranges of required HTTP status codes separated by commas. Also supports user macros as part of comma separated list.<br><br>Example: 200,200-{\$M},{M},200-400                  |
| templateid       | string  | <i>(readonly)</i> ID of the parent template LLD rule.  |
| timeout          | string  | Item data polling request timeout. Used for HTTP agent and script LLD rules. Supports user macros.<br><br>default: 3s<br>maximum value: 60s  |
| trapper_hosts    | string  | Allowed hosts. Used by trapper LLD rules or HTTP agent LLD rules.  |
| username         | string  | Username for authentication. Used by simple check, SSH, Telnet, database monitor, JMX and HTTP agent LLD rules.  |
| uuid             | string  | Required by SSH and Telnet LLD rules.<br>Universal unique identifier, used for linking imported LLD rules to already existing ones. Used only for LLD rules on templates.<br>Auto-generated, if not given. |
| verify_host      | integer | HTTP agent LLD rule field. Whether to validate that the host name for the connection matches the one in the host's certificate.<br><br>0 - <i>(default)</i> Do not validate.<br>1 - Validate.              |
| verify_peer      | integer | HTTP agent LLD rule field. Whether to validate that the host's certificate is authentic.<br><br>0 - <i>(default)</i> Do not validate.<br>1 - Validate.   |



Note that for some methods (update, delete) the required/optional parameter combination is different.

#### LLD rule filter

The LLD rule filter object defines a set of conditions that can be used to filter discovered objects. It has the following properties:

| Property                        | Type    | Description  |
|---------------------------------|---------|--|
| <b>conditions</b><br>(required) | array   | Set of filter conditions to use for filtering results.   |
| <b>evaltype</b><br>(required)   | integer | Filter condition evaluation method.<br><br>Possible values:<br>0 - and/or;<br>1 - and;<br>2 - or;<br>3 - custom expression.  |
| eval_formula                    | string  | <i>(readonly)</i> Generated expression that will be used for evaluating filter conditions. The expression contains IDs that reference specific filter conditions by its <code>formulaid</code> . The value of <code>eval_formula</code> is equal to the value of <code>formula</code> for filters with a custom expression.  |
| formula                         | string  | User-defined expression to be used for evaluating conditions of filters with a custom expression. The expression must contain IDs that reference specific filter conditions by its <code>formulaid</code> . The IDs used in the expression must exactly match the ones defined in the filter conditions: no condition can remain unused or omitted.<br><br>Required for custom expression filters. |

#### LLD rule filter condition

The LLD rule filter condition object defines a separate check to perform on the value of an LLD macro. It has the following properties:

| Property                   | Type    | Description  |
|----------------------------|---------|--|
| <b>macro</b><br>(required) | string  | LLD macro to perform the check on.   |
| <b>value</b><br>(required) | string  | Value to compare with.   |
| formulaid                  | string  | Arbitrary unique ID that is used to reference the condition from a custom expression. Can only contain capital-case letters. The ID must be defined by the user when modifying filter conditions, but will be generated anew when requesting them afterward. |
| operator                   | integer | Condition operator.<br><br>Possible values:<br>8 - <i>(default)</i> matches regular expression;<br>9 - does not match regular expression;<br>12 - exists;<br>13 - does not exist.  |

#### Note:

To better understand how to use filters with various types of expressions, see examples on the [discoveryrule.get](#) and [discoveryrule.create](#) method pages.

#### LLD macro path

The LLD macro path has the following properties:

| Property                       | Type   | Description |
|--------------------------------|--------|-------------|
| <b>lld_macro</b><br>(required) | string | LLD macro.  |

| Property                  | Type   | Description   |
|---------------------------|--------|---|
| <b>path</b><br>(required) | string | Selector for value which will be assigned to corresponding macro. |

#### LLD rule preprocessing

The LLD rule preprocessing object has the following properties.

| Property                                  | Type    | Description  |
|---|---------|--|
| <b>type</b><br>(required)                 | integer | The preprocessing option type.<br><br>Possible values:<br>5 - Regular expression matching;<br>11 - XML XPath;<br>12 - JSONPath;<br>15 - Does not match regular expression;<br>16 - Check for error in JSON;<br>17 - Check for error in XML;<br>20 - Discard unchanged with heartbeat;<br>21 - JavaScript;<br>23 - Prometheus to JSON;<br>24 - CSV to JSON;<br>25 - Replace;<br>27 - XML to JSON. |
| <b>params</b><br>(required)               | string  | Additional parameters used by preprocessing option. Multiple parameters are separated by LF (\n) character.  |
| <b>error_handler</b><br>(required)        | integer | Action type used in case of preprocessing step failure.<br><br>Possible values:<br>0 - Error message is set by Zabbix server;<br>1 - Discard value;<br>2 - Set custom value;<br>3 - Set custom error message.  |
| <b>error_handler_params</b><br>(required) | string  | Error handler parameters. Used with <code>error_handler</code> .<br><br>Must be empty, if <code>error_handler</code> is 0 or 1.<br>Can be empty if, <code>error_handler</code> is 2.<br>Cannot be empty, if <code>error_handler</code> is 3.   |

The following parameters and error handlers are supported for each preprocessing type.

| Preprocessing type | Name                              | Parameter 1          | Parameter 2         | Parameter 3 | Supported error handlers |
|--------------------|-----------------------------------|----------------------|---------------------|-------------|--------------------------|
| 5                  | Regular expression                | pattern <sup>1</sup> | output <sup>2</sup> |             | 0, 1, 2, 3               |
| 11                 | XML XPath                         | path <sup>3</sup>    |                     |             | 0, 1, 2, 3               |
| 12                 | JSONPath                          | path <sup>3</sup>    |                     |             | 0, 1, 2, 3               |
| 15                 | Does not match regular expression | pattern <sup>1</sup> |                     |             | 0, 1, 2, 3               |

| Preprocessing type | Name   | Parameter 1            | Parameter 2              | Parameter 3 | Supported error handlers |
|--------------------|--|------------------------|--------------------------|-------------|--------------------------|
| 16                 | Check for error in JSON                                    | path <sup>3</sup>      |                          |             | 0, 1, 2, 3               |
| 17                 | Check for error in XML                                     | path <sup>3</sup>      |                          |             | 0, 1, 2, 3               |
| 20                 | Discard seconds <sup>4, 5</sup> un-changed with heart-beat |                        |                          |             |                          |
| 21                 | JavaScript <sup>2</sup>                                    |                        |                          |             |                          |
| 23                 | Prometheus pattern <sup>5, 6</sup>                         |                        |                          |             | 0, 1, 2, 3               |
| 24                 | CSV to JSON  | character <sup>2</sup> | character <sup>2</sup>   | 0,1         | 0, 1, 2, 3               |
| 25                 | Replace search string <sup>2</sup>                         |                        | replacement <sup>2</sup> |             |                          |
| 27                 | XML to JSON  |                        |                          |             | 0, 1, 2, 3               |

<sup>1</sup> regular expression

<sup>2</sup> string

<sup>3</sup> JSONPath or XML XPath

<sup>4</sup> positive integer (with support of time suffixes, e.g. 30s, 1m, 2h, 1d)

<sup>5</sup> user macro

<sup>6</sup> Prometheus pattern following the syntax: <metric name>{<label name>=<label value> , ...} == <value>. Each Prometheus pattern component (metric, label name, label value and metric value) can be user macro.

#### LLD rule overrides

The LLD rule overrides object defines a set of rules (filters, conditions and operations) that are used to override properties of different prototype objects. It has the following properties:

| Property                  | Type    | Description   |
|---------------------------|---------|---|
| <b>name</b><br>(required) | string  | Unique override name.   |
| <b>step</b><br>(required) | integer | Unique order number of the override.  |
| stop                      | integer | Stop processing next overrides if matches.  |
|                           |         | Possible values:<br>0 - ( <i>default</i> ) don't stop processing overrides;<br>1 - stop processing overrides if filter matches. |
| filter                    | object  | Override filter.  |
| operations                | array   | Override operations.  |

#### LLD rule override filter

The LLD rule override filter object defines a set of conditions that if they match the discovered object the override is applied. It has the following properties:

| Property                        | Type    | Description  |
|---------------------------------|---------|--|
| <b>evaltype</b><br>(required)   | integer | Override filter condition evaluation method.<br><br>Possible values:<br>0 - and/or;<br>1 - and;<br>2 - or;<br>3 - custom expression.   |
| <b>conditions</b><br>(required) | array   | Set of override filter conditions to use for matching the discovered objects.  |
| eval_formula                    | string  | ( <i>readonly</i> ) Generated expression that will be used for evaluating override filter conditions. The expression contains IDs that reference specific override filter conditions by its <code>formulaid</code> . The value of <code>eval_formula</code> is equal to the value of <code>formula</code> for filters with a custom expression.  |
| formula                         | string  | User-defined expression to be used for evaluating conditions of override filters with a custom expression. The expression must contain IDs that reference specific override filter conditions by its <code>formulaid</code> . The IDs used in the expression must exactly match the ones defined in the override filter conditions: no condition can remain unused or omitted.<br><br>Required for custom expression override filters. |

#### LLD rule override filter condition

The LLD rule override filter condition object defines a separate check to perform on the value of an LLD macro. It has the following properties:

| Property                   | Type    | Description  |
|----------------------------|---------|--|
| <b>macro</b><br>(required) | string  | LLD macro to perform the check on.   |
| <b>value</b><br>(required) | string  | Value to compare with.   |
| formulaid                  | string  | Arbitrary unique ID that is used to reference the condition from a custom expression. Can only contain capital-case letters. The ID must be defined by the user when modifying filter conditions, but will be generated anew when requesting them afterward. |
| operator                   | integer | Condition operator.<br><br>Possible values:<br>8 - ( <i>default</i> ) matches regular expression;<br>9 - does not match regular expression;<br>12 - exists;<br>13 - does not exist.  |

#### LLD rule override operation

The LLD rule override operation is combination of conditions and actions to perform on the prototype object. It has the following properties:

| Property                             | Type    | Description  |
|--------------------------------------|---------|--|
| <b>operationobject</b><br>(required) | integer | Type of discovered object to perform the action.<br><br>Possible values:<br>0 - Item prototype;<br>1 - Trigger prototype;<br>2 - Graph prototype;<br>3 - Host prototype. |

| Property    | Type    | Description   |
|-------------|---------|---|
| operator    | integer | Override condition operator.<br><br>Possible values:<br>0 - (default) equals;<br>1 - does not equal;<br>2 - contains;<br>3 - does not contain;<br>8 - matches;<br>9 - does not match. |
| value       | string  | Pattern to match item, trigger, graph or host prototype name depending on selected object.  |
| opstatus    | object  | Override operation status object for item, trigger and host prototype objects.  |
| opdiscover  | object  | Override operation discover status object (all object types).   |
| opperiod    | object  | Override operation period (update interval) object for item prototype object.   |
| ophistory   | object  | Override operation history object for item prototype object.  |
| optrends    | object  | Override operation trends object for item prototype object.   |
| opseverity  | object  | Override operation severity object for trigger prototype object.  |
| optag       | array   | Override operation tag object for trigger and host prototype objects.   |
| optemplate  | array   | Override operation template object for host prototype object.   |
| opinventory | object  | Override operation inventory object for host prototype object.  |

#### LLD rule override operation status

LLD rule override operation status that is set to discovered object. It has the following properties:

| Property                    | Type    | Description   |
|-----------------------------|---------|---|
| <b>status</b><br>(required) | integer | Override the status for selected object.<br><br>Possible values:<br>0 - Create enabled;<br>1 - Create disabled. |

#### LLD rule override operation discover

LLD rule override operation discover status that is set to discovered object. It has the following properties:

| Property                      | Type    | Description   |
|-------------------------------|---------|---|
| <b>discover</b><br>(required) | integer | Override the discover status for selected object.<br><br>Possible values:<br>0 - Yes, continue discovering the objects;<br>1 - No, new objects will not be discovered and existing ones will be marked as lost. |

#### LLD rule override operation period

LLD rule override operation period is an update interval value (supports custom intervals) that is set to discovered item. It has the following properties:

| Property                   | Type   | Description  |
|----------------------------|--------|--|
| <b>delay</b><br>(required) | string | Override the update interval of the item prototype. Accepts seconds or a time unit with suffix (30s,1m,2h,1d) as well as flexible and scheduling intervals and user macros or LLD macros. Multiple intervals are separated by a semicolon. |

#### LLD rule override operation history

LLD rule override operation history value that is set to discovered item. It has the following properties:

| Property                     | Type   | Description   |
|------------------------------|--------|---|
| <b>history</b><br>(required) | string | Override the history of item prototype which is a time unit of how long the history data should be stored. Also accepts user macro and LLD macro. |

LLD rule override operation trends

LLD rule override operation trends value that is set to discovered item. It has the following properties:

| Property                    | Type   | Description   |
|-----------------------------|--------|---|
| <b>trends</b><br>(required) | string | Override the trends of item prototype which is a time unit of how long the trends data should be stored. Also accepts user macro and LLD macro. |

LLD rule override operation severity

LLD rule override operation severity value that is set to discovered trigger. It has the following properties:

| Property                      | Type    | Description  |
|-------------------------------|---------|--|
| <b>severity</b><br>(required) | integer | Override the severity of trigger prototype.<br><br>Possible values are: 0 - <i>(default)</i> not classified;<br>1 - information;<br>2 - warning;<br>3 - average;<br>4 - high;<br>5 - disaster. |

LLD rule override operation tag

LLD rule override operation tag object contains tag name and value that are set to discovered object. It has the following properties:

| Property                 | Type   | Description    |
|--------------------------|--------|----------------|
| <b>tag</b><br>(required) | string | New tag name.  |
| value                    | string | New tag value. |

LLD rule override operation template

LLD rule override operation template object that is linked to discovered host. It has the following properties:

| Property                        | Type   | Description   |
|---------------------------------|--------|---|
| <b>templateid</b><br>(required) | string | Override the template of host prototype linked templates. |

LLD rule override operation inventory

LLD rule override operation inventory mode value that is set to discovered host. It has the following properties:

| Property                            | Type    | Description   |
|-------------------------------------|---------|---|
| <b>inventory_mode</b><br>(required) | integer | Override the host prototype inventory mode.<br><br>Possible values are:<br>-1 - disabled;<br>0 - <i>(default)</i> manual;<br>1 - automatic. |

## discoveryrule.copy

### Description

object discoveryrule.copy(object parameters)

This method allows to copy LLD rules with all of the prototypes to the given hosts.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the LLD rules to copy and the target hosts.

| Parameter    | Type  | Description                                |
|--------------|-------|--|
| discoveryids | array | IDs of the LLD rules to be copied.         |
| hostids      | array | IDs of the hosts to copy the LLD rules to. |

### Return values

(boolean) Returns true if the copying was successful.

### Examples

Copy an LLD rule to multiple hosts

Copy an LLD rule to two hosts.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.copy",
  "params": {
    "discoveryids": [
      "27426"
    ],
    "hostids": [
      "10196",
      "10197"
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": true,
  "id": 1
}
```

Source

CDiscoveryRule::copy() in *ui/include/classes/api/services/CDiscoveryRule.php*.

## discoveryrule.create

Description

object discoveryrule.create(object/array lldRules)

This method allows to create new LLD rules.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) LLD rules to create.

Additionally to the [standard LLD rule properties](#), the method accepts the following parameters.

| Parameter       | Type   | Description                                       |
|-----------------|--------|---|
| filter          | object | LLD rule <a href="#">filter</a> for the LLD rule. |
| preprocessing   | array  | LLD rule <a href="#">preprocessing</a> options.   |
| lld_macro_paths | array  | LLD rule <a href="#">lld_macro_path</a> options.  |
| overrides       | array  | LLD rule <a href="#">overrides</a> options.       |

Return values

(object) Returns an object containing the IDs of the created LLD rules under the *itemids* property. The order of the returned IDs matches the order of the passed LLD rules.

Examples

Creating an LLD rule

Create a Zabbix agent LLD rule to discover mounted file systems. Discovered items will be updated every 30 seconds.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "Mounted filesystem discovery",
    "key_": "vfs.fs.discovery",
    "hostid": "10197",
    "type": 0,
    "interfaceid": "112",
    "delay": "30s"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "27665"
    ]
  },
  "id": 1
}
```



## Using a filter

Create an LLD rule with a set of conditions to filter the results by. The conditions will be grouped together using the logical "and" operator.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "Filtered LLD rule",
    "key_": "lld",
    "hostid": "10116",
    "type": 0,
    "interfaceid": "13",
    "delay": "30s",
    "filter": {
      "evaltype": 1,
      "conditions": [
        {
          "macro": "{#MACRO1}",
          "value": "@regex1"
        },
        {
          "macro": "{#MACRO2}",
          "value": "@regex2",
          "operator": "9"
        },
        {
          "macro": "{#MACRO3}",
          "value": "",
          "operator": "12"
        },
        {
          "macro": "{#MACRO4}",
          "value": "",
          "operator": "13"
        }
      ]
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "27665"
    ]
  },
  "id": 1
}
```

## Creating an LLD rule with macro paths

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "LLD rule with LLD macro paths",
  }
```

```

    "key_": "lld",
    "hostid": "10116",
    "type": 0,
    "interfaceid": "13",
    "delay": "30s",
    "lld_macro_paths": [
      {
        "lld_macro": "#{MACRO1}",
        "path": "$.path.1"
      },
      {
        "lld_macro": "#{MACRO2}",
        "path": "$.path.2"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "27665"
    ]
  },
  "id": 1
}

```

Using a custom expression filter

Create an LLD rule with a filter that will use a custom expression to evaluate the conditions. The LLD rule must only discover objects the "#{MACRO1}" macro value of which matches both regular expression "regex1" and "regex2", and the value of "#{MACRO2}" matches either "regex3" or "regex4". The formula IDs "A", "B", "C" and "D" have been chosen arbitrarily.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "Filtered LLD rule",
    "key_": "lld",
    "hostid": "10116",
    "type": 0,
    "interfaceid": "13",
    "delay": "30s",
    "filter": {
      "evaltype": 3,
      "formula": "(A and B) and (C or D)",
      "conditions": [
        {
          "macro": "#{MACRO1}",
          "value": "@regex1",
          "formulaid": "A"
        },
        {
          "macro": "#{MACRO1}",
          "value": "@regex2",
          "formulaid": "B"
        }
      ]
    }
  }
}

```

```

        "macro": "{#MACRO2}",
        "value": "@regex3",
        "formulaid": "C"
    },
    {
        "macro": "{#MACRO2}",
        "value": "@regex4",
        "formulaid": "D"
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "27665"
    ]
  },
  "id": 1
}

```

Using custom query fields and headers

Create LLD rule with custom query fields and headers.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "hostid": "10257",
    "interfaceid": "5",
    "type": 19,
    "name": "API HTTP agent",
    "key_": "api_discovery_rule",
    "delay": "5s",
    "url": "http://127.0.0.1?discoverer.php",
    "query_fields": [
      {
        "mode": "json"
      },
      {
        "elements": "2"
      }
    ],
    "headers": {
      "X-Type": "api",
      "Authorization": "Bearer mF_A.B5f-2.1JcM"
    },
    "allow_traps": 1,
    "trapper_hosts": "127.0.0.1"
  },
  "auth": "d678e0b85688ce578ff061bd29a20d3b",
  "id": 1
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "28336"
    ]
  },
  "id": 1
}
```

Creating an LLD rule with preprocessing

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "Discovery rule with preprocessing",
    "key_": "lld.with.preprocessing",
    "hostid": "10001",
    "ruleid": "27665",
    "type": 0,
    "delay": "60s",
    "interfaceid": "1155",
    "preprocessing": [
      {
        "type": 20,
        "params": "20",
        "error_handler": 0,
        "error_handler_params": ""
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "44211"
    ]
  },
  "id": 1
}
```

Creating an LLD rule with overrides

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.create",
  "params": {
    "name": "Discover database host",
    "key_": "lld.with.overrides",
    "hostid": "10001",
    "type": 0,
    "delay": "60s",
    "interfaceid": "1155",
    "overrides": [
      {

```

```

"name": "Discover MySQL host",
"step": "1",
"stop": "1",
"filter": {
  "evaltype": "2",
  "conditions": [
    {
      "macro": "{#UNIT.NAME}",
      "operator": "8",
      "value": "~mysqld\\.service$"
    },
    {
      "macro": "{#UNIT.NAME}",
      "operator": "8",
      "value": "~mariadb\\.service$"
    }
  ]
},
"operations": [
  {
    "operationobject": "3",
    "operator": "2",
    "value": "Database host",
    "opstatus": {
      "status": "0"
    },
    "optemplate": [
      {
        "templateid": "10170"
      }
    ],
    "optag": [
      {
        "tag": "Database",
        "value": "MySQL"
      }
    ]
  }
],
},
{
  "name": "Discover PostgreSQL host",
  "step": "2",
  "stop": "1",
  "filter": {
    "evaltype": "0",
    "conditions": [
      {
        "macro": "{#UNIT.NAME}",
        "operator": "8",
        "value": "~postgresql\\.service$"
      }
    ]
  },
  "operations": [
    {
      "operationobject": "3",
      "operator": "2",
      "value": "Database host",
      "opstatus": {
        "status": "0"
      },
    },

```

```

        "optemplate": [
            {
                "templateid": "10263"
            }
        ],
        "optag": [
            {
                "tag": "Database",
                "value": "PostgreSQL"
            }
        ]
    }
}
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "itemids": [
            "30980"
        ]
    },
    "id": 1
}

```

Create script LLD rule

Create a simple data collection using a script LLD rule.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "discoveryrule.create",
    "params": {
        "name": "Script example",
        "key_": "custom.script.lldrule",
        "hostid": "12345",
        "type": 21,
        "params": "var request = new CurlHttpRequest();\nreturn request.Post(\"https://postman-echo.com/post\");",
        "parameters": [
            {
                "name": "host",
                "value": "{HOST.CONN}"
            }
        ]
    },
    "timeout": "6s",
    "delay": "30s"
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 2
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "itemids": [

```

```

        "23865"
    ],
    },
    "id": 3
}

```

See also

- [LLD rule filter](#)
- [LLD macro paths](#)
- [LLD rule preprocessing](#)

Source

CDiscoveryRule::create() in *ui/include/classes/api/services/CDiscoveryRule.php*.

## discoveryrule.delete

Description

object discoveryrule.delete(array lldRuleIds)

This method allows to delete LLD rules.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the LLD rules to delete.

Return values

(object) Returns an object containing the IDs of the deleted LLD rules under the `ruleids` property.

Examples

Deleting multiple LLD rules

Delete two LLD rules.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "discoveryrule.delete",
  "params": [
    "27665",
    "27668"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "ruleids": [
      "27665",
      "27668"
    ]
  },
  "id": 1
}

```

Source

CDiscoveryRule::delete() in *ui/include/classes/api/services/CDiscoveryRule.php*.

## discoveryrule.get

### Description

integer/array discoveryrule.get(object parameters)

The method allows to retrieve LLD rules according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter            | Type         | Description  |
|----------------------|--------------|--|
| itemids              | string/array | Return only LLD rules with the given IDs.  |
| groupids             | string/array | Return only LLD rules that belong to the hosts from the given groups.  |
| hostids              | string/array | Return only LLD rules that belong to the given hosts.  |
| inherited            | boolean      | If set to true return only LLD rules inherited from a template.  |
| interfaceids         | string/array | Return only LLD rules use the given host interfaces.   |
| monitored            | boolean      | If set to true return only enabled LLD rules that belong to monitored hosts.   |
| templated            | boolean      | If set to true return only LLD rules that belong to templates.   |
| templateids          | string/array | Return only LLD rules that belong to the given templates.  |
| selectFilter         | query        | Return a <b>filter</b> property with data of the filter used by the LLD rule.  |
| selectGraphs         | query        | Returns a <b>graphs</b> property with graph prototypes that belong to the LLD rule.  |
| selectHostPrototypes | query        | Supports count.<br>Return a <b>hostPrototypes</b> property with host prototypes that belong to the LLD rule.                                     |
| selectHosts          | query        | Supports count.<br>Return a <b>hosts</b> property with an array of hosts that the LLD rule belongs to.   |
| selectItems          | query        | Return an <b>items</b> property with item prototypes that belong to the LLD rule.  |
| selectTriggers       | query        | Supports count.<br>Return a <b>triggers</b> property with trigger prototypes that belong to the LLD rule.  |
| selectLLDMacroPaths  | query        | Supports count.<br>Return an <b>lld_macro_paths</b> property with a list of LLD macros and paths to values assigned to each corresponding macro. |
| selectPreprocessing  | query        | Return a <b>preprocessing</b> property with LLD rule preprocessing options.  |
| selectOverrides      | query        | Return an <b>lld_rule_overrides</b> property with a list of override filters, conditions and operations that are performed on prototype objects. |
| filter               | object       | Return only those results that exactly match the given filter.   |
|                      |              | Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.            |
|                      |              | Supports additional filters:<br>host - technical name of the host that the LLD rule belongs to.  |



| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| limitSelects           | integer      | Limits the number of records returned by subselects.   |
|                        |              | Applies to the following subselects:<br>selectItems;<br>selectGraphs;<br>selectTriggers.   |
| sortfield              | string/array | Sort the result by the given properties.   |
|                        |              | Possible values are: itemid, name, key_, delay, type and status.<br>These parameters are described in the <a href="#">reference commentary</a> . |
| countOutput            | boolean      |  |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieving discovery rules from a host

Retrieve all discovery rules for specific host ID.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.get",
  "params": {
    "output": "extend",
    "hostids": "10202"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "27425",
      "type": "0",
      "snmp_oid": "",
      "hostid": "10202",
      "name": "Network interface discovery",
      "key_": "net.if.discovery",
      "delay": "1h",
      "status": "0",
      "trapper_hosts": "",
      "templateid": "22444",
      "valuemapid": "0",
      "params": ""
    }
  ]
}
```

```

    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "interfaceid": "119",
    "description": "Discovery of network interfaces as defined in global regular expression \\"Netw
    "lifetime": "30d",
    "jmx_endpoint": "",
    "master_itemid": "0",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",
    "follow_redirects": "1",
    "post_type": "0",
    "http_proxy": "",
    "headers": [],
    "retrieve_mode": "0",
    "request_method": "0",
    "ssl_cert_file": "",
    "ssl_key_file": "",
    "ssl_key_password": "",
    "verify_peer": "0",
    "verify_host": "0",
    "allow_traps": "0",
    "uuid": "",
    "state": "0",
    "error": "",
    "parameters": []
  },
  {
    "itemid": "27426",
    "type": "0",
    "snmp_oid": "",
    "hostid": "10202",
    "name": "Mounted filesystem discovery",
    "key_": "vfs.fs.discovery",
    "delay": "1h",
    "status": "0",
    "trapper_hosts": "",
    "templateid": "22450",
    "valuemapid": "0",
    "params": "",
    "ipmi_sensor": "",
    "authtype": "0",
    "username": "",
    "password": "",
    "publickey": "",
    "privatekey": "",
    "interfaceid": "119",
    "description": "Discovery of file systems of different types as defined in global regular exp
    "lifetime": "30d",
    "jmx_endpoint": "",
    "master_itemid": "0",
    "timeout": "3s",
    "url": "",
    "query_fields": [],
    "posts": "",
    "status_codes": "200",

```

```

        "follow_redirects": "1",
        "post_type": "0",
        "http_proxy": "",
        "headers": [],
        "retrieve_mode": "0",
        "request_method": "0",
        "ssl_cert_file": "",
        "ssl_key_file": "",
        "ssl_key_password": "",
        "verify_peer": "0",
        "verify_host": "0",
        "allow_traps": "0",
        "uuid": "",
        "state": "0",
        "error": "",
        "parameters": []
    }
],
    "id": 1
}

```

#### Retrieving filter conditions

Retrieve the name of the LLD rule "24681" and its filter conditions. The filter uses the "and" evaluation type, so the formula property is empty and eval\_formula is generated automatically.

#### Request:

```

{
    "jsonrpc": "2.0",
    "method": "discoveryrule.get",
    "params": {
        "output": ["name"],
        "selectFilter": "extend",
        "itemids": ["24681"]
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

#### Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "itemid": "24681",
            "name": "Filtered LLD rule",
            "filter": {
                "evaltype": "1",
                "formula": "",
                "conditions": [
                    {
                        "macro": "{#MACRO1}",
                        "value": "@regex1",
                        "operator": "8",
                        "formulaid": "A"
                    },
                    {
                        "macro": "{#MACRO2}",
                        "value": "@regex2",
                        "operator": "9",
                        "formulaid": "B"
                    }
                ]
            }
        }
    ]
}

```

```

        "macro": "{#MACRO3}",
        "value": "",
        "operator": "12",
        "formulaid": "C"
    },
    {
        "macro": "{#MACRO4}",
        "value": "",
        "operator": "13",
        "formulaid": "D"
    }
],
    "eval_formula": "A and B and C and D"
}
}
],
    "id": 1
}

```

Retrieve LLD rule by URL

Retrieve LLD rule for host by rule URL field value. Only exact match of URL string defined for LLD rule is supported.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "discoveryrule.get",
    "params": {
        "hostids": "10257",
        "filter": {
            "type": 19,
            "url": "http://127.0.0.1/discoverer.php"
        }
    },
    "id": 39,
    "auth": "d678e0b85688ce578ff061bd29a20d3b"
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "itemid": "28336",
            "type": "19",
            "snmp_oid": "",
            "hostid": "10257",
            "name": "API HTTP agent",
            "key_": "api_discovery_rule",
            "delay": "5s",
            "status": "0",
            "trapper_hosts": "",
            "templateid": "0",
            "valuemapid": "0",
            "params": "",
            "ipmi_sensor": "",
            "authtype": "0",
            "username": "",
            "password": "",
            "publickey": "",
            "privatekey": "",
            "interfaceid": "5",
            "description": "",

```

```

        "lifetime": "30d",
        "jmx_endpoint": "",
        "master_itemid": "0",
        "timeout": "3s",
        "url": "http://127.0.0.1/discoverer.php",
        "query_fields": [
            {
                "mode": "json"
            },
            {
                "elements": "2"
            }
        ],
        "posts": "",
        "status_codes": "200",
        "follow_redirects": "1",
        "post_type": "0",
        "http_proxy": "",
        "headers": {
            "X-Type": "api",
            "Authorization": "Bearer mF_A.B5f-2.1JcM"
        },
        "retrieve_mode": "0",
        "request_method": "1",
        "ssl_cert_file": "",
        "ssl_key_file": "",
        "ssl_key_password": "",
        "verify_peer": "0",
        "verify_host": "0",
        "allow_traps": "0",
        "uuid": "",
        "state": "0",
        "error": "",
        "parameters": []
    },
    "id": 39
}

```

Retrieve LLD rule with overrides

Retrieve one LLD rule that has various override settings.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "discoveryrule.get",
    "params": {
        "output": ["name"],
        "itemids": "30980",
        "selectOverrides": ["name", "step", "stop", "filter", "operations"]
    },
    "id": 39,
    "auth": "d678e0b85688ce578ff061bd29a20d3b"
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "name": "Discover database host",
            "overrides": [

```

```

{
  "name": "Discover MySQL host",
  "step": "1",
  "stop": "1",
  "filter": {
    "evaltype": "2",
    "formula": "",
    "conditions": [
      {
        "macro": "{#UNIT.NAME}",
        "operator": "8",
        "value": "~mysqld\\.service$",
        "formulaid": "A"
      },
      {
        "macro": "{#UNIT.NAME}",
        "operator": "8",
        "value": "~mariadb\\.service$",
        "formulaid": "B"
      }
    ],
    "eval_formula": "A or B"
  },
  "operations": [
    {
      "operationobject": "3",
      "operator": "2",
      "value": "Database host",
      "opstatus": {
        "status": "0"
      },
      "optag": [
        {
          "tag": "Database",
          "value": "MySQL"
        }
      ],
      "optemplate": [
        {
          "templateid": "10170"
        }
      ]
    }
  ]
},
{
  "name": "Discover PostgreSQL host",
  "step": "2",
  "stop": "1",
  "filter": {
    "evaltype": "0",
    "formula": "",
    "conditions": [
      {
        "macro": "{#UNIT.NAME}",
        "operator": "8",
        "value": "~postgresql\\.service$",
        "formulaid": "A"
      }
    ],
    "eval_formula": "A"
  },

```

```

        "operations": [
            {
                "operationobject": "3",
                "operator": "2",
                "value": "Database host",
                "opstatus": {
                    "status": "0"
                },
                "optag": [
                    {
                        "tag": "Database",
                        "value": "PostgreSQL"
                    }
                ],
                "optemplate": [
                    {
                        "templateid": "10263"
                    }
                ]
            }
        ]
    },
    "id": 39
}

```

See also

- [Graph prototype](#)
- [Host](#)
- [Item prototype](#)
- [LLD rule filter](#)
- [Trigger prototype](#)

Source

CDiscoveryRule::get() in `ui/include/classes/api/services/CDiscoveryRule.php`.

## discoveryrule.update

Description

object discoveryrule.update(object/array lldRules)

This method allows to update existing LLD rules.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) LLD rule properties to be updated.

The `itemid` property must be defined for each LLD rule, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard LLD rule properties](#), the method accepts the following parameters.

| Parameter     | Type   | Description   |
|---------------|--------|---|
| filter        | object | LLD rule <a href="#">filter</a> to replace the current filter.                                |
| preprocessing | array  | LLD rule <a href="#">preprocessing</a> options to replace the existing preprocessing options. |

| Parameter       | Type  | Description   |
|-----------------|-------|---|
| lld_macro_paths | array | LLD rule <code>lld_macro_path</code> options to replace the existing <code>lld_macro_path</code> options. |
| overrides       | array | LLD rule <code>overrides</code> options to replace the existing <code>overrides</code> options.           |

#### Return values

(object) Returns an object containing the IDs of the updated LLD rules under the `itemids` property.

#### Examples

##### Adding a filter to an LLD rule

Add a filter so that the contents of the `{#FSTYPE}` macro would match the `@File systems for discovery` regexp.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.update",
  "params": {
    "itemid": "22450",
    "filter": {
      "evaltype": 1,
      "conditions": [
        {
          "macro": "{#FSTYPE}",
          "value": "@File systems for discovery"
        }
      ]
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "22450"
    ]
  },
  "id": 1
}
```

##### Adding LLD macro paths

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.update",
  "params": {
    "itemid": "22450",
    "lld_macro_paths": [
      {
        "lld_macro": "{#MACRO1}",
        "path": "$.json.path"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```



Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "22450"
    ]
  },
  "id": 1
}
```

Disable trapping

Disable LLD trapping for discovery rule.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.update",
  "params": {
    "itemid": "28336",
    "allow_traps": 0
  },
  "id": 36,
  "auth": "d678e0b85688ce578ff061bd29a20d3b"
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "28336"
    ]
  },
  "id": 36
}
```

Updating LLD rule preprocessing options

Update an LLD rule with preprocessing rule "JSONPath".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "discoveryrule.update",
  "params": {
    "itemid": "44211",
    "preprocessing": [
      {
        "type": 12,
        "params": "$.path.to.json",
        "error_handler": 2,
        "error_handler_params": "5"
      }
    ]
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
```

```

    "result": {
      "itemids": [
        "44211"
      ]
    },
    "id": 1
  }
}

```

Updating LLD rule script

Update an LLD rule script with a different script and remove unnecessary parameters that were used by previous script.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "discoveryrule.update",
  "params": {
    "itemid": "23865",
    "parameters": [],
    "script": "Zabbix.Log(3, 'Log test');\nreturn 1;"
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "itemids": [
      "23865"
    ]
  },
  "id": 1
}

```

Source

CDiscoveryRule::update() in *ui/include/classes/api/services/CDiscoveryRule.php*.

## Maintenance

This class is designed to work with maintenances.

Object references:

- [Maintenance](#)
- [Time period](#)

Available methods:

- [maintenance.create](#) - creating new maintenances
- [maintenance.delete](#) - deleting maintenances
- [maintenance.get](#) - retrieving maintenances
- [maintenance.update](#) - updating maintenances

### > Maintenance object

The following objects are directly related to the `maintenance` API.

Maintenance

The maintenance object has the following properties.

| Property                          | Type      | Description   |
|-----------------------------------|-----------|---|
| maintenanceid                     | string    | (readonly) ID of the maintenance.   |
| <b>name</b><br>(required)         | string    | Name of the maintenance.  |
| <b>active_since</b><br>(required) | timestamp | Time when the maintenance becomes active.   |
| <b>active_till</b><br>(required)  | timestamp | The given value will be rounded down to minutes.<br>Time when the maintenance stops being active.                         |
| description                       | string    | The given value will be rounded down to minutes.<br>Description of the maintenance.                                       |
| maintenance_type                  | integer   | Type of maintenance.  |
| tags_evaltype                     | integer   | Possible values:<br>0 - (default) with data collection;<br>1 - without data collection.<br>Problem tag evaluation method. |
|                                   |           | Possible values:<br>0 - (default) And/Or;<br>2 - Or.  |

Note that for some methods (update, delete) the required/optional parameter combination is different.

#### Time period

The time period object is used to define periods when the maintenance must come into effect. It has the following properties.

| Property        | Type      | Description   |
|-----------------|-----------|---|
| period          | integer   | Duration of the maintenance period in seconds.<br><br>The given value will be rounded down to minutes.  |
| timeperiod_type | integer   | Default: 3600.<br>Type of time period.<br><br>Possible values:<br>0 - (default) one time only;<br>2 - daily;<br>3 - weekly;<br>4 - monthly.   |
| start_date      | timestamp | Date when the maintenance period must come into effect.<br><br>Used only for one time periods.<br><br>The given value will be rounded down to minutes.  |
| start_time      | integer   | Default: current date.<br>Time of day when the maintenance starts in seconds.<br><br>Used for daily, weekly and monthly periods.<br><br>The given value will be rounded down to minutes.<br><br>Default: 0. |

| Property  | Type    | Description  |
|-----------|---------|--|
| every     | integer | <p>Used for daily, weekly and monthly periods.</p> <p>For daily and weekly periods every defines day or week intervals at which the maintenance must come into effect.</p> <p>Default: 1.</p> <p>For monthly periods, if dayofweek property contains at least one selected day of week, the every property defines the week of the month when the maintenance must come into effect.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>1 - (<i>default</i>) first week;</li> <li>2 - second week;</li> <li>3 - third week;</li> <li>4 - fourth week;</li> <li>5 - last week.</li> </ul> |
| dayofweek | integer | <p>Days of the week when the maintenance must come into effect.</p> <p>Possible bitmap values are:</p> <ul style="list-style-type: none"> <li>1 - Monday;</li> <li>2 - Tuesday;</li> <li>4 - Wednesday;</li> <li>8 - Thursday;</li> <li>16 - Friday;</li> <li>32 - Saturday;</li> <li>64 - Sunday.</li> </ul> <p>This is a bitmask field; any sum of possible bitmap values is acceptable (for example, 21 for Monday, Wednesday, and Friday).</p> <p>Used for weekly and monthly time periods. Required only for weekly time periods.</p>   |
| day       | integer | <p>At least one dayofweek or day must be specified for monthly time periods.</p> <p>Day of the month when the maintenance must come into effect.</p> <p>Used only for monthly time periods.</p> <p>At least one dayofweek or day must be specified for monthly time periods.</p>   |

| Property | Type    | Description  |
|----------|---------|--|
| month    | integer | <p>Months when the maintenance must come into effect.</p> <p>Possible bitmap values are:</p> <p>1 - January;<br/> 2 - February;<br/> 4 - March;<br/> 8 - April;<br/> 16 - May;<br/> 32 - June;<br/> 64 - July;<br/> 128 - August;<br/> 256 - September;<br/> 512 - October;<br/> 1024 - November;<br/> 2048 - December.</p> <p>This is a bitmask field; any sum of possible bitmap values is acceptable (for example, 585 for January, April, July, and October).</p> <p>Required only for monthly time periods.</p> |

#### Problem tag

The problem tag object is used to define which problems must be suppressed when the maintenance comes into effect. It has the following properties.

| Property                 | Type    | Description   |
|--------------------------|---------|---|
| <b>tag</b><br>(required) | string  | Problem tag name.   |
| operator                 | integer | <p>Condition operator.</p> <p>Possible values:<br/> 0 - Equals;<br/> 2 - <i>(default)</i> Contains.</p> |
| value                    | string  | Problem tag value.  |

Tags can only be specified for maintenance periods with data collection ("maintenance\_type":0).

### **maintenance.create**

#### Description

object maintenance.create(object/array maintenances)

This method allows to create new maintenances.

#### **Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object/array) Maintenances to create.

Additionally to the [standard maintenance properties](#), the method accepts the following parameters.

| Parameter                        | Type         | Description   |
|----------------------------------|--------------|---|
| groups                           | object/array | Host <b>groups</b> that will undergo maintenance.<br><br>The host groups must have the <code>groupid</code> property defined.   |
| hosts                            | object/array | At least one object of <code>groups</code> or <code>hosts</code> must be specified.<br><b>Hosts</b> that will undergo maintenance.<br><br>The hosts must have the <code>hostid</code> property defined. |
| <b>timeperiods</b><br>(required) | object/array | At least one object of <code>groups</code> or <code>hosts</code> must be specified.<br>Maintenance <b>time periods</b> .  |
| tags                             | object/array | <b>Problem tags</b> .<br><br>Define what problems must be suppressed.<br>If no tags are given, all active maintenance host problems will be suppressed.   |
| groupids<br>(deprecated)         | array        | This parameter is deprecated, please use <code>groups</code> instead.<br>IDs of the host groups that will undergo maintenance.  |
| hostids<br>(deprecated)          | array        | This parameter is deprecated, please use <code>hosts</code> instead.<br>IDs of the hosts that will undergo maintenance.   |

#### Return values

(object) Returns an object containing the IDs of the created maintenances under the `maintenanceids` property. The order of the returned IDs matches the order of the passed maintenances.

#### Examples

##### Creating a maintenance

Create a maintenance with data collection for host group with ID "2" and with problem tags **service:mysql** and **error**. It must be active from 22.01.2013 till 22.01.2014, come in effect each Sunday at 18:00 and last for one hour.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "maintenance.create",
  "params": {
    "name": "Sunday maintenance",
    "active_since": 1358844540,
    "active_till": 1390466940,
    "tags_evaltype": 0,
    "groups": [
      {"groupid": "2"}
    ],
    "timeperiods": [
      {
        "period": 3600,
        "timeperiod_type": 3,
        "start_time": 64800,
        "every": 1,
        "dayofweek": 64
      }
    ],
    "tags": [
      {
        "tag": "service",
        "operator": "0",
        "value": "mysqld"
      },
      {
        "tag": "error",
```

```

        "operator": "2",
        "value": ""
    }
],
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "maintenanceids": [
            "3"
        ]
    },
    "id": 1
}

```

See also

- [Time period](#)

Source

CMaintenance::create() in *ui/include/classes/api/services/CMaintenance.php*.

## **maintenance.delete**

Description

object maintenance.delete(array maintenanceIds)

This method allows to delete maintenance periods.

### **Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the maintenance periods to delete.

Return values

(object) Returns an object containing the IDs of the deleted maintenance periods under the `maintenanceids` property.

Examples

Deleting multiple maintenance periods

Delete two maintenance periods.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "maintenance.delete",
    "params": [
        "3",
        "1"
    ],
    "auth": "3a57200802b24cda67c4e4010b50c065",
    "id": 1
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "maintenanceids": [
      "3",
      "1"
    ]
  },
  "id": 1
}
```

Source

CMaintenance::delete() in *ui/include/classes/api/services/CMaintenance.php*.

## maintenance.get

Description

integer/array maintenance.get(object parameters)

The method allows to retrieve maintenances according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| groupids               | string/array | Return only maintenances that are assigned to the given host groups.   |
| hostids                | string/array | Return only maintenances that are assigned to the given hosts.   |
| maintenanceids         | string/array | Return only maintenances with the given IDs.   |
| selectGroups           | query        | Return a <b>groups</b> property with host groups assigned to the maintenance.  |
| selectHosts            | query        | Return a <b>hosts</b> property with hosts assigned to the maintenance.   |
| selectTags             | query        | Return a <b>tags</b> property with problem tags of the maintenance.  |
| selectTimeperiods      | query        | Return a <b>timeperiods</b> property with time periods of the maintenance.   |
| sortfield              | string/array | Sort the result by the given properties.   |
| countOutput            | boolean      | Possible values are: <code>maintenanceid</code> , <code>name</code> and <code>maintenance_type</code> . These parameters are described in the <a href="#">reference commentary</a> . |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.



## Examples

### Retrieving maintenances

Retrieve all configured maintenances, and the data about the assigned host groups, defined time periods and problem tags.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "maintenance.get",
  "params": {
    "output": "extend",
    "selectGroups": "extend",
    "selectTimeperiods": "extend",
    "selectTags": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "maintenanceid": "3",
      "name": "Sunday maintenance",
      "maintenance_type": "0",
      "description": "",
      "active_since": "1358844540",
      "active_till": "1390466940",
      "tags_evaltype": "0",
      "groups": [
        {
          "groupid": "4",
          "name": "Zabbix servers",
          "internal": "0"
        }
      ],
      "timeperiods": [
        {
          "timeperiod_type": "3",
          "every": "1",
          "month": "0",
          "dayofweek": "1",
          "day": "0",
          "start_time": "64800",
          "period": "3600",
          "start_date": "2147483647"
        }
      ],
      "tags": [
        {
          "tag": "service",
          "operator": "0",
          "value": "mysqld",
        },
        {
          "tag": "error",
          "operator": "2",
          "value": ""
        }
      ]
    }
  ]
}
```

```
],
  "id": 1
}
```

See also

- [Host](#)
- [Host group](#)
- [Time period](#)

Source

CMaintenance::get() in *ui/include/classes/api/services/CMaintenance.php*.

## **maintenance.update**

Description

object maintenance.update(object/array maintenances)

This method allows to update existing maintenances.

### **Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Maintenance properties to be updated.

The `maintenanceid` property must be defined for each maintenance, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard maintenance properties](#), the method accepts the following parameters.

| Parameter                | Type         | Description   |
|--------------------------|--------------|---|
| groups                   | object/array | Host <a href="#">groups</a> to replace the current groups.  |
| hosts                    | object/array | The host groups must have the <code>groupid</code> property defined.<br><a href="#">Hosts</a> to replace the current hosts.               |
| timeperiods              | object/array | The hosts must have the <code>hostid</code> property defined.<br>Maintenance <a href="#">time periods</a> to replace the current periods. |
| tags                     | object/array | <a href="#">Problem tags</a> to replace the current tags.   |
| groupids<br>(deprecated) | array        | This parameter is deprecated, please use <code>groups</code> instead.<br>IDs of the host groups that will undergo maintenance.            |
| hostids<br>(deprecated)  | array        | This parameter is deprecated, please use <code>hosts</code> instead.<br>IDs of the hosts that will undergo maintenance.                   |

### **Attention:**

At least one host or host group must be defined for each maintenance.

Return values

(object) Returns an object containing the IDs of the updated maintenances under the `maintenanceids` property.

Examples

Assigning different hosts

Replace the hosts currently assigned to maintenance with two different ones.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "maintenance.update",
  "params": {
    "maintenanceid": "3",
    "hosts": [
      {"hostid": "10085"},
      {"hostid": "10084"}
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "maintenanceids": [
      "3"
    ]
  },
  "id": 1
}
```

See also

- [Time period](#)

Source

CMaintenance::update() in *ui/include/classes/api/services/CMaintenance.php*.

## Map

This class is designed to work with maps.

Object references:

- [Map](#)
- [Map element](#)
- [Map link](#)
- [Map URL](#)
- [Map user](#)
- [Map user group](#)
- [Map shape](#)
- [Map line](#)

Available methods:

- [map.create](#) - create new maps
- [map.delete](#) - delete maps
- [map.get](#) - retrieve maps
- [map.update](#) - update maps

## > Map object

The following objects are directly related to the map API.

Map

The map object has the following properties.

| Property                    | Type    | Description  |
|-----------------------------|---------|--|
| sysmapid                    | string  | ( <i>readonly</i> ) ID of the map.   |
| <b>height</b><br>(required) | integer | Height of the map in pixels.   |
| <b>name</b><br>(required)   | string  | Name of the map.   |
| <b>width</b><br>(required)  | integer | Width of the map in pixels.  |
| backgroundid                | string  | ID of the image used as the background for the map.  |
| expand_macros               | integer | Whether to expand macros in labels when configuring the map.<br><br>Possible values:<br>0 - ( <i>default</i> ) do not expand macros;<br>1 - expand macros.   |
| expandproblem               | integer | Whether the problem trigger will be displayed for elements with a single problem.<br><br>Possible values:<br>0 - always display the number of problems;<br>1 - ( <i>default</i> ) display the problem trigger if there's only one problem. |
| grid_align                  | integer | Whether to enable grid aligning.<br><br>Possible values:<br>0 - disable grid aligning;<br>1 - ( <i>default</i> ) enable grid aligning.   |
| grid_show                   | integer | Whether to show the grid on the map.<br><br>Possible values:<br>0 - do not show the grid;<br>1 - ( <i>default</i> ) show the grid.   |
| grid_size                   | integer | Size of the map grid in pixels.<br><br>Supported values: 20, 40, 50, 75 and 100.   |
| highlight                   | integer | Default: 50.<br>Whether icon highlighting is enabled.<br><br>Possible values:<br>0 - highlighting disabled;<br>1 - ( <i>default</i> ) highlighting enabled.  |
| iconmapid                   | string  | ID of the icon map used on the map.  |
| label_format                | integer | Whether to enable advanced labels.<br><br>Possible values:<br>0 - ( <i>default</i> ) disable advanced labels;<br>1 - enable advanced labels.   |
| label_location              | integer | Location of the map element label.<br><br>Possible values:<br>0 - ( <i>default</i> ) bottom;<br>1 - left;<br>2 - right;<br>3 - top.  |
| label_string_host           | string  | Custom label for host elements.  |
| label_string_hostgroup      | string  | Required for maps with custom host label type.<br>Custom label for host group elements.  |
| label_string_image          | string  | Required for maps with custom host group label type.<br>Custom label for image elements.<br><br>Required for maps with custom image label type.  |

| Property             | Type    | Description   |
|----------------------|---------|---|
| label_string_map     | string  | Custom label for map elements.  |
| label_string_trigger | string  | Required for maps with custom map label type.<br>Custom label for trigger elements.   |
| label_type           | integer | Required for maps with custom trigger label type.<br>Map element label type.<br><br>Possible values:<br>0 - label;<br>1 - IP address;<br>2 - ( <i>default</i> ) element name;<br>3 - status only;<br>4 - nothing. |
| label_type_host      | integer | Label type for host elements.<br><br>Possible values:<br>0 - label;<br>1 - IP address;<br>2 - ( <i>default</i> ) element name;<br>3 - status only;<br>4 - nothing;  |
| label_type_hostgroup | integer | Label type for host group elements.<br><br>Possible values:<br>0 - label;<br>2 - ( <i>default</i> ) element name;<br>3 - status only;<br>4 - nothing;<br>5 - custom.  |
| label_type_image     | integer | Label type for host group elements.<br><br>Possible values:<br>0 - label;<br>2 - ( <i>default</i> ) element name;<br>4 - nothing;<br>5 - custom.  |
| label_type_map       | integer | Label type for map elements.<br><br>Possible values:<br>0 - label;<br>2 - ( <i>default</i> ) element name;<br>3 - status only;<br>4 - nothing;<br>5 - custom.   |
| label_type_trigger   | integer | Label type for trigger elements.<br><br>Possible values:<br>0 - label;<br>2 - ( <i>default</i> ) element name;<br>3 - status only;<br>4 - nothing;<br>5 - custom.   |
| markelements         | integer | Whether to highlight map elements that have recently changed their status.<br><br>Possible values:<br>0 - ( <i>default</i> ) do not highlight elements;<br>1 - highlight elements.                                |

| Property        | Type    | Description  |
|-----------------|---------|--|
| severity_min    | integer | Minimum severity of the triggers that will be displayed on the map.  |
| show_unack      | integer | Refer to the <b>trigger "severity" property</b> for a list of supported trigger severities.<br>How problems should be displayed.<br><br>Possible values:<br>0 - <i>(default)</i> display the count of all problems;<br>1 - display only the count of unacknowledged problems;<br>2 - display the count of acknowledged and unacknowledged problems separately. |
| userid          | string  | Map owner user ID.   |
| private         | integer | Type of map sharing.<br><br>Possible values:<br>0 - public map;<br>1 - <i>(default)</i> private map.   |
| show_suppressed | integer | Whether suppressed problems are shown.<br><br>Possible values:<br>0 - <i>(default)</i> hide suppressed problems;<br>1 - show suppressed problems.  |

Note that for some methods (update, delete) the required/optional parameter combination is different.

#### Map element

The map element object defines an object displayed on a map. It has the following properties.

| Property                         | Type    | Description   |
|----------------------------------|---------|---|
| selementid                       | string  | <i>(readonly)</i> ID of the map element.  |
| <b>elements</b><br>(required)    | array   | Element data object. Required for host, host group, trigger and map type elements.  |
| <b>elementtype</b><br>(required) | integer | Type of map element.<br><br>Possible values:<br>0 - host;<br>1 - map;<br>2 - trigger;<br>3 - host group;<br>4 - image.  |
| <b>iconid_off</b><br>(required)  | string  | ID of the image used to display the element in default state.   |
| areatype                         | integer | How separate host group hosts should be displayed.<br><br>Possible values:<br>0 - <i>(default)</i> the host group element will take up the whole map;<br>1 - the host group element will have a fixed size. |
| elementsubtype                   | integer | How a host group element should be displayed on a map.<br><br>Possible values:<br>0 - <i>(default)</i> display the host group as a single element;<br>1 - display each host in the group separately.        |
| evaltype                         | integer | Map element tag filtering condition evaluation method.<br><br>Possible values:<br>0 - <i>(default)</i> AND / OR;<br>2 - OR.   |
| height                           | integer | Height of the fixed size host group element in pixels.<br><br>Default: 200.   |

| Property           | Type    | Description   |
|--------------------|---------|---|
| iconid_disabled    | string  | ID of the image used to display disabled map elements. Unused for image elements.   |
| iconid_maintenance | string  | ID of the image used to display map elements in maintenance. Unused for image elements.   |
| iconid_on          | string  | ID of the image used to display map elements with problems. Unused for image elements.  |
| label              | string  | Label of the element.   |
| label_location     | integer | Location of the map element label.<br><br>Possible values:<br>-1 - <i>(default)</i> default location;<br>0 - bottom;<br>1 - left;<br>2 - right;<br>3 - top.   |
| permission         | integer | Type of permission level.<br><br>Possible values:<br>-1 - none;<br>2 - read only;<br>3 - read-write.  |
| sysmapid           | string  | <i>(readonly)</i> ID of the map that the element belongs to.  |
| urls               | array   | Map element URLs.   |
| use_iconmap        | integer | The map element URL object is <b>described in detail below</b> . Whether icon mapping must be used for host elements.<br><br>Possible values:<br>0 - do not use icon mapping;<br>1 - <i>(default)</i> use icon mapping. |
| viewtype           | integer | Host group element placing algorithm.<br><br>Possible values:<br>0 - <i>(default)</i> grid.   |
| width              | integer | Width of the fixed size host group element in pixels.   |
| x                  | integer | Default: 200.<br>X-coordinates of the element in pixels.  |
| y                  | integer | Default: 0.<br>Y-coordinates of the element in pixels.  |
|                    |         | Default: 0.   |

#### Map element Host

The map element Host object defines one host element.

| Property | Type   | Description |
|----------|--------|-------------|
| hostid   | string | Host ID     |

#### Map element Host group

The map element Host group object defines one host group element.

| Property | Type   | Description   |
|----------|--------|---------------|
| groupid  | string | Host group ID |

#### Map element Map

The map element Map object defines one map element.

| Property | Type   | Description |
|----------|--------|-------------|
| sysmapid | string | Map ID      |

#### Map element Trigger

The map element Trigger object defines one or more trigger elements.

| Property  | Type   | Description |
|-----------|--------|-------------|
| triggerid | string | Trigger ID  |

#### Map element tag

The map element tag object has the following properties.

| Property                 | Type    | Description  |
|--------------------------|---------|--|
| <b>tag</b><br>(required) | string  | Map element tag name.  |
| operator                 | integer | Map element tag condition operator.<br><br>Possible values:<br>0 - <i>(default)</i> Contains;<br>1 - Equals;<br>2 - Does not contain;<br>3 - Does not equal;<br>4 - Exists;<br>5 - Does not exist. |
| value                    | string  | Map element tag value.   |

#### Map element URL

The map element URL object defines a clickable link that will be available for a specific map element. It has the following properties:

| Property                  | Type   | Description                                    |
|---------------------------|--------|--|
| sysmapelementurlid        | string | <i>(readonly)</i> ID of the map element URL.   |
| <b>name</b><br>(required) | string | Link caption.                                  |
| <b>url</b><br>(required)  | string | Link URL.                                      |
| selementid                | string | ID of the map element that the URL belongs to. |

#### Map link

The map link object defines a link between two map elements. It has the following properties.

| Property                         | Type   | Description   |
|----------------------------------|--------|---|
| linkid                           | string | <i>(readonly)</i> ID of the map link.                           |
| <b>selementid1</b><br>(required) | string | ID of the first map element linked on one end.                  |
| <b>selementid2</b><br>(required) | string | ID of the first map element linked on the other end.            |
| color                            | string | Line color as a hexadecimal color code.<br><br>Default: 000000. |



| Property     | Type    | Description   |
|--------------|---------|---|
| drawtype     | integer | Link line draw style.<br><br>Possible values:<br>0 - <i>(default)</i> line;<br>2 - bold line;<br>3 - dotted line;<br>4 - dashed line.                                     |
| label        | string  | Link label.   |
| linktriggers | array   | Map link triggers to use as link status indicators.   |
| permission   | integer | The map link trigger object is <b>described in detail below</b> .<br>Type of permission level.<br><br>Possible values:<br>-1 - none;<br>2 - read only;<br>3 - read-write. |
| sysmapid     | string  | ID of the map the link belongs to.  |

#### Map link trigger

The map link trigger object defines a map link status indicator based on the state of a trigger. It has the following properties:

| Property                       | Type    | Description   |
|--------------------------------|---------|---|
| linktriggerid                  | string  | <i>(readonly)</i> ID of the map link trigger.   |
| <b>triggerid</b><br>(required) | string  | ID of the trigger used as a link indicator.   |
| color                          | string  | Indicator color as a hexadecimal color code.  |
| drawtype                       | integer | Default: DD0000.<br>Indicator draw style.<br><br>Possible values:<br>0 - <i>(default)</i> line;<br>2 - bold line;<br>3 - dotted line;<br>4 - dashed line. |
| linkid                         | string  | ID of the map link that the link trigger belongs to.  |

#### Map URL

The map URL object defines a clickable link that will be available for all elements of a specific type on the map. It has the following properties:

| Property                  | Type    | Description  |
|---------------------------|---------|--|
| sysmapurlid               | string  | <i>(readonly)</i> ID of the map URL.   |
| <b>name</b><br>(required) | string  | Link caption.  |
| <b>url</b><br>(required)  | string  | Link URL.  |
| elementtype               | integer | Type of map element for which the URL will be available.<br><br>Refer to the <b>map element "type" property</b> for a list of supported types. |
| sysmapid                  | string  | Default: 0.<br>ID of the map that the URL belongs to.  |

#### Map user

List of map permissions based on users. It has the following properties:

| Property                        | Type    | Description  |
|---------------------------------|---------|--|
| sysmapuserid                    | string  | ( <i>readonly</i> ) ID of the map user.  |
| <b>userid</b><br>(required)     | string  | User ID.   |
| <b>permission</b><br>(required) | integer | Type of permission level.<br><br>Possible values:<br>2 - read only;<br>3 - read-write; |

#### Map user group

List of map permissions based on user groups. It has the following properties:

| Property                        | Type    | Description  |
|---------------------------------|---------|--|
| sysmapusrgrpid                  | string  | ( <i>readonly</i> ) ID of the map user group.  |
| <b>usrgrpid</b><br>(required)   | string  | User group ID.   |
| <b>permission</b><br>(required) | integer | Type of permission level.<br><br>Possible values:<br>2 - read only;<br>3 - read-write; |

#### Map shapes

The map shape object defines a geometric shape (with or without text) displayed on a map. It has the following properties:

| Property               | Type    | Description  |
|------------------------|---------|--|
| sysmap_shapeid         | string  | ( <i>readonly</i> ) ID of the map shape element.   |
| <b>type</b> (required) | integer | Type of map shape element.<br><br>Possible values:<br>0 - rectangle;<br>1 - ellipse.       |
| x                      | integer | Property is required when new shapes are created.<br>X-coordinates of the shape in pixels. |
| y                      | integer | Default: 0.<br>Y-coordinates of the shape in pixels.                                       |
| width                  | integer | Default: 0.<br>Width of the shape in pixels.   |
| height                 | integer | Default: 200.<br>Height of the shape in pixels.  |
| text                   | string  | Default: 200.<br>Text of the shape.  |

| Property         | Type    | Description   |
|------------------|---------|---|
| font             | integer | Font of the text within shape.<br><br>Possible values:<br>0 - Georgia, serif<br>1 - "Palatino Linotype", "Book Antiqua", Palatino, serif<br>2 - "Times New Roman", Times, serif<br>3 - Arial, Helvetica, sans-serif<br>4 - "Arial Black", Gadget, sans-serif<br>5 - "Comic Sans MS", cursive, sans-serif<br>6 - Impact, Charcoal, sans-serif<br>7 - "Lucida Sans Unicode", "Lucida Grande", sans-serif<br>8 - Tahoma, Geneva, sans-serif<br>9 - "Trebuchet MS", Helvetica, sans-serif<br>10 - Verdana, Geneva, sans-serif<br>11 - "Courier New", Courier, monospace<br>12 - "Lucida Console", Monaco, monospace |
| font_size        | integer | Default: 9.<br>Font size in pixels.   |
| font_color       | string  | Default: 11.<br>Font color.   |
| text_halign      | integer | Default: '000000'.<br>Horizontal alignment of text.<br><br>Possible values:<br>0 - center;<br>1 - left;<br>2 - right.   |
| text_valign      | integer | Default: 0.<br>Vertical alignment of text.<br><br>Possible values:<br>0 - middle;<br>1 - top;<br>2 - bottom.  |
| border_type      | integer | Default: 0.<br>Type of the border.<br><br>Possible values:<br>0 - none;<br>1 - _____;<br>2 - - - -;<br>3 - - - - -.   |
| border_width     | integer | Default: 0.<br>Width of the border in pixels.   |
| border_color     | string  | Default: 0.<br>Border color.  |
| background_color | string  | Default: '000000'.<br>Background color (fill color).  |
| zindex           | integer | Default: (empty).<br>Value used to order all shapes and lines (z-index).<br><br>Default: 0.   |

## Map lines

The map line object defines a line displayed on a map. It has the following properties:

| Property       | Type    | Description  |
|----------------|---------|--|
| sysmap_shapeid | string  | ( <i>readonly</i> ) ID of the map shape element.   |
| x1             | integer | X-coordinates of the line point 1 in pixels.   |
| y1             | integer | Default: 0.<br>Y-coordinates of the line point 1 in pixels.  |
| x2             | integer | Default: 0.<br>X-coordinates of the line point 2 in pixels.  |
| y2             | integer | Default: 200.<br>Y-coordinates of the line point 2 in pixels.  |
| line_type      | integer | Default: 200.<br>Type of the lines.<br><br>Possible values:<br>0 - none;<br>1 - _____;<br>2 - - - -;<br>3 - - - - -. |
| line_width     | integer | Default: 0.<br>Width of the lines in pixels.   |
| line_color     | string  | Default: 0.<br>Line color.   |
| zindex         | integer | Default: '000000'.<br>Value used to order all shapes and lines (z-index).  |
|                |         | Default: 0.  |

## map.create

### Description

`object map.create(object/array maps)`

This method allows to create new maps.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Maps to create.

Additionally to the [standard map properties](#), the method accepts the following parameters.

| Parameter  | Type  | Description   |
|------------|-------|---|
| links      | array | Map <a href="#">links</a> to be created on the map.             |
| selements  | array | Map <a href="#">elements</a> to be created on the map.          |
| urls       | array | Map <a href="#">URLs</a> to be created on the map.              |
| users      | array | Map <a href="#">user</a> shares to be created on the map.       |
| userGroups | array | Map <a href="#">user group</a> shares to be created on the map. |
| shapes     | array | Map <a href="#">shapes</a> to be created on the map.            |

| Parameter | Type  | Description                                |
|-----------|-------|--|
| lines     | array | Map <b>lines</b> to be created on the map. |

#### Note:

To create map links you'll need to set a map element `selementid` to an arbitrary value and then use this value to reference this element in the links `selementid1` or `selementid2` properties. When the element is created, this value will be replaced with the correct ID generated by Zabbix. [See example.](#)

#### Return values

(object) Returns an object containing the IDs of the created maps under the `sysmapids` property. The order of the returned IDs matches the order of the passed maps.

#### Examples

Create an empty map

Create a map with no elements.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.create",
  "params": {
    "name": "Map",
    "width": 600,
    "height": 600
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "8"
    ]
  },
  "id": 1
}
```

Create a host map

Create a map with two host elements and a link between them. Note the use of temporary `"selementid1"` and `"selementid2"` values in the map link object to refer to map elements.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.create",
  "params": {
    "name": "Host map",
    "width": 600,
    "height": 600,
    "selements": [
      {
        "selementid": "1",
        "elements": [
          {"hostid": "1033"}
        ]
      },
      {
        "selementid": "2",
        "elements": [
          {"hostid": "1033"}
        ]
      }
    ],
    "elementtype": 0,
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

```

        "iconid_off": "2"
      },
      {
        "selementid": "2",
        "elements": [
          {"hostid": "1037"}
        ],
        "elementtype": 0,
        "iconid_off": "2"
      }
    ],
    "links": [
      {
        "selementid1": "1",
        "selementid2": "2"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "9"
    ]
  },
  "id": 1
}

```

Create a trigger map

Create a map with trigger element, which contains two triggers.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "map.create",
  "params": {
    "name": "Trigger map",
    "width": 600,
    "height": 600,
    "selements": [
      {
        "elements": [
          {"triggerid": "12345"},
          {"triggerid": "67890"}
        ],
        "elementtype": 2,
        "iconid_off": "2"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "10"
    ]
  },
  "id": 1
}
```

### Map sharing

Create a map with two types of sharing (user and user group).

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.create",
  "params": {
    "name": "Map sharing",
    "width": 600,
    "height": 600,
    "users": [
      {
        "userid": "4",
        "permission": "3"
      }
    ],
    "userGroups": [
      {
        "usrgrpid": "7",
        "permission": "2"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "9"
    ]
  },
  "id": 1
}
```

### Map shapes

Create a map with map name title.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.create",
  "params": {
    "name": "Host map",
    "width": 600,
    "height": 600,
    "shapes": [
      {

```

```

        "type": 0,
        "x": 0,
        "y": 0,
        "width": 600,
        "height": 11,
        "text": "{MAP.NAME}"
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "10"
    ]
  },
  "id": 1
}

```

Map lines

Create a map line.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "map.create",
  "params": {
    "name": "Map API lines",
    "width": 500,
    "height": 500,
    "lines": [
      {
        "x1": 30,
        "y1": 10,
        "x2": 100,
        "y2": 50,
        "line_type": 1,
        "line_width": 10,
        "line_color": "009900"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "11"
    ]
  },
  "id": 1
}

```



See also

- [Map element](#)
- [Map link](#)
- [Map URL](#)
- [Map user](#)
- [Map user group](#)
- [Map shape](#)
- [Map line](#)

Source

CMap::create() in *ui/include/classes/api/services/CMap.php*.

### map.delete

Description

object map.delete(array mapIds)

This method allows to delete maps.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the maps to delete.

Return values

(object) Returns an object containing the IDs of the deleted maps under the `sysmapids` property.

Examples

Delete multiple maps

Delete two maps.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.delete",
  "params": [
    "12",
    "34"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "12",
      "34"
    ]
  },
  "id": 1
}
```

Source

CMap::delete() in *ui/include/classes/api/services/CMap.php*.

## map.get

### Description

integer/array map.get(object parameters)

The method allows to retrieve maps according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| sysmapids              | string/array | Returns only maps with the given IDs.  |
| userids                | string/array | Returns only maps that belong to the given user IDs.   |
| expandUrls             | flag         | Adds global map URLs to the corresponding map elements and expands macros in all map element URLs. |
| selectIconMap          | query        | Returns an <b>iconmap</b> property with the icon map used on the map.                              |
| selectLinks            | query        | Returns a <b>links</b> property with the map links between elements.                               |
| selectSelements        | query        | Returns a <b>selements</b> property with the map elements.   |
| selectUrls             | query        | Returns a <b>urls</b> property with the map URLs.  |
| selectUsers            | query        | Returns a <b>users</b> property with users that the map is shared with.                            |
| selectUserGroups       | query        | Returns a <b>userGroups</b> property with user groups that the map is shared with.                 |
| selectShapes           | query        | Returns a <b>shapes</b> property with the map shapes.  |
| selectLines            | query        | Returns a <b>lines</b> property with the map lines.  |
| sortfield              | string/array | Sort the result by the given properties.   |
|                        |              | Possible values are: <b>name</b> , <b>width</b> and <b>height</b> .                                |
| countOutput            | boolean      | These parameters are described in the <a href="#">reference commentary</a> .                       |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the **countOutput** parameter has been used.

### Examples

Retrieve a map

Retrieve all data about map "3".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.get",
```

```

"params": {
  "output": "extend",
  "selectSelements": "extend",
  "selectLinks": "extend",
  "selectUsers": "extend",
  "selectUserGroups": "extend",
  "selectShapes": "extend",
  "selectLines": "extend",
  "sysmapids": "3"
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "selements": [
        {
          "selementid": "10",
          "sysmapid": "3",
          "elementtype": "4",
          "evaltype": "0",
          "iconid_off": "1",
          "iconid_on": "0",
          "label": "Zabbix server",
          "label_location": "3",
          "x": "11",
          "y": "141",
          "iconid_disabled": "0",
          "iconid_maintenance": "0",
          "elementsubtype": "0",
          "areatype": "0",
          "width": "200",
          "height": "200",
          "tags": [
            {
              "tag": "service",
              "value": "mysqld",
              "operator": "0"
            }
          ],
          "viewtype": "0",
          "use_iconmap": "1",
          "urls": [],
          "elements": []
        },
        {
          "selementid": "11",
          "sysmapid": "3",
          "elementtype": "4",
          "evaltype": "0",
          "iconid_off": "1",
          "iconid_on": "0",
          "label": "Web server",
          "label_location": "3",
          "x": "211",
          "y": "191",
          "iconid_disabled": "0",
          "iconid_maintenance": "0",

```

```

        "elementsubtype": "0",
        "areatype": "0",
        "width": "200",
        "height": "200",
        "viewtype": "0",
        "use_iconmap": "1",
        "tags": [],
        "urls": [],
        "elements": []
    },
    {
        "selementid": "12",
        "sysmapid": "3",
        "elementtype": "0",
        "evaltype": "0",
        "iconid_off": "185",
        "iconid_on": "0",
        "label": "{HOST.NAME}\\r\\n{HOST.CONN}",
        "label_location": "0",
        "x": "111",
        "y": "61",
        "iconid_disabled": "0",
        "iconid_maintenance": "0",
        "elementsubtype": "0",
        "areatype": "0",
        "width": "200",
        "height": "200",
        "viewtype": "0",
        "use_iconmap": "0",
        "tags": [],
        "urls": [],
        "elements": [
            {
                "hostid": "10084"
            }
        ]
    }
],
"links": [
    {
        "linkid": "23",
        "sysmapid": "3",
        "selementid1": "10",
        "selementid2": "11",
        "drawtype": "0",
        "color": "00CC00",
        "label": "",
        "linktriggers": []
    }
],
"users": [
    {
        "sysmapuserid": "1",
        "userid": "2",
        "permission": "2"
    }
],
"userGroups": [
    {
        "sysmapusrgrpid": "1",
        "usrgrpid": "7",
        "permission": "2"
    }
]

```

```

    }
  ],
  "shapes": [
    {
      "sysmap_shapeid": "1",
      "type": "0",
      "x": "0",
      "y": "0",
      "width": "680",
      "height": "15",
      "text": "{MAP.NAME}",
      "font": "9",
      "font_size": "11",
      "font_color": "000000",
      "text_halign": "0",
      "text_valign": "0",
      "border_type": "0",
      "border_width": "0",
      "border_color": "000000",
      "background_color": "",
      "zindex": "0"
    }
  ],
  "lines": [
    {
      "sysmap_shapeid": "2",
      "x1": 30,
      "y1": 10,
      "x2": 100,
      "y2": 50,
      "line_type": 1,
      "line_width": 10,
      "line_color": "009900",
      "zindex": "1"
    }
  ],
  "sysmapid": "3",
  "name": "Local network",
  "width": "400",
  "height": "400",
  "backgroundid": "0",
  "label_type": "2",
  "label_location": "3",
  "highlight": "1",
  "expandproblem": "1",
  "markelements": "0",
  "show_unack": "0",
  "grid_size": "50",
  "grid_show": "1",
  "grid_align": "1",
  "label_format": "0",
  "label_type_host": "2",
  "label_type_hostgroup": "2",
  "label_type_trigger": "2",
  "label_type_map": "2",
  "label_type_image": "2",
  "label_string_host": "",
  "label_string_hostgroup": "",
  "label_string_trigger": "",
  "label_string_map": "",
  "label_string_image": "",
  "iconmapid": "0",

```

```

        "expand_macros": "0",
        "severity_min": "0",
        "userid": "1",
        "private": "1",
        "show_suppressed": "1"
    }
],
    "id": 1
}

```

See also

- [Icon map](#)
- [Map element](#)
- [Map link](#)
- [Map URL](#)
- [Map user](#)
- [Map user group](#)
- [Map shapes](#)
- [Map lines](#)

Source

CMap::get() in *ui/include/classes/api/services/CMap.php*.

## map.update

Description

object map.update(object/array maps)

This method allows to update existing maps.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Map properties to be updated.

The `mapid` property must be defined for each map, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard map properties](#), the method accepts the following parameters.

| Parameter  | Type  | Description   |
|------------|-------|---|
| links      | array | Map <a href="#">links</a> to replace the existing links.                |
| selements  | array | Map <a href="#">elements</a> to replace the existing elements.          |
| urls       | array | Map <a href="#">URLs</a> to replace the existing URLs.                  |
| users      | array | Map <a href="#">user</a> shares to replace the existing elements.       |
| userGroups | array | Map <a href="#">user group</a> shares to replace the existing elements. |
| shapes     | array | Map <a href="#">shapes</a> to replace the existing shapes.              |
| lines      | array | Map <a href="#">lines</a> to replace the existing lines.                |

### Note:

To create map links between new map elements you'll need to set an element's `selementid` to an arbitrary value and then use this value to reference this element in the `links selementid1` or `selementid2` properties. When the element is created, this value will be replaced with the correct ID generated by Zabbix. [See example for map.create](#).

Return values

(object) Returns an object containing the IDs of the updated maps under the `sysmapids` property.

Examples

## Resize a map

Change the size of the map to 1200x1200 pixels.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.update",
  "params": {
    "sysmapid": "8",
    "width": 1200,
    "height": 1200
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "8"
    ]
  },
  "id": 1
}
```

## Change map owner

Available only for admins and super admins.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "map.update",
  "params": {
    "sysmapid": "9",
    "userid": "1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 2
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "sysmapids": [
      "9"
    ]
  },
  "id": 2
}
```

See also

- [Map element](#)
- [Map link](#)
- [Map URL](#)
- [Map user](#)
- [Map user group](#)
- [Map shapes](#)
- [Map lines](#)

Source

CMap::update() in *ui/include/classes/api/services/CMap.php*.

## Media type

This class is designed to work with media types.

Object references:

- [Media type](#)

Available methods:

- [mediatype.create](#) - creating new media types
- [mediatype.delete](#) - deleting media types
- [mediatype.get](#) - retrieving media types
- [mediatype.update](#) - updating media types

## > Media type object

The following objects are directly related to the mediatype API.

Media type

The media type object has the following properties.

| Property                  | Type    | Description  |
|---------------------------|---------|--|
| mediatypeid               | string  | ( <i>readonly</i> ) ID of the media type.  |
| <b>name</b><br>(required) | string  | Name of the media type.  |
| <b>type</b><br>(required) | integer | Transport used by the media type.<br><br>Possible values:<br>0 - email;<br>1 - script;<br>2 - SMS;<br>4 - Webhook. |
| exec_path                 | string  | For script media types exec_path contains the name of the executed script.   |
| gsm_modem                 | string  | Required for script media types.<br>Serial device name of the GSM modem.   |
| passwd                    | string  | Required for SMS media types.<br>Authentication password.  |
| smtp_email                | string  | Used for email media types.<br>Email address from which notifications will be sent.                                |
| smtp_helo                 | string  | Required for email media types.<br>SMTP HELO.  |
| smtp_server               | string  | Required for email media types.<br>SMTP server.  |
| smtp_port                 | integer | Required for email media types.<br>SMTP server port to connect to.   |



| Property            | Type    | Description  |
|---------------------|---------|--|
| smtp_security       | integer | SMTP connection security level to use.<br><br>Possible values:<br>0 - None;<br>1 - STARTTLS;<br>2 - SSL/TLS.   |
| smtp_verify_host    | integer | SSL verify host for SMTP.<br><br>Possible values:<br>0 - No;<br>1 - Yes.   |
| smtp_verify_peer    | integer | SSL verify peer for SMTP.<br><br>Possible values:<br>0 - No;<br>1 - Yes.   |
| smtp_authentication | integer | SMTP authentication method to use.<br><br>Possible values:<br>0 - None;<br>1 - Normal password.  |
| status              | integer | Whether the media type is enabled.<br><br>Possible values:<br>0 - <i>(default)</i> enabled;<br>1 - disabled.   |
| username            | string  | User name.   |
| exec_params         | string  | Used for email media types.<br>Script parameters.  |
| maxsessions         | integer | Each parameter ends with a new line feed.<br>The maximum number of alerts that can be processed in parallel.<br><br>Possible values for SMS:<br>1 - <i>(default)</i> |
| maxattempts         | integer | Possible values for other media types:<br>0-100<br>The maximum number of attempts to send an alert.<br><br>Possible values:<br>1-100                                 |
| attempt_interval    | string  | Default value:<br>3<br>The interval between retry attempts. Accepts seconds and time unit with suffix.   |
| content_type        | integer | Possible values:<br>0-1h<br>Default value:<br>10s<br>Message format.   |
| script              | text    | Possible values:<br>0 - plain text;<br>1 - <i>(default)</i> html.<br>Media type webhook script javascript body.  |

| Property        | Type    | Description  |
|-----------------|---------|--|
| timeout         | string  | Media type webhook script timeout. Accepts seconds and time unit with suffix.<br><br>Possible values:<br>1-60s<br><br>Default value:<br>30s  |
| process_tags    | integer | Defines should the webhook script response to be interpreted as tags and these tags should be added to associated event.<br><br>Possible values:<br>0 - <i>(default)</i> Ignore webhook script response.<br>1 - Process webhook script response as tags. |
| show_event_menu | integer | Show media type entry in <code>problem.get</code> and <code>event.get</code> property urls.<br><br>Possible values:<br>0 - <i>(default)</i> Do not add urls entry.<br>1 - Add media type to urls property.   |
| event_menu_url  | string  | Define url property of media type entry in urls property of <code>problem.get</code> and <code>event.get</code> .  |
| event_menu_name | string  | Define name property of media type entry in urls property of <code>problem.get</code> and <code>event.get</code> .   |
| parameters      | array   | Array of <b>webhook input parameters</b> .   |
| description     | text    | Media type description.  |

Note that for some methods (update, delete) the required/optional parameter combination is different.

#### Webhook parameters

Parameters passed to webhook script when it is called, have the following properties.

| Property                  | Type   | Description  |
|---------------------------|--------|--|
| <b>name</b><br>(required) | string | Parameter name.  |
| value                     | string | Parameter value, supports macros.<br>Supported macros are described on the <b>Supported macros</b> page. |

#### Message template

The message template object defines a template that will be used as a default message for action operations to send a notification. It has the following properties.

| Property                          | Type    | Description   |
|-----------------------------------|---------|---|
| <b>eventsources</b><br>(required) | integer | Event source.<br><br>Possible values:<br>0 - triggers;<br>1 - discovery;<br>2 - autoregistration;<br>3 - internal;<br>4 - services. |
| <b>recovery</b><br>(required)     | integer | Operation mode.<br><br>Possible values:<br>0 - operations;<br>1 - recovery operations;<br>2 - update operations.                    |
| subject                           | string  | Message subject.  |

| Property | Type   | Description   |
|----------|--------|---------------|
| message  | string | Message text. |

## mediatype.create

### Description

object mediatype.create(object/array mediaTypes)

This method allows to create new media types.

#### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Media types to create.

Additionally to the [standard media type properties](#), the method accepts the following parameters.

| Parameter         | Type  | Description  |
|-------------------|-------|--|
| parameters        | array | <a href="#">Webhook parameters</a> to be created for the media type. |
| message_templates | array | <a href="#">Message templates</a> to be created for the media type.  |

### Return values

(object) Returns an object containing the IDs of the created media types under the `mediatypeids` property. The order of the returned IDs matches the order of the passed media types.

### Examples

#### Creating an e-mail media type

Create a new e-mail media type with a custom SMTP port and message templates.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "mediatype.create",
  "params": {
    "type": "0",
    "name": "E-mail",
    "smtp_server": "mail.example.com",
    "smtp_helo": "example.com",
    "smtp_email": "zabbix@example.com",
    "smtp_port": "587",
    "content_type": "1",
    "message_templates": [
      {
        "eventsourcing": "0",
        "recovery": "0",
        "subject": "Problem: {EVENT.NAME}",
        "message": "Problem \"{EVENT.NAME}\" on host \"{HOST.NAME}\" started at {EVENT.TIME}."
      },
      {
        "eventsourcing": "0",
        "recovery": "1",
        "subject": "Resolved in {EVENT.DURATION}: {EVENT.NAME}",
        "message": "Problem \"{EVENT.NAME}\" on host \"{HOST.NAME}\" has been resolved at {EVENT.TIME}."
      }
    ]
  },
  "id": 1
}
```

```

        "recovery": "2",
        "subject": "Updated problem in {EVENT.AGE}: {EVENT.NAME}",
        "message": "{USER.FULLNAME} {EVENT.UPDATE.ACTION} problem \"{EVENT.NAME}\" on host \"{HOSTNAME}\""
    }
}
],
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "mediatypeids": [
      "7"
    ]
  },
  "id": 1
}

```

Creating a script media type

Create a new script media type with a custom value for the number of attempts and the interval between them.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "mediatype.create",
  "params": {
    "type": "1",
    "name": "Push notifications",
    "exec_path": "push-notification.sh",
    "exec_params": "{ALERT.SENDTO}\n{ALERT.SUBJECT}\n{ALERT.MESSAGE}\n",
    "maxattempts": "5",
    "attempt_interval": "11s"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "mediatypeids": [
      "8"
    ]
  },
  "id": 1
}

```

Creating a webhook media type

Create a new webhook media type.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "mediatype.create",
  "params": {
    "type": "4",
    "name": "Webhook",
    "script": "var Webhook = {\r\n    token: null,\r\n    to: null,\r\n    subject: null,\r\n    messa

```

```

    "parameters": [
      {
        "name": "Message",
        "value": "{ALERT.MESSAGE}"
      },
      {
        "name": "Subject",
        "value": "{ALERT.SUBJECT}"
      },
      {
        "name": "To",
        "value": "{ALERT.SENDTO}"
      },
      {
        "name": "Token",
        "value": "<Token>"
      }
    ],
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
  }
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "mediatypeids": [
      "9"
    ]
  },
  "id": 1
}

```

Source

CMediaType::create() in `ui/include/classes/api/services/CMediaType.php`.

## mediatype.delete

Description

object mediatype.delete(array mediaTypeIds)

This method allows to delete media types.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the media types to delete.

Return values

(object) Returns an object containing the IDs of the deleted media types under the `mediatypeids` property.

Examples

Deleting multiple media types

Delete two media types.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "mediatype.delete",
  "params": [
    "3",
    "5"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "mediatypeids": [
      "3",
      "5"
    ]
  },
  "id": 1
}
```

Source

CMediaType::delete() in `ui/include/classes/api/services/CMediaType.php`.

## mediatype.get

Description

integer/array mediatype.get(object parameters)

The method allows to retrieve media types according to the given parameters.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

### Note:

Since Zabbix 6.0.34, when requesting user-related information of media types, *Admin* type users may retrieve only data about their own user. For an example, see [Retrieving media types as Admin](#).

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| mediatypeids           | string/array | Return only media types with the given IDs.   |
| mediaids               | string/array | Return only media types used by the given <a href="#">media</a> .                         |
| userids                | string/array | Return only media types used by the given users.  |
| selectMessageTemplates | query        | Return a <a href="#">message_templates</a> property with an array of media type messages. |
|                        |              | Since Zabbix 6.0.34, this parameter is supported only for <i>Super admin</i> type users.  |
| selectUsers            | query        | Return a <a href="#">users</a> property with the users that use the media type.           |

See [user.get](#) for restrictions based on user type.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| sortfield              | string/array | Sort the result by the given properties.   |
| filter                 | object       | <p>Possible values are: mediatypeid.</p> <p>Return only those results that exactly match the given filter.</p> <p>Accepts an object, where the keys are property names, and the values are either a single value or an array of values to match against.</p> <p>Does not support properties of text <b>data type</b>.</p>  |
| output                 | query        | <p>Possible <b>Media type object</b> properties for <i>Admin</i> type users (since Zabbix 6.0.34): mediatypeid, name, type, status, maxattempts. <b>Media type object</b> properties to be returned.</p> <p>Since Zabbix 6.0.34, <i>Admin</i> type users may retrieve only the following properties: mediatypeid, name, type, status, maxattempts, description. For an example, see <a href="#">Retrieving media types as Admin</a>.</p> |
| search                 | object       | <p>Default: extend.</p> <p>Return results that match the given pattern (case-insensitive).</p> <p>Accepts an object, where the keys are property names, and the values are strings to search for. If no additional options are given, this will perform a LIKE "%...%" search.</p> <p>Supports only properties of string and text <b>data type</b>.</p>  |
| countOutput            | boolean      | <p>Possible <b>Media type object</b> properties for <i>Admin</i> type users (since Zabbix 6.0.34): name, description.</p> <p>These parameters are described in the <a href="#">reference commentary</a>.</p>   |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| limit                  | integer      |  |
| preservekeys           | boolean      |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving media types

Retrieve all configured media types.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "mediatype.get",
  "params": {
    "output": "extend",
    "selectMessageTemplates": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "mediatypeid": "1",
      "type": "0",
      "name": "Email",
      "smtp_server": "mail.example.com",
      "smtp_helo": "example.com",
      "smtp_email": "zabbix@example.com",
      "exec_path": "",
      "gsm_modem": "",
      "username": "",
      "passwd": "",
      "status": "0",
      "smtp_port": "25",
      "smtp_security": "0",
      "smtp_verify_peer": "0",
      "smtp_verify_host": "0",
      "smtp_authentication": "0",
      "exec_params": "",
      "maxsessions": "1",
      "maxattempts": "3",
      "attempt_interval": "10s",
      "content_type": "0",
      "script": "",
      "timeout": "30s",
      "process_tags": "0",
      "show_event_menu": "1",
      "event_menu_url": "",
      "event_menu_name": "",
      "description": "",
      "message_templates": [
        {
          "eventsourcing": "0",
          "recovery": "0",
          "subject": "Problem: {EVENT.NAME}",
          "message": "Problem started at {EVENT.TIME} on {EVENT.DATE}\r\nProblem name: {EVENT.NAME}"
        },
        {
          "eventsourcing": "0",
          "recovery": "1",
          "subject": "Resolved: {EVENT.NAME}",
          "message": "Problem has been resolved at {EVENT.RECOVERY.TIME} on {EVENT.RECOVERY.DATE}"
        },
        {
          "eventsourcing": "0",
          "recovery": "2",
          "subject": "Updated problem: {EVENT.NAME}",
          "message": "{USER.FULLNAME} {EVENT.UPDATE.ACTION} problem at {EVENT.UPDATE.DATE} {EVENT.NAME}"
        },
        {
          "eventsourcing": "1",
          "recovery": "0",
          "subject": "Discovery: {DISCOVERY.DEVICE.STATUS} {DISCOVERY.DEVICE.IPADDRESS}",
          "message": "Discovery rule: {DISCOVERY.RULE.NAME}\r\n\r\nDevice IP: {DISCOVERY.DEVICE.IPADDRESS}"
        },
        {
          "eventsourcing": "2",
          "recovery": "0",
          "subject": "Autoregistration: {HOST.HOST}",

```



```

        "message": "Host name: {HOST.HOST}\r\nHost IP: {HOST.IP}\r\nAgent port: {HOST.PORT}"
    },
    ],
    "parameters": []
},
{
    "mediatypeid": "3",
    "type": "2",
    "name": "SMS",
    "smtp_server": "",
    "smtp_helo": "",
    "smtp_email": "",
    "exec_path": "",
    "gsm_modem": "/dev/ttyS0",
    "username": "",
    "passwd": "",
    "status": "0",
    "smtp_port": "25",
    "smtp_security": "0",
    "smtp_verify_peer": "0",
    "smtp_verify_host": "0",
    "smtp_authentication": "0",
    "exec_params": "",
    "maxsessions": "1",
    "maxattempts": "3",
    "attempt_interval": "10s",
    "content_type": "1",
    "script": "",
    "timeout": "30s",
    "process_tags": "0",
    "show_event_menu": "1",
    "event_menu_url": "",
    "event_menu_name": "",
    "description": "",
    "message_templates": [
        {
            "eventsourcing": "0",
            "recovery": "0",
            "subject": "",
            "message": "{EVENT.SEVERITY}: {EVENT.NAME}\r\nHost: {HOST.NAME}\r\n{EVENT.DATE} {EVENT.TIME}"
        },
        {
            "eventsourcing": "0",
            "recovery": "1",
            "subject": "",
            "message": "RESOLVED: {EVENT.NAME}\r\nHost: {HOST.NAME}\r\n{EVENT.DATE} {EVENT.TIME}"
        },
        {
            "eventsourcing": "0",
            "recovery": "2",
            "subject": "",
            "message": "{USER.FULLNAME} {EVENT.UPDATE.ACTION} problem at {EVENT.UPDATE.DATE} {EVENT.UPDATE.TIME}"
        },
        {
            "eventsourcing": "1",
            "recovery": "0",
            "subject": "",
            "message": "Discovery: {DISCOVERY.DEVICE.STATUS} {DISCOVERY.DEVICE.IPADDRESS}"
        },
        {
            "eventsourcing": "2",
            "recovery": "0",

```

```

        "subject": "",
        "message": "Autoregistration: {HOST.HOST}\\r\\nHost IP: {HOST.IP}\\r\\nAgent port: {HOST.P
    },
    "parameters": []
},
{id": 1
}

```

Retrieving media types as *Admin*

As an *Admin* type user, retrieve all media types that are enabled, with users that use these media types. The following example returns two media types:

- email media type with one user (since Zabbix 6.0.34, only *Admin* type user's own user);
- SMS media type with no users.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "mediatype.get",
  "params": {
    "output": "extend",
    "filter": {
      "status": 0
    },
    "selectUsers": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "mediatypeid": "1",
      "type": "0",
      "name": "Email",
      "status": "0",
      "description": "",
      "maxattempts": "3",
      "users": [
        {
          "userid": "3",
          "username": "database-admin",
          "name": "John",
          "surname": "Doe",
          "url": "",
          "autologin": "0",
          "autologout": "0",
          "lang": "default",
          "refresh": "30s",
          "theme": "default",
          "attempt_failed": "0",
          "attempt_ip": "",
          "attempt_clock": "0",
          "rows_per_page": "50",
          "timezone": "default",
          "roleid": "2"
        }
      ]
    }
  ]
}

```

```

    },
    {
        "mediatypeid": "3",
        "type": "2",
        "name": "SMS",
        "status": "0",
        "description": "",
        "maxattempts": "3",
        "users": []
    }
],
"id": 1
}

```

See also

- [User](#)

Source

CMediaType::get() in `ui/include/classes/api/services/CMediaType.php`.

## mediatype.update

Description

`object mediatype.update(object/array mediaTypes)`

This method allows to update existing media types.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Media type properties to be updated.

The `mediatypeid` property must be defined for each media type, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard media type properties](#), the method accepts the following parameters.

| Parameter         | Type  | Description   |
|-------------------|-------|---|
| parameters        | array | <a href="#">Webhook parameters</a> to replace the current webhook parameters. |
| message_templates | array | <a href="#">Message templates</a> to replace the current message templates.   |

Return values

(object) Returns an object containing the IDs of the updated media types under the `mediatypeids` property.

Examples

Enabling a media type

Enable a media type, that is, set its status to "0".

Request:

```

{
    "jsonrpc": "2.0",
    "method": "mediatype.update",
    "params": {
        "mediatypeid": "6",
        "status": "0"
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
}

```

```
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "mediatypeids": [
      "6"
    ]
  },
  "id": 1
}
```

Source

CMediaType::update() in *ui/include/classes/api/services/CMediaType.php*.

## Problem

This class is designed to work with problems.

Object references:

- [Problem](#)

Available methods:

- [problem.get](#) - retrieving problems

## > Problem object

The following objects are directly related to the problem API.

Problem

### Note:

Problems are created by the Zabbix server and cannot be modified via the API.

The problem object has the following properties.

| Property | Type    | Description   |
|----------|---------|---|
| eventid  | string  | ID of the problem event.  |
| source   | integer | Type of the problem event.<br><br>Possible values:<br>0 - event created by a trigger;<br>3 - internal event;<br>4 - event created on service status update.   |
| object   | integer | Type of object that is related to the problem event.<br><br>Possible values for trigger events:<br>0 - trigger.<br><br>Possible values for internal events:<br>0 - trigger;<br>4 - item;<br>5 - LLD rule. |
| objectid | string  | Possible values for service events:<br>6 - service.<br>ID of the related object.  |

| Property      | Type      | Description   |
|---------------|-----------|---|
| clock         | timestamp | Time when the problem event was created.  |
| ns            | integer   | Nanoseconds when the problem event was created.   |
| r_eventid     | string    | Recovery event ID.  |
| r_clock       | timestamp | Time when the recovery event was created.   |
| r_ns          | integer   | Nanoseconds when the recovery event was created.  |
| correlationid | string    | Correlation rule ID if this event was recovered by global correlation rule.   |
| userid        | string    | User ID if the problem was manually closed.   |
| name          | string    | Resolved problem name.  |
| acknowledged  | integer   | Acknowledge state for problem.  |
|               |           | Possible values:<br>0 - not acknowledged;<br>1 - acknowledged.  |
| severity      | integer   | Problem current severity.   |
|               |           | Possible values:<br>0 - not classified;<br>1 - information;<br>2 - warning;<br>3 - average;<br>4 - high;<br>5 - disaster. |
| suppressed    | integer   | Whether the problem is suppressed.  |
|               |           | Possible values:<br>0 - problem is in normal state;<br>1 - problem is suppressed.   |
| opdata        | string    | Operational data with expanded macros.  |
| urls          | array     | Active <b>media type</b> URLs.  |

#### Problem tag

The problem tag object has the following properties.

| Property | Type   | Description        |
|----------|--------|--------------------|
| tag      | string | Problem tag name.  |
| value    | string | Problem tag value. |

#### Media type URL

The media type URL object has the following properties.

| Property | Type   | Description                   |
|----------|--------|-------------------------------|
| name     | string | Media type defined URL name.  |
| url      | string | Media type defined URL value. |

Results will contain entries only for active media types with enabled event menu entry. Macro used in properties will be expanded, but if one of the properties contains an unexpanded macro, both properties will be excluded from results. For supported macros, see *Supported macros*.

#### **problem.get**

##### Description

`integer/array problem.get(object parameters)`

The method allows to retrieve problems according to the given parameters.

This method is for retrieving unresolved problems. It is also possible, if specified, to additionally retrieve recently resolved problems. The period that determines how old is "recently" is defined in *Administration* → *General*. Problems that were resolved prior to that period are not kept in the problem table. To retrieve problems that were resolved further back in the past, use the [event.get](#) method.

**Attention:**

This method may return problems of a deleted entity if these problems have not been removed by the housekeeper yet.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter    | Type             | Description   |
|--------------|------------------|---|
| eventids     | string/array     | Return only problems with the given IDs.  |
| groupids     | string/array     | Return only problems created by objects that belong to the given host groups.   |
| hostids      | string/array     | Return only problems created by objects that belong to the given hosts.   |
| objectids    | string/array     | Return only problems created by the given objects.  |
| source       | integer          | Return only problems with the given type.<br><br>Refer to the <a href="#">problem event object page</a> for a list of supported event types.  |
| object       | integer          | Default: 0 - problem created by a trigger.<br>Return only problems created by objects of the given type.<br><br>Refer to the <a href="#">problem event object page</a> for a list of supported object types.  |
| acknowledged | boolean          | Default: 0 - trigger.<br><code>true</code> - return acknowledged problems only;<br><code>false</code> - unacknowledged only.  |
| suppressed   | boolean          | <code>true</code> - return only suppressed problems;<br><code>false</code> - return problems in the normal state.   |
| severities   | integer/array    | Return only problems with given event severities. Applies only if object is trigger.  |
| evaltype     | integer          | Rules for tag searching.  |
| tags         | array of objects | Possible values:<br>0 - (default) And/Or;<br>2 - Or.<br>Return only problems with given tags. Exact match by tag and case-insensitive search by value and operator.<br>Format: [{"tag": "<tag>", "value": "<value>", "operator": "<operator>"}, ...].<br>An empty array returns all problems.                   |
| recent       | boolean          | Possible operator types:<br>0 - (default) Like;<br>1 - Equal;<br>2 - Not like;<br>3 - Not equal<br>4 - Exists;<br>5 - Not exists.<br><code>true</code> - return PROBLEM and recently RESOLVED problems (depends on Display OK triggers for N seconds)<br>Default: <code>false</code> - UNRESOLVED problems only |

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| eventid_from           | string       | Return only problems with IDs greater or equal to the given ID.   |
| eventid_till           | string       | Return only problems with IDs less or equal to the given ID.  |
| time_from              | timestamp    | Return only problems that have been created after or at the given time.   |
| time_till              | timestamp    | Return only problems that have been created before or at the given time.  |
| selectAcknowledges     | query        | Return an acknowledges property with the problem updates. Problem updates are sorted in reverse chronological order.<br><br>The problem update object has the following properties:<br>acknowledgeid - (string) update's ID;<br>userid - (string) ID of the user that updated the event;<br>eventid - (string) ID of the updated event;<br>clock - (timestamp) time when the event was updated;<br>message - (string) text of the message;<br>action - (integer) type of update action (see <a href="#">event.acknowledge</a> );<br>old_severity - (integer) event severity before this update action;<br>new_severity - (integer) event severity after this update action; |
| selectTags             | query        | Supports count.<br>Return a tags property with the problem tags. Output format: [{"tag": "<tag>", "value": "<value>"}, ...].  |
| selectSuppressionData  | query        | Return a suppression_data property with the list of maintenances:<br>maintenanceid - (string) ID of the maintenance;<br>suppress_until - (integer) time until the problem is suppressed.  |
| sortfield              | string/array | Sort the result by the given properties.<br><br>Possible values are: eventid.<br>These parameters are described in the <a href="#">reference commentary</a> .   |
| countOutput            | boolean      |   |
| editable               | boolean      |   |
| excludeSearch          | boolean      |   |
| filter                 | object       |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving trigger problem events

Retrieve recent events from trigger "15112."

Request:

```
{
  "jsonrpc": "2.0",
  "method": "problem.get",
  "params": {
    "output": "extend",
    "selectAcknowledges": "extend",
    "selectTags": "extend",
    "selectSuppressionData": "extend",
    "objectids": "15112",
```

```

    "recent": "true",
    "sortfield": ["eventid"],
    "sortorder": "DESC"
  },
  "auth": "67f45d3eb1173338e1b1647c4bdc1916",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "eventid": "1245463",
      "source": "0",
      "object": "0",
      "objectid": "15112",
      "clock": "1472457242",
      "ns": "209442442",
      "r_eventid": "1245468",
      "r_clock": "1472457285",
      "r_ns": "125644870",
      "correlationid": "0",
      "userid": "1",
      "name": "Zabbix agent on localhost is unreachable for 5 minutes",
      "acknowledged": "1",
      "severity": "3",
      "opdata": "",
      "acknowledges": [
        {
          "acknowledgeid": "14443",
          "userid": "1",
          "eventid": "1245463",
          "clock": "1472457281",
          "message": "problem solved",
          "action": "6",
          "old_severity": "0",
          "new_severity": "0"
        }
      ],
      "suppression_data": [
        {
          "maintenanceid": "15",
          "suppress_until": "1472511600"
        }
      ],
      "suppressed": "1",
      "tags": [
        {
          "tag": "test tag",
          "value": "test value"
        }
      ]
    }
  ],
  "id": 1
}

```

See also

- [Alert](#)
- [Item](#)
- [Host](#)



- LLD rule
- Trigger

Source

CEvent::get() in *ui/include/classes/api/services/CProblem.php*.

## Proxy

This class is designed to work with proxies.

Object references:

- Proxy
- Proxy interface

Available methods:

- **proxy.create** - create new proxies
- **proxy.delete** - delete proxies
- **proxy.get** - retrieve proxies
- **proxy.update** - update proxies

### > Proxy object

The following objects are directly related to the proxy API.

Proxy

The proxy object has the following properties.

| Property                    | Type      | Description  |
|-----------------------------|-----------|--|
| proxyid                     | string    | ( <i>readonly</i> ) ID of the proxy.   |
| <b>host</b><br>(required)   | string    | Name of the proxy.   |
| <b>status</b><br>(required) | integer   | Type of proxy.<br><br>Possible values:<br>5 - active proxy;<br>6 - passive proxy.  |
| description                 | text      | Description of the proxy.  |
| lastaccess                  | timestamp | ( <i>readonly</i> ) Time when the proxy last connected to the server.  |
| tls_connect                 | integer   | Connections to host.<br><br>Possible values are:<br>1 - ( <i>default</i> ) No encryption;<br>2 - PSK;<br>4 - certificate.  |
| tls_accept                  | integer   | Connections from host.<br><br>Possible bitmap values are:<br>1 - ( <i>default</i> ) No encryption;<br>2 - PSK;<br>4 - certificate.<br><br>This is a bitmask field; any sum of possible bitmap values is acceptable (for example, 6 for PSK and certificate). |
| tls_issuer                  | string    | Certificate issuer.  |
| tls_subject                 | string    | Certificate subject.   |

| Property         | Type    | Description   |
|------------------|---------|---|
| tls_psk_identity | string  | (write-only) PSK identity; must be paired with only one PSK (across <b>autoregistration</b> , <b>hosts</b> , and <b>proxies</b> ). Required if either <b>tls_connect</b> or <b>tls_accept</b> has PSK enabled.<br>Do not include sensitive information in the PSK identity, as it is sent unencrypted over the network to inform the receiver which PSK to use. |
| tls_psk          | string  | (write-only) Pre-shared key (PSK); must be at least 32 hex digits. Required if either <b>tls_connect</b> or <b>tls_accept</b> has PSK enabled.  |
| proxy_address    | string  | Comma-delimited IP addresses or DNS names of active Zabbix proxy.   |
| auto_compress    | integer | (readonly) Indicates if communication between Zabbix server and proxy is compressed.<br><br>Possible values are:<br>0 - No compression;<br>1 - Compression enabled;   |

Note that for some methods (update, delete) the required/optional parameter combination is different.

#### Proxy interface

The proxy interface object defines the interface used to connect to a passive proxy. It has the following properties.

| Property                   | Type    | Description   |
|----------------------------|---------|---|
| <b>dns</b><br>(required)   | string  | DNS name to connect to.<br><br>Can be empty if connections are made via IP address.   |
| <b>ip</b><br>(required)    | string  | IP address to connect to.<br><br>Can be empty if connections are made via DNS names.  |
| <b>port</b><br>(required)  | string  | Port number to connect to.  |
| <b>useip</b><br>(required) | integer | Whether the connection should be made via IP address.<br><br>Possible values are:<br>0 - connect using DNS name;<br>1 - connect using IP address. |

#### proxy.create

##### Description

`object proxy.create(object/array proxies)`

This method allows to create new proxies.

##### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See **User roles** for more information.

##### Parameters

(object/array) Proxies to create.

Additionally to the **standard proxy properties**, the method accepts the following parameters.

| Parameter | Type  | Description   |
|-----------|-------|---|
| hosts     | array | <b>Hosts</b> to be monitored by the proxy. If a host is already monitored by a different proxy, it will be reassigned to the current proxy. |

The hosts must have the `hostid` property defined.

| Parameter | Type   | Description  |
|-----------|--------|--|
| interface | object | Host <b>interface</b> to be created for the passive proxy. |
|           |        | Required for passive proxies.                              |

#### Return values

(object) Returns an object containing the IDs of the created proxies under the `proxyids` property. The order of the returned IDs matches the order of the passed proxies.

#### Examples

Create an active proxy

Create an action proxy "Active proxy" and assign a host to be monitored by it.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "proxy.create",
  "params": {
    "host": "Active proxy",
    "status": "5",
    "hosts": [
      {
        "hostid": "10279"
      }
    ]
  },
  "auth": "ab9638041ec6922cb14b07982b268f47",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "proxyids": [
      "10280"
    ]
  },
  "id": 1
}
```

Create a passive proxy

Create a passive proxy "Passive proxy" and assign two hosts to be monitored by it.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "proxy.create",
  "params": {
    "host": "Passive proxy",
    "status": "6",
    "interface": {
      "ip": "127.0.0.1",
      "dns": "",
      "useip": "1",
      "port": "10051"
    },
    "hosts": [
      {
        "hostid": "10192"
      }
    ]
  },
  "auth": "ab9638041ec6922cb14b07982b268f47",
  "id": 1
}
```

```

        },
        {
            "hostid": "10139"
        }
    ],
    "auth": "ab9638041ec6922cb14b07982b268f47",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "proxyids": [
            "10284"
        ]
    },
    "id": 1
}

```

See also

- [Host](#)
- [Proxy interface](#)

Source

CProxy::create() in *ui/include/classes/api/services/CProxy.php*.

## proxy.delete

Description

object proxy.delete(array proxies)

This method allows to delete proxies.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of proxies to delete.

Return values

(object) Returns an object containing the IDs of the deleted proxies under the `proxyids` property.

Examples

Delete multiple proxies

Delete two proxies.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "proxy.delete",
    "params": [
        "10286",
        "10285"
    ],
    "auth": "3a57200802b24cda67c4e4010b50c065",
    "id": 1
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "proxyids": [
      "10286",
      "10285"
    ]
  },
  "id": 1
}
```

Source

CProxy::delete() in `ui/include/classes/api/services/CProxy.php`.

## proxy.get

Description

integer/array proxy.get(object parameters)

The method allows to retrieve proxies according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| proxyids               | string/array | Return only proxies with the given IDs.  |
| selectHosts            | query        | Return a <b>hosts</b> property with the hosts monitored by the proxy.                  |
| selectInterface        | query        | Return an <b>interface</b> property with the proxy interface used by a passive proxy.  |
| sortfield              | string/array | Sort the result by the given properties.   |
|                        |              | Possible values are: <code>hostid</code> , <code>host</code> and <code>status</code> . |
| countOutput            | boolean      | These parameters are described in the <a href="#">reference commentary</a> .           |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

Examples

Retrieve all proxies

Retrieve all configured proxies and their interfaces.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "proxy.get",
  "params": {
    "output": "extend",
    "selectInterface": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "host": "Active proxy",
      "status": "5",
      "lastaccess": "0",
      "description": "",
      "tls_connect": "1",
      "tls_accept": "1",
      "tls_issuer": "",
      "tls_subject": "",
      "proxy_address": "",
      "auto_compress": "0",
      "proxyid": "30091",
      "interface": []
    },
    {
      "host": "Passive proxy",
      "status": "6",
      "lastaccess": "0",
      "description": "",
      "tls_connect": "1",
      "tls_accept": "1",
      "tls_issuer": "",
      "tls_subject": "",
      "proxy_address": "",
      "auto_compress": "0",
      "proxyid": "30092",
      "interface": {
        "interfaceid": "30109",
        "hostid": "30092",
        "useip": "1",
        "ip": "127.0.0.1",
        "dns": "",
        "port": "10051"
      }
    }
  ],
  "id": 1
}
```

See also

- [Host](#)
- [Proxy interface](#)

Source

CProxy::get() in *ui/include/classes/api/services/CProxy.php*.

proxy.update

Description

object proxy.update(object/array proxies)

This method allows to update existing proxies.

**Note:**

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Proxy properties to be updated.

The proxyid property must be defined for each proxy, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard proxy properties](#), the method accepts the following parameters.

| Parameter | Type   | Description  |
|-----------|--------|--|
| hosts     | array  | <a href="#">Hosts</a> to be monitored by the proxy. If a host is already monitored by a different proxy, it will be reassigned to the current proxy.     |
| interface | object | The hosts must have the <code>hostid</code> property defined.<br>Host <a href="#">interface</a> to replace the existing interface for the passive proxy. |

Return values

(object) Returns an object containing the IDs of the updated proxies under the proxyids property.

Examples

Change hosts monitored by a proxy

Update the proxy to monitor the two given hosts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "proxy.update",
  "params": {
    "proxyid": "10293",
    "hosts": [
      {
        "hostid": "10294"
      },
      {
        "hostid": "10295"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "proxyids": [
      "10293"
    ]
  },
}
```

```
"id": 1
}
```

Change proxy status

Change the proxy to an active proxy and rename it to "Active proxy".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "proxy.update",
  "params": {
    "proxyid": "10293",
    "host": "Active proxy",
    "status": "5"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "proxyids": [
      "10293"
    ]
  },
  "id": 1
}
```

See also

- [Host](#)
- [Proxy interface](#)

Source

CProxy::update() in *ui/include/classes/api/services/CProxy.php*.

## Regular expression

This class is designed to work with global regular expressions.

Object references:

- [Regular expression](#)

Available methods:

- [regexp.create](#) - creating new regular expressions
- [regexp.delete](#) - deleting regular expressions
- [regexp.get](#) - retrieving regular expressions
- [regexp.update](#) - updating regular expressions

## > Regular expression object

The following objects are directly related to the `regexp` API.

Regular expression

The global regular expression object has the following properties.



| Property                  | Type   | Description                                       |
|---------------------------|--------|---|
| regexpid                  | string | ( <i>readonly</i> ) ID of the regular expression. |
| <b>name</b><br>(required) | string | Name of the regular expression.                   |
| test_string               | string | Test string.                                      |

Note that for some methods (update, delete) the required/optional parameter combination is different.

## Expressions

The expressions object has the following properties.

| Property                             | Type    | Description  |
|--------------------------------------|---------|--|
| <b>expression</b><br>(required)      | string  | Regular expression.  |
| <b>expression_type</b><br>(required) | integer | Type of Regular expression.<br><br>Possible values:<br>0 - Character string included;<br>1 - Any character string included;<br>2 - Character string not included;<br>3 - Result is TRUE;<br>4 - Result is FALSE. |
| exp_delimiter                        | string  | Expression delimiter. Only when <code>expression_type</code> <i>Any character string included</i> .<br><br>Default value <code>,</code> .  |
| case_sensitive                       | integer | Possible values: <code>,</code> , <code>.</code> , <code>/</code> .<br>Case sensitivity.<br><br>Default value 0.<br><br>Possible values:<br>0 - Case insensitive;<br>1 - Case sensitive.                         |

## regexp.create

### Description

`object regexp.create(object/array regularExpressions)`

This method allows to create new global regular expressions.

#### Note:

This method is only available to *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Regular expressions to create.

Additionally to the [standard properties](#), the method accepts the following parameters.

| Parameter   | Type  | Description                          |
|-------------|-------|--------------------------------------|
| expressions | array | <a href="#">Expressions</a> options. |

### Return values

(object) Returns an object containing the IDs of the created regular expressions under the `regexpids` property.

## Examples

Creating a new global regular expression.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "regex.create",
  "params": {
    "name": "Storage devices for SNMP discovery",
    "test_string": "/boot",
    "expressions": [
      {
        "expression": "^(Physical memory|Virtual memory|Memory buffers|Cached memory|Swap space)$",
        "expression_type": "4",
        "case_sensitive": "1"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "regexpids": [
      "16"
    ]
  },
  "id": 1
}
```

## Source

CRegexp::create() in `ui/include/classes/api/services/CRegexp.php`.

## regex.delete

### Description

object regex.delete(array regexpids)

This method allows to delete global regular expressions.

#### Note:

This method is only available to *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(array) IDs of the regular expressions to delete.

### Return values

(object) Returns an object containing the IDs of the deleted regular expressions under the `regexpids` property.

## Examples

Deleting multiple global regular expressions.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "regex.delete",
  "params": [
```

```

        "16",
        "17"
    ],
    "auth": "3a57200802b24cda67c4e4010b50c065",
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "regexpsids": [
      "16",
      "17"
    ]
  },
  "id": 1
}

```

Source

CRegexp::delete() in ui/include/classes/api/services/CRegexp.php.

## regex.get

Description

integer/array regex.get(object parameters)

The method allows to retrieve global regular expressions according to the given parameters.

### Note:

This method is available only to *Super Admin*. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| regexpsids             | string/array | Return only regular expressions with the given IDs.                          |
| selectExpressions      | query        | Return a <b>expressions</b> property.  |
| sortfield              | string/array | Sort the result by the given properties.                                     |
|                        |              | Possible values are: <code>regexpid</code> and <code>name</code> .           |
| countOutput            | boolean      | These parameters are described in the <a href="#">reference commentary</a> . |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieving global regular expressions.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "regexp.get",
  "params": {
    "output": ["regexpid", "name"],
    "selectExpressions": ["expression", "expression_type"],
    "regexpids": [1, 2],
    "preservekeys": true
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "1": {
      "regexpid": "1",
      "name": "File systems for discovery",
      "expressions": [
        {
          "expression": "^(btrfs|ext2|ext3|ext4|reiser|xfs|ffs|ufs|jfs|jfs2|vxfs|hfs|apfs|refs|ntfs|fat32|)",
          "expression_type": "3"
        }
      ]
    },
    "2": {
      "regexpid": "2",
      "name": "Network interfaces for discovery",
      "expressions": [
        {
          "expression": "^Software Loopback Interface",
          "expression_type": "4"
        },
        {
          "expression": "^(In)?[Ll]oop[Bb]ack[0-9._]*$",
          "expression_type": "4"
        },
        {
          "expression": "^NULL[0-9.*]*$",
          "expression_type": "4"
        },
        {
          "expression": "^[Ll]o[0-9.*]*$",
          "expression_type": "4"
        },
        {
          "expression": "^[Ss]ystem$",
          "expression_type": "4"
        },
        {
          "expression": "^Nu[0-9.*]*$",
          "expression_type": "4"
        }
      ]
    }
  ]
}
```

```

    }
  },
  "id": 1
}

```

Source

CRegexp::get() in *ui/include/classes/api/services/CRegexp.php*.

## regex.update

Description

object regex.update(object/array regularExpressions)

This method allows to update existing global regular expressions.

### Note:

This method is only available to *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Regular expression properties to be updated.

The `regexpid` property must be defined for each object, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard properties](#), the method accepts the following parameters.

| Parameter   | Type  | Description                          |
|-------------|-------|--------------------------------------|
| expressions | array | <a href="#">Expressions</a> options. |

Return values

(object) Returns an object containing the IDs of the updated regular expressions under the `regexpids` property.

Examples

Updating global regular expression for file systems discovery.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "regex.update",
  "params": {
    "regexpid": "1",
    "name": "File systems for discovery",
    "test_string": "",
    "expressions": [
      {
        "expression": "^(btrfs|ext2|ext3|ext4|reiser|xfs|ffs|ufs|jfs|jfs2|vxfs|hfs|apfs|refs|zfs)$",
        "expression_type": "3",
        "exp_delimiter": ",",
        "case_sensitive": "0"
      },
      {
        "expression": "^(ntfs|fat32|fat16)$",
        "expression_type": "3",
        "exp_delimiter": ",",
        "case_sensitive": "0"
      }
    ]
  },
  "auth": "700ca65537074ec963db7efabda78259",

```

```
}
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "regexpids": [
      "1"
    ]
  },
  "id": 1
}
```

Source

CRegexp::update() in *ui/include/classes/api/services/CRegexp.php*.

## Report

This class is designed to work with scheduled reports.

Object references:

- [Report](#)
- [Users](#)
- [User groups](#)

Available methods:

- [report.create](#) - create new scheduled reports
- [report.delete](#) - delete scheduled reports
- [report.get](#) - retrieve scheduled reports
- [report.update](#) - update scheduled reports

### > Report object

The following objects are directly related to the `report` API.

Report

The report object has the following properties:

| Property                         | Type    | Description  |
|----------------------------------|---------|--|
| reportid                         | string  | ( <i>readonly</i> ) ID of the report.  |
| <b>userid</b><br>(required)      | string  | ID of the user who created the report.   |
| <b>name</b><br>(required)        | string  | Unique name of the report.   |
| <b>dashboardid</b><br>(required) | string  | ID of the dashboard that the report is based on.   |
| period                           | integer | Period for which the report will be prepared.<br><br>Possible values:<br>0 - ( <i>default</i> ) previous day;<br>1 - previous week;<br>2 - previous month;<br>3 - previous year. |

| Property     | Type      | Description  |
|--------------|-----------|--|
| cycle        | integer   | Period repeating schedule.<br><br>Possible values:<br>0 - ( <i>default</i> ) daily;<br>1 - weekly;<br>2 - monthly;<br>3 - yearly.  |
| start_time   | integer   | Time of the day, in seconds, when the report will be prepared for sending.   |
| weekdays     | integer   | Default: 0.<br>Days of the week for sending the report.<br><br>Required for weekly reports only.<br><br>Possible bitmap values:<br>1 - Monday;<br>2 - Tuesday;<br>4 - Wednesday;<br>8 - Thursday;<br>16 - Friday;<br>32 - Saturday;<br>64 - Sunday.<br><br>This is a bitmask field; any sum of possible bitmap values is acceptable (for example, 21 for Monday, Wednesday, and Friday). |
| active_since | string    | Default: 0.<br>On which date to start.<br><br>Possible values:<br>empty string - ( <i>default</i> ) not specified (stored as 0);<br>specific date in YYYY-MM-DD format (stored as a timestamp of the beginning of a day (00:00:00)).   |
| active_till  | string    | On which date to end.<br><br>Possible values:<br>empty string - ( <i>default</i> ) not specified (stored as 0);<br>specific date in YYYY-MM-DD format (stored as a timestamp of the end of a day (23:59:59)).  |
| subject      | string    | Report message subject.  |
| message      | string    | Report message text.   |
| status       | integer   | Whether the report is enabled or disabled.<br><br>Possible values:<br>0 - Disabled;<br>1 - ( <i>default</i> ) Enabled.   |
| description  | text      | Description of the report.   |
| state        | integer   | ( <i>readonly</i> ) State of the report.<br><br>Possible values:<br>0 - ( <i>default</i> ) report was not yet processed;<br>1 - report was generated and successfully sent to all recipients;<br>2 - report generating failed; "info" contains error information;<br>3 - report was generated, but sending to some (or all) recipients failed; "info" contains error information.        |
| lastsent     | timestamp | ( <i>readonly</i> ) Unix timestamp of the last successfully sent report.   |
| info         | string    | ( <i>readonly</i> ) Error description or additional information.   |

Note that for some methods (update, delete) the required/optional parameter combination is different.

## Users

The users object has the following properties:

| Property                    | Type    | Description   |
|-----------------------------|---------|---|
| <b>userid</b><br>(required) | string  | ID of user to send the report to.   |
| access_userid               | string  | ID of user on whose behalf the report will be generated.  |
| exclude                     | integer | 0 - <i>(default)</i> Generate report by recipient.<br>Whether to exclude the user from mailing list.<br><br>Possible values:<br>0 - <i>(default)</i> Include;<br>1 - Exclude. |

## User groups

The user groups object has the following properties:

| Property                      | Type   | Description  |
|-------------------------------|--------|--|
| <b>usrgrpId</b><br>(required) | string | ID of user group to send the report to.                  |
| access_userid                 | string | ID of user on whose behalf the report will be generated. |
|                               |        | 0 - <i>(default)</i> Generate report by recipient.       |

## report.create

### Description

`object report.create(object/array reports)`

This method allows to create new scheduled reports.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Scheduled reports to create.

Additionally to the [standard scheduled report properties](#), the method accepts the following parameters.

| Parameter   | Type         | Description  |
|-------------|--------------|--|
| users       | object/array | <a href="#">Users</a> to send the report to.       |
| user_groups | object/array | <a href="#">User groups</a> to send the report to. |

### Return values

(object) Returns an object containing the IDs of the created scheduled reports under the `reportids` property. The order of the returned IDs matches the order of the passed scheduled reports.

### Examples

#### Creating a scheduled report

Create a weekly report that will be prepared for the previous week every Monday-Friday at 12:00 from 2021-04-01 to 2021-08-31.

Request:



```

{
  "jsonrpc": "2.0",
  "method": "report.create",
  "params": {
    "userid": "1",
    "name": "Weekly report",
    "dashboardid": "1",
    "period": "1",
    "cycle": "1",
    "start_time": "43200",
    "weekdays": "31",
    "active_since": "2021-04-01",
    "active_till": "2021-08-31",
    "subject": "Weekly report",
    "message": "Report accompanying text",
    "status": "1",
    "description": "Report description",
    "users": [
      {
        "userid": "1",
        "access_userid": "1",
        "exclude": "0"
      },
      {
        "userid": "2",
        "access_userid": "0",
        "exclude": "1"
      }
    ],
    "user_groups": [
      {
        "usrgrpid": "7",
        "access_userid": "0"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "reportids": [
      "1"
    ]
  },
  "id": 1
}

```

See also

- [Users](#)
- [User groups](#)

Source

CReport::create() in `ui/include/classes/api/services/CReport.php`.

## report.delete

Description

`object report.delete(array reportids)`

This method allows to delete scheduled reports.

**Note:**

This method is only available to *Admin* and *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the scheduled reports to delete.

Return values

(object) Returns an object containing the IDs of the deleted scheduled reports under the `reportids` property.

Examples

Deleting multiple scheduled reports

Delete two scheduled reports.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "report.delete",
  "params": [
    "1",
    "2"
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "reportids": [
      "1",
      "2"
    ]
  },
  "id": 1
}
```

Source

`CReport::delete()` in `ui/include/classes/api/services/CReport.php`.

## **report.get**

Description

`integer/array report.get(object parameters)`

The method allows to retrieve scheduled reports according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| reportids              | string/array | Return only scheduled reports with the given report IDs.  |
| expired                | boolean      | If set to true returns only expired scheduled reports, if false - only active scheduled reports.                    |
| selectUsers            | query        | Return a <b>users</b> property with users the report is configured to be sent to.                                   |
| selectUserGroups       | query        | Return a <b>user_groups</b> property with user groups the report is configured to be sent to.                       |
| sortfield              | string/array | Sort the result by the given properties.  |
| countOutput            | boolean      | Possible values are: reportid, name, status.<br>These parameters are described in the <b>reference commentary</b> . |
| excludeSearch          | boolean      |   |
| filter                 | object       |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving report data

Request:

```
{
  "jsonrpc": "2.0",
  "method": "report.get",
  "params": [
    "output": "extend",
    "selectUsers": "extend",
    "selectUserGroups": "extend",
    "reportids": ["1", "2"]
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "reportid": "1",
      "userid": "1",
      "name": "Weekly report",
      "dashboardid": "1",
      "period": "1",
      "cycle": "1",
      "start_time": "43200",
      "weekdays": "31",
      "active_since": "2021-04-01",
      "active_till": "2021-08-31",
    }
  ]
}
```

```

    "subject": "Weekly report",
    "message": "Report accompanying text",
    "status": "1",
    "description": "Report description",
    "state": "1",
    "lastsent": "1613563219",
    "info": "",
    "users": [
      {
        "userid": "1",
        "access_userid": "1",
        "exclude": "0"
      },
      {
        "userid": "2",
        "access_userid": "0",
        "exclude": "1"
      }
    ],
    "user_groups": [
      {
        "usrgrpid": "7",
        "access_userid": "0"
      }
    ]
  },
  {
    "reportid": "2",
    "userid": "1",
    "name": "Monthly report",
    "dashboardid": "2",
    "period": "2",
    "cycle": "2",
    "start_time": "0",
    "weekdays": "0",
    "active_since": "2021-05-01",
    "active_till": "",
    "subject": "Monthly report",
    "message": "Report accompanying text",
    "status": "1",
    "description": "",
    "state": "0",
    "lastsent": "0",
    "info": "",
    "users": [
      {
        "userid": "1",
        "access_userid": "1",
        "exclude": "0"
      }
    ],
    "user_groups": []
  }
],
"id": 1
}

```

See also

- [Users](#)
- [User groups](#)

Source

CReport::get() in *ui/include/classes/api/services/CReport.php*.

## report.update

### Description

object report.update(object/array reports)

This method allows to update existing scheduled reports.

#### Note:

This method is only available to *Admin* and *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Scheduled report properties to be updated.

The `reportid` property must be defined for each scheduled report, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard scheduled report properties](#) the method accepts the following parameters.

| Parameter   | Type         | Description  |
|-------------|--------------|--|
| users       | object/array | <a href="#">Users</a> to replace the current users assigned to the scheduled report.             |
| user_groups | object/array | <a href="#">User groups</a> to replace the current user groups assigned to the scheduled report. |

### Return values

(object) Returns an object containing the IDs of the updated scheduled reports under the `reportids` property.

### Examples

#### Disabling scheduled report

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "report.update",
  "params": {
    "reportid": "1",
    "status": "0"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "reportids": [
      "1"
    ]
  },
  "id": 1
}
```

### See also

- [Users](#)
- [User groups](#)

### Source

CReport::update() in *ui/include/classes/api/services/CReport.php*.

## Role

This class is designed to work with user roles.

Object references:

- [Role](#)
- [Role rules](#)
- [UI element](#)
- [Service](#)
- [Service tag](#)
- [Module](#)
- [Action](#)

Available methods:

- [role.create](#) - create new user roles
- [role.delete](#) - delete user roles
- [role.get](#) - retrieve user roles
- [role.update](#) - update user roles

### > Role object

The following objects are directly related to the `role` API.

Role

The role object has the following properties:

| Property                               | Type    | Description   |
|--|---------|---|
| <code>roleid</code>                    | string  | <i>(readonly)</i> ID of the role.   |
| <b><code>name</code></b><br>(required) | string  | Name of the role.   |
| <b><code>type</code></b><br>(required) | integer | User type.<br><br>Possible values:<br>1 - <i>(default)</i> User;<br>2 - Admin;<br>3 - Super admin.              |
| <code>readonly</code>                  | integer | <i>(readonly)</i> Whether the role is readonly.<br><br>Possible values:<br>0 - <i>(default)</i> No;<br>1 - Yes. |

Note that for some methods (update, delete) the required/optional parameter combination is different.

Role rules

The role rules object has the following properties:

| Property                       | Type    | Description   |
|--------------------------------|---------|---|
| <code>ui</code>                | array   | Array of the <a href="#">UI element</a> objects.  |
| <code>ui.default_access</code> | integer | Whether access to new UI elements is enabled.<br><br>Possible values:<br>0 - Disabled;<br>1 - <i>(default)</i> Enabled. |

| Property               | Type    | Description  |
|------------------------|---------|--|
| services.read.mode     | integer | Read-only access to services.<br><br>Possible values:<br><br>0 - Read-only access to the services, specified by the <code>services.read.list</code> or matched by the <code>services.read.tag</code> properties.<br>1 - <i>(default)</i> Read-only access to all services.   |
| services.read.list     | array   | Array of <b>Service</b> objects.<br><br>The specified services, including child services, will be granted a read-only access to the user role. Read-only access will not override read-write access to the services.   |
| services.read.tag      | object  | Only used if <code>services.read.mode</code> is set to 0.<br>Array of <b>Service tag</b> object.<br><br>The tag matched services, including child services, will be granted a read-only access to the user role. Read-only access will not override read-write access to the services.   |
| services.write.mode    | integer | Only used if <code>services.read.mode</code> is set to 0.<br>Read-write access to services.<br><br>Possible values:<br><br>0 - <i>(default)</i> Read-write access to the services, specified by the <code>services.write.list</code> or matched by the <code>services.write.tag</code> properties.<br>1 - Read-write access to all services. |
| services.write.list    | array   | Array of <b>Service</b> objects.<br><br>The specified services, including child services, will be granted a read-write access to the user role. Read-write access will override read-only access to the services.  |
| services.write.tag     | object  | Only used if <code>services.write.mode</code> is set to 0.<br>Array of <b>Service tag</b> object.<br><br>The tag matched services, including child services, will be granted a read-write access to the user role. Read-write access will override read-only access to the services.   |
| modules                | array   | Only used if <code>services.write.mode</code> is set to 0.<br>Array of the <b>module</b> objects.  |
| modules.default_access | integer | Whether access to new modules is enabled.<br><br>Possible values:<br>0 - Disabled;<br>1 - <i>(default)</i> Enabled.  |
| api.access             | integer | Whether access to API is enabled.<br><br>Possible values:<br>0 - Disabled;<br>1 - <i>(default)</i> Enabled.  |
| api.mode               | integer | Mode for treating API methods listed in the <code>api</code> property.<br><br>Possible values:<br>0 - <i>(default)</i> Deny list;<br>1 - Allow list.   |
| api                    | array   | Array of API methods.  |

| Property               | Type    | Description   |
|------------------------|---------|---|
| actions                | array   | Array of the <b>action</b> objects.   |
| actions.default_access | integer | Whether access to new actions is enabled.<br><br>Possible values:<br>0 - Disabled;<br>1 - <i>(default)</i> Enabled. |

## UI element

The UI element object has the following properties:

| Property                  | Type   | Description  |
|---------------------------|--------|--|
| <b>name</b><br>(required) | string | <p>Name of the UI element.</p> <p>Possible values for users of any type:<br/> monitoring.dashboard - <i>Monitoring → Dashboard</i>;<br/> monitoring.problems - <i>Monitoring → Problems</i>;<br/> monitoring.hosts - <i>Monitoring → Hosts</i>;<br/> monitoring.latest_data - <i>Monitoring → Latest data</i>;<br/> monitoring.maps - <i>Monitoring → Maps</i>;<br/> services.services - <i>Services → Services</i>;<br/> services.sla_report - <i>Services → SLA report</i>;<br/> inventory.overview - <i>Inventory → Overview</i>;<br/> inventory.hosts - <i>Inventory → Hosts</i>;<br/> reports.availability_report - <i>Reports → Availability report</i>;<br/> reports.top_triggers - <i>Reports → Triggers top 100</i>.</p> <p>Possible values only for users of <i>Admin</i> and <i>Super admin</i> user types:<br/> monitoring.discovery - <i>Monitoring → Discovery</i>;<br/> services.actions - <i>Services → Service actions</i>;<br/> services.sla - <i>Services → SLA</i>;<br/> reports.scheduled_reports - <i>Reports → Scheduled reports</i>;<br/> reports.notifications - <i>Reports → Notifications</i>;<br/> configuration.host_groups - <i>Configuration → Host groups</i>;<br/> configuration.templates - <i>Configuration → Templates</i>;<br/> configuration.hosts - <i>Configuration → Hosts</i>;<br/> configuration.maintenance - <i>Configuration → Maintenance</i>;<br/> configuration.actions - <i>Configuration → Actions</i>;<br/> configuration.discovery - <i>Configuration → Discovery</i>.</p> <p>Possible values only for users of <i>Super admin</i> user type:<br/> reports.system_info - <i>Reports → System information</i>;<br/> reports.audit - <i>Reports → Audit</i>;<br/> reports.action_log - <i>Reports → Action log</i>;<br/> configuration.event_correlation - <i>Configuration → Event correlation</i>;<br/> administration.general - <i>Administration → General</i>;<br/> administration.proxies - <i>Administration → Proxies</i>;<br/> administration.authentication - <i>Administration → Authentication</i>;<br/> administration.user_groups - <i>Administration → User groups</i>;<br/> administration.user_roles - <i>Administration → User roles</i>;<br/> administration.users - <i>Administration → Users</i>;<br/> administration.media_types - <i>Administration → Media types</i>;<br/> administration.scripts - <i>Administration → Scripts</i>;<br/> administration.queue - <i>Administration → Queue</i>.</p> |



| Property | Type    | Description  |
|----------|---------|--|
| status   | integer | Whether access to the UI element is enabled.<br><br>Possible values:<br>0 - Disabled;<br>1 - <i>(default)</i> Enabled. |

#### Service

| Property                       | Type   | Description        |
|--------------------------------|--------|--------------------|
| <b>serviceid</b><br>(required) | string | ID of the Service. |

#### Service tag

| Property                 | Type   | Description  |
|--------------------------|--------|--|
| <b>tag</b><br>(required) | string | Tag name.<br><br>If empty string is specified, the service tag will not be used for service matching.            |
| value                    | string | Tag value.<br><br>If no value or empty string is specified, only the tag name will be used for service matching. |

#### Module

The module object has the following properties:

| Property                      | Type    | Description  |
|-------------------------------|---------|--|
| <b>moduleid</b><br>(required) | string  | ID of the module.  |
| status                        | integer | Whether access to the module is enabled.<br><br>Possible values:<br>0 - Disabled;<br>1 - <i>(default)</i> Enabled. |

#### Action

The action object has the following properties:

| Property                  | Type    | Description   |
|---------------------------|---------|---|
| <b>name</b><br>(required) | string  | <p>Name of the action.</p> <p>Possible values for users of any type:</p> <p>edit_dashboards - Create and edit dashboards;</p> <p>edit_maps - Create and edit maps;</p> <p>add_problem_comments - Add problem comments;</p> <p>change_severity - Change problem severity;</p> <p>acknowledge_problems - Acknowledge problems;</p> <p>close_problems - Close problems;</p> <p>execute_scripts - Execute scripts;</p> <p>manage_api_tokens - Manage API tokens.</p> <p>Possible values only for users of <i>Admin</i> and <i>Super admin</i> user types:</p> <p>edit_maintenance - Create and edit maintenances;</p> <p>manage_scheduled_reports - Manage scheduled reports;</p> <p>manage_sla - Manage SLA.</p> |
| status                    | integer | <p>Whether access to perform the action is enabled.</p> <p>Possible values:</p> <p>0 - Disabled;</p> <p>1 - <i>(default)</i> Enabled.</p>   |

## role.create

### Description

object role.create(object/array roles)

This method allows to create new roles.

#### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Roles to create.

Additionally to the [standard role properties](#), the method accepts the following parameters.

| Parameter | Type  | Description  |
|-----------|-------|--|
| rules     | array | Role <a href="#">rules</a> to be created for the role. |

### Return values

(object) Returns an object containing the IDs of the created roles under the `roleids` property. The order of the returned IDs matches the order of the passed roles.

### Examples

#### Creating a role

Create a role with type "User" and denied access to two UI elements.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "role.create",
  "params": {
    "name": "Operator",
    "type": "1",
    "rules": {
```

```

        "ui": [
            {
                "name": "monitoring.hosts",
                "status": "0"
            },
            {
                "name": "monitoring.maps",
                "status": "0"
            }
        ]
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "roleids": [
            "5"
        ]
    },
    "id": 1
}

```

See also

- [Role rules](#)
- [UI element](#)
- [Module](#)
- [Action](#)

Source

CRole::create() in `ui/include/classes/api/services/CRole.php`.

## role.delete

Description

object role.delete(array roleids)

This method allows to delete roles.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the roles to delete.

Return values

(object) Returns an object containing the IDs of the deleted roles under the `roleids` property.

Examples

Deleting multiple user roles

Delete two user roles.

Request:

```

{
    "jsonrpc": "2.0",

```

```

    "method": "role.delete",
    "params": [
        "4",
        "5"
    ],
    "auth": "3a57200802b24cda67c4e4010b50c065",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "roleids": [
            "4",
            "5"
        ]
    },
    "id": 1
}

```

Source

CRole::delete() in *ui/include/classes/api/services/CRole.php*.

## role.get

Description

integer/array role.get(object parameters)

The method allows to retrieve roles according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| roleids                | string/array | Return only roles with the given IDs.   |
| selectRules            | query        | Return role rules in the <a href="#">rules</a> property.  |
| selectUsers            | query        | Select <a href="#">users</a> this role is assigned to.  |
| sortfield              | string/array | See <a href="#">user.get</a> for restrictions based on user type.<br>Sort the result by the given properties. |
| countOutput            | boolean      | Possible values are: roleid, name.  |
| editable               | boolean      | These parameters are described in the <a href="#">reference commentary</a> .                                  |
| excludeSearch          | boolean      |   |
| filter                 | object       |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |

| Parameter   | Type    | Description |
|-------------|---------|-------------|
| startSearch | boolean |             |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving role data

Retrieve "Super admin role" role data and its access rules.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "role.get",
  "params": {
    "output": "extend",
    "selectRules": "extend",
    "roleids": "3"
  },
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "roleid": "3",
      "name": "Super admin role",
      "type": "3",
      "readonly": "1",
      "rules": {
        "ui": [
          {
            "name": "inventory.hosts",
            "status": "1"
          },
          {
            "name": "inventory.overview",
            "status": "1"
          },
          {
            "name": "monitoring.dashboard",
            "status": "1"
          },
          {
            "name": "monitoring.hosts",
            "status": "1"
          },
          {
            "name": "monitoring.latest_data",
            "status": "1"
          },
          {
            "name": "monitoring.maps",
            "status": "1"
          }
        ]
      }
    }
  ]
}
```

```

{
  "name": "monitoring.problems",
  "status": "1"
},
{
  "name": "reports.availability_report",
  "status": "1"
},
{
  "name": "reports.top_triggers",
  "status": "1"
},
{
  "name": "services.services",
  "status": "1"
},
{
  "name": "services.sla_report",
  "status": "1"
},
{
  "name": "configuration.actions",
  "status": "1"
},
{
  "name": "configuration.discovery",
  "status": "1"
},
{
  "name": "configuration.host_groups",
  "status": "1"
},
{
  "name": "configuration.hosts",
  "status": "1"
},
{
  "name": "configuration.maintenance",
  "status": "1"
},
{
  "name": "configuration.templates",
  "status": "1"
},
{
  "name": "monitoring.discovery",
  "status": "1"
},
{
  "name": "reports.notifications",
  "status": "1"
},
{
  "name": "reports.scheduled_reports",
  "status": "1"
},
{
  "name": "services.actions",
  "status": "1"
},
{
  "name": "services.sla",

```

```

        "status": "1"
    },
    {
        "name": "administration.authentication",
        "status": "1"
    },
    {
        "name": "administration.general",
        "status": "1"
    },
    {
        "name": "administration.media_types",
        "status": "1"
    },
    {
        "name": "administration.proxies",
        "status": "1"
    },
    {
        "name": "administration.queue",
        "status": "1"
    },
    {
        "name": "administration.scripts",
        "status": "1"
    },
    {
        "name": "administration.user_groups",
        "status": "1"
    },
    {
        "name": "administration.user_roles",
        "status": "1"
    },
    {
        "name": "administration.users",
        "status": "1"
    },
    {
        "name": "configuration.event_correlation",
        "status": "1"
    },
    {
        "name": "reports.action_log",
        "status": "1"
    },
    {
        "name": "reports.audit",
        "status": "1"
    },
    {
        "name": "reports.system_info",
        "status": "1"
    }
],
"ui.default_access": "1",
"services.read.mode": "1",
"services.read.list": [],
"services.read.tag": {
    "tag": "",
    "value": ""
},

```

```

    "services.write.mode": "1",
    "services.write.list": [],
    "services.write.tag": {
        "tag": "",
        "value": ""
    },
    "modules": [],
    "modules.default_access": "1",
    "api.access": "1",
    "api.mode": "0",
    "api": [],
    "actions": [
        {
            "name": "edit_dashboards",
            "status": "1"
        },
        {
            "name": "edit_maps",
            "status": "1"
        },
        {
            "name": "acknowledge_problems",
            "status": "1"
        },
        {
            "name": "close_problems",
            "status": "1"
        },
        {
            "name": "change_severity",
            "status": "1"
        },
        {
            "name": "add_problem_comments",
            "status": "1"
        },
        {
            "name": "execute_scripts",
            "status": "1"
        },
        {
            "name": "manage_api_tokens",
            "status": "1"
        },
        {
            "name": "edit_maintenance",
            "status": "1"
        },
        {
            "name": "manage_scheduled_reports",
            "status": "1"
        },
        {
            "name": "manage_sla",
            "status": "1"
        }
    ],
    "actions.default_access": "1"
}
],
    "id": 1

```



```
}
```

See also

- [Role rules](#)
- [User](#)

Source

CRole::get() in *ui/include/classes/api/services/CRole.php*.

## role.update

Description

`object role.update(object/array roles)`

This method allows to update existing roles.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Role properties to be updated.

The `roleid` property must be defined for each role, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard role properties](#) the method accepts the following parameters.

| Parameter          | Type  | Description  |
|--------------------|-------|--|
| <code>rules</code> | array | Access <a href="#">rules</a> to update for the role. |

Return values

(object) Returns an object containing the IDs of the updated roles under the `roleids` property.

Examples

Disabling ability to execute scripts

Update role with ID "5", disable ability to execute scripts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "role.update",
  "params": [
    {
      "roleid": "5",
      "rules": {
        "actions": [
          {
            "name": "execute_scripts",
            "status": "0"
          }
        ]
      }
    ]
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "roleids": [
      "5"
    ]
  },
  "id": 1
}
```

Limiting access to API

Update role with ID "5", deny to call any "create", "update" or "delete" methods.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "role.update",
  "params": [
    {
      "roleid": "5",
      "rules": {
        "api.access": "1",
        "api.mode": "0",
        "api": ["*.create", "/*.update", "/*.delete"]
      }
    }
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "roleids": [
      "5"
    ]
  },
  "id": 1
}
```

Source

`CRole::update()` in `ui/include/classes/api/services/CRole.php`.

## Script

This class is designed to work with scripts.

Object references:

- [Script](#)
- [Webhook parameters](#)
- [Debug](#)
- [Log entry](#)

Available methods:

- [script.create](#) - create new scripts
- [script.delete](#) - delete scripts
- [script.execute](#) - run scripts

- [script.get](#) - retrieve scripts
- [script.getscriptsbyhosts](#) - retrieve scripts for hosts
- [script.update](#) - update scripts

## > Script object

The following objects are directly related to the `script` API.

Script

The script object has the following properties.

| Property                                  | Type    | Description   |
|---|---------|---|
| <code>scriptid</code>                     | string  | ( <i>readonly</i> ) ID of the script.   |
| <b><code>name</code></b><br>(required)    | string  | Name of the script.   |
| <b><code>type</code></b><br>(required)    | integer | Script type.<br><br>Possible values:<br>0 - Script;<br>1 - IPMI;<br>2 - SSH;<br>3 - Telnet;<br>5 - ( <i>default</i> ) Webhook.  |
| <b><code>command</code></b><br>(required) | string  | Command to run.   |
| <code>scope</code>                        | integer | Script scope.<br><br>Possible values:<br>1 - <i>default</i> action operation;<br>2 - manual host action;<br>4 - manual event action.  |
| <code>execute_on</code>                   | integer | Where to run the script.<br>Used if <code>type</code> is 0 (script).<br><br>Possible values:<br>0 - run on Zabbix agent;<br>1 - run on Zabbix server;<br>2 - ( <i>default</i> ) run on Zabbix server (proxy). |
| <code>menu_path</code>                    | string  | Folders separated by slash that form a menu like navigation in frontend when clicked on host or event.<br>Used if <code>scope</code> is 2 or 4.   |
| <code>authtype</code>                     | integer | Authentication method used for SSH script type.<br>Used if <code>type</code> is 2.<br><br>Possible values:<br>0 - password;<br>1 - public key.  |
| <code>username</code>                     | string  | User name used for authentication.<br>Required if <code>type</code> is 2 or 3.  |
| <code>password</code>                     | string  | Password used for SSH scripts with password authentication and Telnet scripts.<br>Used if <code>type</code> is 2 and <code>authtype</code> is 0 or <code>type</code> is 3.                                    |
| <code>publickey</code>                    | string  | Name of the public key file used for SSH scripts with public key authentication.<br>Required if <code>type</code> is 2 and <code>authtype</code> is 1.  |
| <code>privatekey</code>                   | string  | Name of the private key file used for SSH scripts with public key authentication.<br>Required if <code>type</code> is 2 and <code>authtype</code> is 1.   |
| <code>port</code>                         | string  | Port number used for SSH and Telnet scripts.<br>Used if <code>type</code> is 2 or 3.  |

| Property     | Type    | Description   |
|--------------|---------|---|
| groupid      | string  | ID of the host group that the script can be run on. If set to 0, the script will be available on all host groups.   |
| usrgrpid     | string  | Default: 0.<br>ID of the user group that will be allowed to run the script. If set to 0, the script will be available for all user groups.<br>Used if scope is 2 or 4.                        |
| host_access  | integer | Default: 0.<br>Host permissions needed to run the script.<br>Used if scope is 2 or 4.   |
| confirmation | string  | Possible values:<br>2 - (default) read;<br>3 - write.<br>Confirmation pop up text. The pop up will appear when trying to run the script from the Zabbix frontend.<br>Used if scope is 2 or 4. |
| timeout      | string  | Webhook script execution timeout in seconds. Time suffixes are supported, e.g. 30s, 1m.<br>Required if type is 5.<br><br>Possible values:<br>1-60s  |
| parameters   | array   | Default value:<br>30s<br>Array of <b>webhook input parameters</b> .<br>Used if type is 5.   |
| description  | string  | Description of the script.  |

Note that for some methods (update, delete) the required/optional parameter combination is different.

#### Webhook parameters

Parameters passed to webhook script when it is called have the following properties.

| Property                  | Type   | Description                               |
|---------------------------|--------|---|
| <b>name</b><br>(required) | string | Parameter name.                           |
| value                     | string | Parameter value. Supports <b>macros</b> . |

#### Debug

Debug information of executed webhook script. The debug object has the following properties.

| Property | Type   | Description                                |
|----------|--------|--|
| logs     | array  | Array of <b>log entries</b> .              |
| ms       | string | Script execution duration in milliseconds. |

#### Log entry

The log entry object has the following properties.

| Property | Type    | Description   |
|----------|---------|---|
| level    | integer | Log level.  |
| ms       | string  | The time elapsed in milliseconds since the script was run before log entry was added. |

| Property | Type   | Description  |
|----------|--------|--------------|
| message  | string | Log message. |

## script.create

### Description

object script.create(object/array scripts)

This method allows to create new scripts.

#### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Scripts to create.

The method accepts scripts with the **standard script properties**.

### Return values

(object) Returns an object containing the IDs of the created scripts under the `scriptids` property. The order of the returned IDs matches the order of the passed scripts.

### Examples

Create a webhook script

Create a webhook script that sends HTTP request to external service.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "script.create",
  "params": {
    "name": "Webhook script",
    "command": "try {\n var request = new HttpRequest(),\n response,\n data;\n\n request.addHeader('Co",
    "type": 5,
    "timeout": "40s",
    "parameters": [
      {
        "name": "token",
        "value": "${WEBHOOK.TOKEN}"
      },
      {
        "name": "host",
        "value": "${HOST.HOST}"
      },
      {
        "name": "v",
        "value": "2.2"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "scriptids": [
```

```

    "3"
  ],
  },
  "id": 1
}

```

Create an SSH script

Create an SSH script with public key authentication that can be executed on a host and has a context menu.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "script.create",
  "params": {
    "name": "SSH script",
    "command": "my script command",
    "type": 2,
    "username": "John",
    "publickey": "pub.key",
    "privatekey": "priv.key",
    "password": "secret",
    "port": "12345",
    "scope": 2,
    "menu_path": "All scripts/SSH",
    "usrgrp": "7",
    "groupid": "4"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "scriptids": [
      "5"
    ]
  },
  "id": 1
}

```

Create a custom script

Create a custom script that will reboot a server. The script will require write access to the host and will display a configuration message before running in the frontend.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "script.create",
  "params": {
    "name": "Reboot server",
    "command": "reboot server 1",
    "confirmation": "Are you sure you would like to reboot the server?",
    "scope": 2,
    "type": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "scriptids": [
      "4"
    ]
  },
  "id": 1
}
```

Source

CScript::create() in *ui/include/classes/api/services/CScript.php*.

## script.delete

Description

object script.delete(array scriptIds)

This method allows to delete scripts.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the scripts to delete.

Return values

(object) Returns an object containing the IDs of the deleted scripts under the `scriptids` property.

Examples

Delete multiple scripts

Delete two scripts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "script.delete",
  "params": [
    "3",
    "4"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "scriptids": [
      "3",
      "4"
    ]
  },
  "id": 1
}
```

Source

CScript::delete() in *ui/include/classes/api/services/CScript.php*.

## script.execute

### Description

`object script.execute(object parameters)`

This method allows to run a script on a host or event.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters containing the ID of the script to run and either the ID of the host or the ID of the event.

| Parameter                     | Type   | Description                           |
|-------------------------------|--------|---------------------------------------|
| <b>scriptid</b><br>(required) | string | ID of the script to run.              |
| hostid                        | string | ID of the host to run the script on.  |
| eventid                       | string | ID of the event to run the script on. |

### Return values

(object) Returns the result of script execution.

| Property | Type   | Description   |
|----------|--------|---|
| response | string | Whether the script was run successfully.  |
| value    | string | Possible value - success.<br>Script output.   |
| debug    | object | Contains a <b>debug object</b> if a webhook script is executed. For other script types, it contains empty object. |

### Examples

#### Run a webhook script

Run a webhook script that sends HTTP request to external service.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "script.execute",
  "params": {
    "scriptid": "4",
    "hostid": "30079"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "response": "success",
    "value": "{\"status\":\"sent\",\"timestamp\":\"1611235391\"}",
    "debug": {
      "logs": [
        {
          "level": 3,

```



```

        "ms": 480,
        "message": "[Webhook Script] HTTP status: 200."
    },
    ],
    "ms": 495
},
},
"id": 1
}

```

Run a custom script

Run a “ping” script on a host.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "script.execute",
  "params": {
    "scriptid": "1",
    "hostid": "30079"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "response": "success",
    "value": "PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.\n64 bytes from 127.0.0.1: icmp_req=1 tt",
    "debug": []
  },
  "id": 1
}

```

Source

CScript::execute() in *ui/include/classes/api/services/CScript.php*.

## script.get

Description

integer/array script.get(object parameters)

The method allows to retrieve scripts according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter    | Type         | Description   |
|--------------|--------------|---|
| groupids     | string/array | Return only scripts that can be run on the given host groups.                   |
| hostids      | string/array | Return only scripts that can be run on the given hosts.                         |
| scriptids    | string/array | Return only scripts with the given IDs.   |
| usrgrpsids   | string/array | Return only scripts that can be run by users in the given user groups.          |
| selectGroups | query        | Return a <b>groups</b> property with host groups that the script can be run on. |

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| selectHosts            | query        | Return a <b>hosts</b> property with hosts that the script can be run on.          |
| selectActions          | query        | Return a <b>actions</b> property with actions that the script is associated with. |
| sortfield              | string/array | Sort the result by the given properties.  |
|                        |              | Possible values are: scriptid and name.   |
|                        |              | These parameters are described in the <b>reference commentary</b> .               |
| countOutput            | boolean      |   |
| editable               | boolean      |   |
| excludeSearch          | boolean      |   |
| filter                 | object       |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieve all scripts

Retrieve all configured scripts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "script.get",
  "params": {
    "output": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "scriptid": "1",
      "name": "Ping",
      "command": "/bin/ping -c 3 {HOST.CONN} 2>&1",
      "host_access": "2",
      "usrgrpid": "0",
      "groupid": "0",
      "description": "",
      "confirmation": "",
      "type": "0",
      "execute_on": "1",
      "timeout": "30s",
      "parameters": []
    },
    {
      "scriptid": "2",
      "name": "Traceroute",
```

```

        "command": "/usr/bin/traceroute {HOST.CONN} 2>&1",
        "host_access": "2",
        "usrgrpuid": "0",
        "groupid": "0",
        "description": "",
        "confirmation": "",
        "type": "0",
        "execute_on": "1",
        "timeout": "30s",
        "parameters": []
    },
    {
        "scriptid": "3",
        "name": "Detect operating system",
        "command": "sudo /usr/bin/nmap -O {HOST.CONN} 2>&1",
        "host_access": "2",
        "usrgrpuid": "7",
        "groupid": "0",
        "description": "",
        "confirmation": "",
        "type": "0",
        "execute_on": "1",
        "timeout": "30s",
        "parameters": []
    },
    {
        "scriptid": "4",
        "name": "Webhook",
        "command": "try {\n var request = new HttpRequest(),\n response,\n data;\n\n request.addHeader",
        "host_access": "2",
        "usrgrpuid": "7",
        "groupid": "0",
        "description": "",
        "confirmation": "",
        "type": "5",
        "execute_on": "1",
        "timeout": "30s",
        "parameters": [
            {
                "name": "token",
                "value": "{$WEBHOOK.TOKEN}"
            },
            {
                "name": "host",
                "value": "{HOST.HOST}"
            },
            {
                "name": "v",
                "value": "2.2"
            }
        ]
    }
],
"id": 1
}

```

See also

- [Host](#)
- [Host group](#)

Source

CScript::get() in `ui/include/classes/api/services/CScript.php`.

## script.getscriptsbyhosts

### Description

object script.getscriptsbyhosts(array hostIds)

This method allows to retrieve scripts available on the given hosts.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(string/array) IDs of hosts to return scripts for.

### Return values

(object) Returns an object with host IDs as properties and arrays of available scripts as values.

#### Note:

The method will automatically expand macros in the confirmation text.

### Examples

#### Retrieve scripts by host IDs

Retrieve all scripts available on hosts "30079" and "30073".

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "script.getscriptsbyhosts",
  "params": [
    "30079",
    "30073"
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "30079": [
      {
        "scriptid": "3",
        "name": "Detect operating system",
        "command": "sudo /usr/bin/nmap -O {HOST.CONN} 2>&1",
        "host_access": "2",
        "usrgrpuid": "7",
        "groupid": "0",
        "description": "",
        "confirmation": "",
        "type": "0",
        "execute_on": "1",
        "hostid": "10001"
      },
      {
        "scriptid": "1",
        "name": "Ping",
        "command": "/bin/ping -c 3 {HOST.CONN} 2>&1",
        "host_access": "2",
        "usrgrpuid": "0",

```

```

        "groupid": "0",
        "description": "",
        "confirmation": "",
        "type": "0",
        "execute_on": "1",
        "hostid": "10001"
    },
    {
        "scriptid": "2",
        "name": "Traceroute",
        "command": "/usr/bin/traceroute {HOST.CONN} 2>&1",
        "host_access": "2",
        "usrgrpid": "0",
        "groupid": "0",
        "description": "",
        "confirmation": "",
        "type": "0",
        "execute_on": "1",
        "hostid": "10001"
    }
],
"30073": [
    {
        "scriptid": "3",
        "name": "Detect operating system",
        "command": "sudo /usr/bin/nmap -O {HOST.CONN} 2>&1",
        "host_access": "2",
        "usrgrpid": "7",
        "groupid": "0",
        "description": "",
        "confirmation": "",
        "type": "0",
        "execute_on": "1",
        "hostid": "10001"
    },
    {
        "scriptid": "1",
        "name": "Ping",
        "command": "/bin/ping -c 3 {HOST.CONN} 2>&1",
        "host_access": "2",
        "usrgrpid": "0",
        "groupid": "0",
        "description": "",
        "confirmation": "",
        "type": "0",
        "execute_on": "1",
        "hostid": "10001"
    },
    {
        "scriptid": "2",
        "name": "Traceroute",
        "command": "/usr/bin/traceroute {HOST.CONN} 2>&1",
        "host_access": "2",
        "usrgrpid": "0",
        "groupid": "0",
        "description": "",
        "confirmation": "",
        "type": "0",
        "execute_on": "1",
        "hostid": "10001"
    }
]

```

```
},
  "id": 1
}
```

#### Source

CScript::getScriptsByHosts() in *ui/include/classes/api/services/CScript.php*.

### script.update

#### Description

object script.update(object/array scripts)

This method allows to update existing scripts.

#### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object/array) **Script properties** to be updated.

The `scriptid` property must be defined for each script, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged. An exception is type property change from 5 (Webhook) to other: the `parameters` property will be cleaned.

#### Return values

(object) Returns an object containing the IDs of the updated scripts under the `scriptids` property.

#### Examples

##### Change script command

Change the command of the script to `"/bin/ping -c 10 {HOST.CONN} 2>&1"`.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "script.update",
  "params": {
    "scriptid": "1",
    "command": "/bin/ping -c 10 {HOST.CONN} 2>&1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "scriptids": [
      "1"
    ]
  },
  "id": 1
}
```

#### Source

CScript::update() in *ui/include/classes/api/services/CScript.php*.

## Service

This class is designed to work with IT infrastructure/business services.

Object references:

- [Service](#)
- [Status rule](#)
- [Service tag](#)
- [Service alarm](#)
- [Problem tag](#)

Available methods:

- [service.create](#) - creating new services
- [service.delete](#) - deleting services
- [service.get](#) - retrieving services
- [service.update](#) - updating services

### > Service object

The following objects are directly related to the `service` API.

Service

The service object has the following properties.

| Property                     | Type    | Description   |
|------------------------------|---------|---|
| <code>serviceid</code>       | string  | ( <i>readonly</i> ) ID of the service.  |
| <code>algorithm</code>       | integer | Status calculation rule. Only applicable if child services exist.<br><br>Possible values:<br>0 - set status to OK;<br>1 - most critical if all children have problems;<br>2 - most critical of child services.  |
| <code>name</code>            | string  | Name of the service.  |
| <code>sortorder</code>       | integer | Position of the service used for sorting.<br><br>Possible values: 0-999.  |
| <code>weight</code>          | integer | Service weight.<br><br>Possible values: 0-1000000.  |
| <code>propagationrule</code> | integer | Default: 0.<br>Status propagation rule. Must be set together with <code>propagation_value</code> .<br><br>Possible values:<br>0 - ( <i>default</i> ) propagate service status as is - without any changes;<br>1 - increase the propagated status by a given <code>propagation_value</code> (by 1 to 5 severities);<br>2 - decrease the propagated status by a given <code>propagation_value</code> (by 1 to 5 severities);<br>3 - ignore this service - the status is not propagated to the parent service at all;<br>4 - set fixed service status using a given <code>propagation_value</code> . |

| Property         | Type    | Description   |
|------------------|---------|---|
| propagation_rule | integer | Status propagation value. Must be set together with <code>propagation_rule</code> .<br><br>Possible values for <code>propagation_rule</code> with values 0 and 3: 0.<br><br>Possible values for <code>propagation_rule</code> with values 1 and 2: 1-5.<br><br>Possible values for <code>propagation_rule</code> with value 4:<br>-1 - OK;<br>0 - Not classified;<br>1 - Information;<br>2 - Warning;<br>3 - Average;<br>4 - High;<br>5 - Disaster. |
| status           | integer | ( <i>readonly</i> ) Whether the service is in OK or problem state.<br><br>If the service is in problem state, <code>status</code> is equal either to:<br>- the severity of the most critical problem;<br>- the highest status of a child service in problem state.<br><br>If the service is in OK state, <code>status</code> is equal to -1.  |
| description      | string  | Description of the service.   |
| uuid             | string  | Universal unique identifier. For update operations this field is <i>readonly</i> .  |
| created          | integer | Unix timestamp when service was created.  |
| readonly         | boolean | ( <i>readonly</i> ) Access to the service.<br><br>Possible values:<br>0 - Read-write;<br>1 - Read-only.   |

Note that for some methods (update, delete) the required/optional parameter combination is different.

#### Status rule

The status rule object has the following properties.

| Property                         | Type    | Description   |
|----------------------------------|---------|---|
| <b>type</b><br>(required)        | integer | Condition for setting (New status) status.<br><br>Possible values:<br>0 - if at least (N) child services have (Status) status or above;<br>1 - if at least (N%) of child services have (Status) status or above;<br>2 - if less than (N) child services have (Status) status or below;<br>3 - if less than (N%) of child services have (Status) status or below;<br>4 - if weight of child services with (Status) status or above is at least (W);<br>5 - if weight of child services with (Status) status or above is at least (N%);<br>6 - if weight of child services with (Status) status or below is less than (W);<br>7 - if weight of child services with (Status) status or below is less than (N%).<br><br>Where:<br>- N (W) is <code>limit_value</code> ;<br>- (Status) is <code>limit_status</code> ;<br>- (New status) is <code>new_status</code> . |
| <b>limit_value</b><br>(required) | integer | Limit value.<br><br>Possible values:<br>- for N and W: 1-100000;<br>- for N%: 1-100.  |



| Property                          | Type    | Description  |
|-----------------------------------|---------|--|
| <b>limit_status</b><br>(required) | integer | Limit status.<br><br>Possible values:<br>-1 - OK;<br>0 - Not classified;<br>1 - Information;<br>2 - Warning;<br>3 - Average;<br>4 - High;<br>5 - Disaster. |
| <b>new_status</b><br>(required)   | integer | New status value.<br><br>Possible values:<br>0 - Not classified;<br>1 - Information;<br>2 - Warning;<br>3 - Average;<br>4 - High;<br>5 - Disaster.         |

### Service tag

The service tag object has the following properties.

| Property                 | Type   | Description        |
|--------------------------|--------|--------------------|
| <b>tag</b><br>(required) | string | Service tag name.  |
| value                    | string | Service tag value. |

### Service alarm

#### Note:

Service alarms cannot be directly created, updated or deleted via the Zabbix API.

The service alarm objects represent a service's state change. It has the following properties.

| Property  | Type      | Description                                      |
|---|-----------|--|
| clock   | timestamp | Time when the service state change has happened. |
| value   | integer   | Status of the service.                           |
| Refer to the <a href="#">service status property</a> for a list of possible values. |           |  |

### Problem tag

Problem tags allow linking services with problem events. The problem tag object has the following properties.

| Property                 | Type    | Description  |
|--------------------------|---------|--|
| <b>tag</b><br>(required) | string  | Problem tag name.  |
| operator                 | integer | Mapping condition operator.<br><br>Possible values:<br>0 - <i>(default)</i> equals;<br>2 - like. |
| value                    | string  | Problem tag value.   |

service.create

Description

object service.create(object/array services)

This method allows to create new services.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) services to create.

Additionally to the **standard service properties**, the method accepts the following parameters.

| Parameter    | Type  | Description   |
|--------------|-------|---|
| children     | array | Child services to be linked to the service.   |
| parents      | array | The children must have the serviceid property defined.<br>Parent services to be linked to the service.      |
| tags         | array | The parents must have the serviceid property defined.<br>Service <b>tags</b> to be created for the service. |
| problem_tags | array | <b>Problem tags</b> to be created for the service.  |
| status_rules | array | <b>Status rules</b> to be created for the service.  |

Return values

(object) Returns an object containing the IDs of the created services under the serviceids property. The order of the returned IDs matches the order of the passed services.

Examples

Creating a service

Create a service that will be switched to problem state, if at least one child has a problem.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.create",
  "params": {
    "name": "Server 1",
    "algorithm": 1,
    "sortorder": 1
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "serviceids": [
      "5"
    ]
  },
  "id": 1
}
```

Source

CService::create() in *ui/include/classes/api/services/CService.php*.

## service.delete

### Description

object service.delete(array serviceIds)

This method allows to delete services.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(array) IDs of the services to delete.

### Return values

(object) Returns an object containing the IDs of the deleted services under the `serviceids` property.

### Examples

#### Deleting multiple services

Delete two services.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.delete",
  "params": [
    "4",
    "5"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "serviceids": [
      "4",
      "5"
    ]
  },
  "id": 1
}
```

### Source

CService::delete() in *ui/include/classes/api/services/CService.php*.

## service.get

### Description

integer/array service.get(object parameters)

The method allows to retrieve services according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

## Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter            | Type         |  |
|----------------------|--------------|--|
| serviceids           | string/array | Return only services with the given IDs.   |
| parentids            | string/array | Return only services that are linked to the given parent services.   |
| deep_parentids       | flag         | Return all direct and indirect child services. Used together with <code>parentids</code> .   |
| childids             | string/array | Return only services that are linked to the given child services.  |
| evaltype             | integer      | Rules for tag searching.<br><br>Possible values:<br>0 - ( <i>default</i> ) And/Or;<br>2 - Or.  |
| tags                 | object/array | Return only services with given tags. Exact match by tag and case-sensitive or case-insensitive search by tag value depending on operator value.<br>Format: [{"tag": "<tag>", "value": "<value>", "operator": "<operator>"}, ...].<br>An empty array returns all services.<br><br>Possible operator values:<br>0 - ( <i>default</i> ) Contains;<br>1 - Equals;<br>2 - Does not contain;<br>3 - Does not equal;<br>4 - Exists;<br>5 - Does not exist.         |
| problem_tags         | object/array | Return only services with given problem tags. Exact match by tag and case-sensitive or case-insensitive search by tag value depending on operator value.<br>Format: [{"tag": "<tag>", "value": "<value>", "operator": "<operator>"}, ...].<br>An empty array returns all services.<br><br>Possible operator values:<br>0 - ( <i>default</i> ) Contains;<br>1 - Equals;<br>2 - Does not contain;<br>3 - Does not equal;<br>4 - Exists;<br>5 - Does not exist. |
| without_problem_tags | flag         | Return only services without problem tags.   |
| slaids               | string/array | Return only services that are linked to the specific SLA(s).   |
| selectChildren       | boolean      | Return a <code>children</code> property with the child services.<br><br>Supports count.  |
| selectParents        | boolean      | Return a <code>parents</code> property with the parent services.<br><br>Supports count.  |
| selectTags           | boolean      | Return a <code>tags</code> property with service tags.<br><br>Supports count.  |
| selectProblemEvents  | boolean      | Return a <code>problem_events</code> property with an array of problem event objects.<br><br>The problem event object has the following properties:<br><code>eventid</code> - ( <i>string</i> ) Event ID;<br><code>severity</code> - ( <i>string</i> ) Current event severity;<br><code>name</code> - ( <i>string</i> ) Resolved event name.   |
| selectProblemTags    | boolean      | Return a <code>problem_tags</code> property with problem tags.<br><br>Supports count.  |

| Parameter            | Type            |  |
|----------------------|-----------------|--|
| selectStatusRules    | boolean         | Return a <code>status_rules</code> property with status rules.   |
|                      |                 | Supports count.  |
| selectStatusTimeline | object/timeline | Return a <code>status_timeline</code> property containing service state changes for given periods.   |
|                      |                 | Format [{"period_from": "<period_from>", "period_to": "<period_to>"}, ...] - <code>period_from</code> being a starting date (inclusive; integer timestamp) and <code>period_to</code> being an ending date (exclusive; integer timestamp) for the period you're interested in. |
|                      |                 | Returns an array of entries containing a <code>start_value</code> property and an <code>alarms</code> array for the state changes within specified periods.  |
| sortfield            | string/array    | Sort the result by the given properties.   |
|                      |                 | Possible values are: <code>serviceid</code> , <code>name</code> , <code>status</code> , <code>sortorder</code> and <code>created_at</code> .   |
| countOutput          | boolean         | These parameters are described in the <a href="#">reference commentary</a> .   |
| editable             | boolean         |  |
| excludeSearch        | boolean         |  |
| filter               | object          |  |
| limit                | integer         |  |
| output               | query           |  |
| preservekeys         | boolean         |  |
| search               | object          |  |
| searchByAny          | boolean         |  |
| searchWildcard       | boolean         |  |
| sortorder            | string/array    |  |
| startSearch          | boolean         |  |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

##### Retrieving all services

Retrieve all data about all services and their dependencies.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.get",
  "params": {
    "output": "extend",
    "selectChildren": "extend",
    "selectParents": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "serviceid": "1",
      "name": "My Service - 0001",

```

```

        "status": "-1",
        "algorithm": "2",
        "sortorder": "0",
        "weight": "0",
        "propagation_rule": "0",
        "propagation_value": "0",
        "description": "My Service Description 0001.",
        "uuid": "dfa4daeaea754e3a95c04d6029182681",
        "created_at": "946684800",
        "readonly": false,
        "parents": [],
        "children": []
    },
    {
        "serviceid": "2",
        "name": "My Service - 0002",
        "status": "-1",
        "algorithm": "2",
        "sortorder": "0",
        "weight": "0",
        "propagation_rule": "0",
        "propagation_value": "0",
        "description": "My Service Description 0002.",
        "uuid": "20ea0d85212841219130abeaca28c065",
        "created_at": "946684800",
        "readonly": false,
        "parents": [],
        "children": []
    }
],
    "id": 1
}

```

Source

CService::get() in *ui/include/classes/api/services/CService.php*.

## service.update

Description

object service.update(object/array services)

This method allows to update existing services.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) service properties to be updated.

The `serviceid` property must be defined for each service, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard service properties](#), the method accepts the following parameters.

| Parameter | Type  | Description  |
|-----------|-------|--|
| children  | array | Child services to replace the current service children.<br><br>The children must have the <code>serviceid</code> property defined. |
| parents   | array | Parent services to replace the current service parents.<br><br>The parents must have the <code>serviceid</code> property defined.  |

| Parameter    | Type  | Description  |
|--------------|-------|--|
| tags         | array | Service <b>tags</b> to replace the current service tags. |
| problem_tags | array | <b>Problem tags</b> to replace the current problem tags. |
| status_rules | array | <b>Status rules</b> to replace the current status rules. |

#### Return values

(object) Returns an object containing the IDs of the updated services under the `serviceids` property.

#### Examples

##### Setting the parent for a service

Make service with ID "3" to be the parent for service with ID "5".

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.update",
  "params": {
    "serviceid": "5",
    "parents": [
      {
        "serviceid": "3"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "serviceids": [
      "5"
    ]
  },
  "id": 1
}
```

##### Adding a scheduled downtime

Add a downtime for service with ID "4" scheduled weekly from Monday 22:00 till Tuesday 10:00.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "service.update",
  "params": {
    "serviceid": "4",
    "times": [
      {
        "type": "1",
        "ts_from": "165600",
        "ts_to": "201600"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "serviceids": [
      "4"
    ]
  },
  "id": 1
}
```

Source

CService::update() in *ui/include/classes/api/services/CService.php*.

## Settings

This class is designed to work with common administration settings.

Object references:

- [Settings](#)

Available methods:

- [settings.get](#) - retrieve settings
- [settings.update](#) - update settings

## > Settings object

The following objects are directly related to the settings API.

Settings

The settings object has the following properties.

| Property                | Type    | Description  |
|-------------------------|---------|--|
| default_lang            | string  | System language by default.  |
| default_timezone        | string  | Default: <code>en_US</code> .<br>System time zone by default.<br><br>Default: <code>system</code> - system default.  |
| default_theme           | string  | For the full list of supported time zones please refer to <a href="#">PHP documentation</a> .<br>Default theme.  |
| search_limit            | integer | Possible values:<br><code>blue-theme</code> - (default) Blue;<br><code>dark-theme</code> - Dark;<br><code>hc-light</code> - High-contrast light;<br><code>hc-dark</code> - High-contrast dark.<br>Limit for search and filter results. |
| max_overview_table_size | integer | Default: 1000.<br>Max number of columns and rows in Data overview and Trigger overview dashboard widgets.  |
| max_in_table            | integer | Default: 50.<br>Max count of elements to show inside table cell.   |
|                         |         | Default: 50.   |



| Property              | Type    | Description  |
|-----------------------|---------|--|
| server_check_interval | integer | Show warning if Zabbix server is down.<br><br>Possible values:<br>0 - Do not show warning;<br>10 - <i>(default)</i> Show warning.  |
| work_period           | string  | Working time.<br><br>Default: 1-5,09:00-18:00.   |
| show_technical_errors | integer | Show technical errors (PHP/SQL) to non-Super admin users and to users that are not part of user groups with debug mode enabled.<br><br>Possible values:<br>0 - <i>(default)</i> Do not technical errors;<br>1 - Show technical errors. |
| history_period        | string  | Max period to display history data in Latest data, Web, and Data overview dashboard widgets. Accepts seconds and time unit with suffix.<br><br>Default: 24h.   |
| period_default        | string  | Time filter default period. Accepts seconds and time unit with suffix with month and year support (30s,1m,2h,1d,1M,1y).  |
| max_period            | string  | Default: 1h.<br>Max period for time filter. Accepts seconds and time unit with suffix with month and year support (30s,1m,2h,1d,1M,1y).  |
| severity_color_0      | string  | Default: 2y.<br>Color for "Not classified" severity as a hexadecimal color code.   |
| severity_color_1      | string  | Default: 97AAB3.<br>Color for "Information" severity as a hexadecimal color code.  |
| severity_color_2      | string  | Default: 7499FF.<br>Color for "Warning" severity as a hexadecimal color code.  |
| severity_color_3      | string  | Default: FFC859.<br>Color for "Average" severity as a hexadecimal color code.  |
| severity_color_4      | string  | Default: FFA059.<br>Color for "High" severity as a hexadecimal color code.   |
| severity_color_5      | string  | Default: E97659.<br>Color for "Disaster" severity as a hexadecimal color code.   |
| severity_name_0       | string  | Default: E45959.<br>Name for "Not classified" severity.  |
| severity_name_1       | string  | Default: Not classified.<br>Name for "Information" severity.   |
| severity_name_2       | string  | Default: Information.<br>Name for "Warning" severity.  |
| severity_name_3       | string  | Default: Warning.<br>Name for "Average" severity.  |
| severity_name_4       | string  | Default: Average.<br>Name for "High" severity.<br><br>Default: High.   |

| Property               | Type    | Description   |
|------------------------|---------|---|
| severity_name_5        | string  | Name for "Disaster" severity.   |
| custom_color           | integer | Default: Disaster.<br>Use custom event status colors.   |
| ok_period              | string  | Possible values:<br>0 - <i>(default)</i> Do not use custom event status colors;<br>1 - Use custom event status colors.<br>Display OK triggers period. Accepts seconds and time unit with suffix.                    |
| blink_period           | string  | Default: 5m.<br>On status change triggers blink period. Accepts seconds and time unit with suffix.  |
| problem_unack_color    | string  | Default: 2m.<br>Color for unacknowledged PROBLEM events as a hexadecimal color code.  |
| problem_ack_color      | string  | Default: CC0000.<br>Color for acknowledged PROBLEM events as a hexadecimal color code.  |
| ok_unack_color         | string  | Default: CC0000.<br>Color for unacknowledged RESOLVED events as a hexadecimal color code.   |
| ok_ack_color           | string  | Default: 009900.<br>Color for acknowledged RESOLVED events as a hexadecimal color code.   |
| problem_unack_style    | integer | Default: 009900.<br>Blinking for unacknowledged PROBLEM events.   |
| problem_ack_style      | integer | Possible values:<br>0 - Do not show blinking;<br>1 - <i>(default)</i> Show blinking.<br>Blinking for acknowledged PROBLEM events.   |
| ok_unack_style         | integer | Possible values:<br>0 - Do not show blinking;<br>1 - <i>(default)</i> Show blinking.<br>Blinking for unacknowledged RESOLVED events.  |
| ok_ack_style           | integer | Possible values:<br>0 - Do not show blinking;<br>1 - <i>(default)</i> Show blinking.<br>Blinking for acknowledged RESOLVED events.  |
| url                    | string  | Possible values:<br>0 - Do not show blinking;<br>1 - <i>(default)</i> Show blinking.<br>Frontend URL.   |
| discovery_groupid      | integer | ID of the host group to which will be automatically placed discovered hosts.  |
| default_inventory_mode | integer | Default host inventory mode.  |
| alert_usrgrpid         | integer | Possible values:<br>-1 - <i>(default)</i> Disabled;<br>0 - Manual;<br>1 - Automatic.<br>ID of the user group to which will be sending database down alarm message. If set to 0, the alarm message will not be sent. |

| Property                     | Type    | Description   |
|------------------------------|---------|---|
| snmptrap_logging             | integer | Log unmatched SNMP traps.<br><br>Possible values:<br>0 - Do not log unmatched SNMP traps;<br>1 - ( <i>default</i> ) Log unmatched SNMP traps.   |
| login_attempts               | integer | Number of failed login attempts after which login form will be blocked.<br><br>Default: 5.  |
| login_block                  | string  | Time interval during which login form will be blocked if number of failed login attempts exceeds defined in login_attempts field. Accepts seconds and time unit with suffix.<br><br>Default: 30s. |
| validate_uri_schemes         | integer | Validate URI schemes.<br><br>Possible values:<br>0 - Do not validate;<br>1 - ( <i>default</i> ) Validate.   |
| uri_valid_schemes            | string  | Valid URI schemes.<br><br>Default: http,https,ftp,file,mailto,tel,ssh.  |
| x_frame_options              | string  | X-Frame-Options HTTP header.<br><br>Default: SAMEORIGIN.  |
| iframe_sandboxing_enabled    | integer | Use iframe sandboxing.<br><br>Possible values:<br>0 - Do not use;<br>1 - ( <i>default</i> ) Use.  |
| iframe_sandboxing_exceptions | string  | Iframe sandboxing exceptions.   |
| connect_timeout              | string  | Connection timeout with Zabbix server.<br><br>Default: 3s.  |
| socket_timeout               | string  | Network default timeout.<br><br>Default: 3s.  |
| media_type_test_timeout      | string  | Network timeout for media type test.<br><br>Default: 65s.   |
| item_test_timeout            | string  | Network timeout for item tests.<br><br>Default: 60s.  |
| script_timeout               | string  | Network timeout for script execution.<br><br>Default: 60s.  |
| report_test_timeout          | string  | Network timeout for scheduled report test.<br><br>Default: 60s.   |
| auditlog_enabled             | integer | Enable audit logging.<br><br>Possible values:<br>0 - Disable;<br>1 - ( <i>default</i> ) Enable.   |
| ha_failover_delay            | string  | Failover delay in seconds (read only).<br><br>Default: 1m.  |

| Property              | Type    | Description   |
|-----------------------|---------|---|
| geomaps_tile_provider | string  | <p>Geomap tile provider.</p> <p>Possible values:<br/> OpenStreetMap.Mapnik - <i>(default)</i> OpenStreetMap Mapnik;<br/> OpenTopoMap - OpenTopoMap;<br/> Stamen.TonerLite - Stamen Toner Lite;<br/> Stamen.Terrain - Stamen Terrain;<br/> USGS.USTopo - USGS US Topo;<br/> USGS.USImagery - USGS US Imagery.</p> <p>Supports empty string to specify custom values of geomaps_tile_url, geomaps_max_zoom and geomaps_attribution.</p> |
| geomaps_tile_url      | string  | Geomap tile URL if geomaps_tile_provider is set to empty string.  |
| geomaps_max_zoom      | integer | Geomap max zoom level if geomaps_tile_provider is set to empty string. Max zoom must be in the range between 0 and 30.  |
| geomaps_attribution   | string  | Geomap attribution text if geomaps_tile_provider is set to empty string.  |

## settings.get

### Description

object settings.get(object parameters)

The method allows to retrieve settings object according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports only one parameter.

| Parameter | Type  | Description   |
|-----------|-------|---|
| output    | query | This parameter is described in the <a href="#">reference commentary</a> . |

### Return values

(object) Returns settings object.

### Examples

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "settings.get",
  "params": {
    "output": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
```

```

"default_theme": "blue-theme",
"search_limit": "1000",
"max_in_table": "50",
"server_check_interval": "10",
"work_period": "1-5,09:00-18:00",
"show_technical_errors": "0",
"history_period": "24h",
"period_default": "1h",
"max_period": "2y",
"severity_color_0": "97AAB3",
"severity_color_1": "7499FF",
"severity_color_2": "FFC859",
"severity_color_3": "FFA059",
"severity_color_4": "E97659",
"severity_color_5": "E45959",
"severity_name_0": "Not classified",
"severity_name_1": "Information",
"severity_name_2": "Warning",
"severity_name_3": "Average",
"severity_name_4": "High",
"severity_name_5": "Disaster",
"custom_color": "0",
"ok_period": "5m",
"blink_period": "2m",
"problem_unack_color": "CC0000",
"problem_ack_color": "CC0000",
"ok_unack_color": "009900",
"ok_ack_color": "009900",
"problem_unack_style": "1",
"problem_ack_style": "1",
"ok_unack_style": "1",
"ok_ack_style": "1",
"discovery_groupid": "5",
"default_inventory_mode": "-1",
>alert_usrgrpid": "7",
"snmptrap_logging": "1",
"default_lang": "en_US",
"default_timezone": "system",
"login_attempts": "5",
"login_block": "30s",
"validate_uri_schemes": "1",
"uri_valid_schemes": "http,https,ftp,file,mailto,tel,ssh",
"x_frame_options": "SAMEORIGIN",
"iframe_sandboxing_enabled": "1",
"iframe_sandboxing_exceptions": "",
"max_overview_table_size": "50",
"connect_timeout": "3s",
"socket_timeout": "3s",
"media_type_test_timeout": "65s",
"script_timeout": "60s",
"item_test_timeout": "60s",
"url": "",
"report_test_timeout": "60s",
"auditlog_enabled": "1",
"ha_failover_delay": "1m",
"geomaps_tile_provider": "OpenStreetMap.Mapnik",
"geomaps_tile_url": "",
"geomaps_max_zoom": "0",
"geomaps_attribution": ""
},
"id": 1
}

```

## Source

CSettings::get() in *ui/include/classes/api/services/CSettings.php*.

## settings.update

### Description

`object settings.update(object settings)`

This method allows to update existing common settings.

#### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Settings properties to be updated.

### Return values

(array) Returns array with the names of updated parameters.

### Examples

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "settings.update",
  "params": {
    "login_attempts": "1",
    "login_block": "1m"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    "login_attempts",
    "login_block"
  ],
  "id": 1
}
```

## Source

CSettings::update() in *ui/include/classes/api/services/CSettings.php*.

## SLA

This class is designed to work with SLA (Service Level Agreement) objects used to estimate the performance of IT infrastructure and business services.

### Object references:

- [SLA](#)
- [SLA schedule](#)
- [SLA excluded downtime](#)
- [SLA service tag](#)

### Available methods:

- **sla.create** - creating new SLAs
- **sla.delete** - deleting SLAs
- **sla.get** - retrieving SLAs
- **sla.getsli** - retrieving Service Level Indicator (SLI) data for SLAs
- **sla.update** - updating SLAs

## > SLA object

The following objects are directly related to the `sla` (Service Level Agreement) API.

### SLA

The SLA object has the following properties.

| Property                      | Type    | Description   |
|-------------------------------|---------|---|
| <b>slaid</b>                  | string  | ( <i>readonly</i> ) ID of the SLA.  |
| <b>name</b><br>(required)     | string  | Name of the SLA.  |
| <b>period</b><br>(required)   | integer | Reporting period of the SLA.<br><br>Possible values:<br>0 - daily;<br>1 - weekly;<br>2 - monthly;<br>3 - quarterly;<br>4 - annually.  |
| <b>slo</b><br>(required)      | float   | Minimum acceptable Service Level Objective expressed as a percent. If the Service Level Indicator (SLI) drops lower, the SLA is considered to be in problem/unfulfilled state.<br><br>Possible values: 0-100 (up to 4 fractional digits). |
| <b>effective_date</b>         | integer | Effective date of the SLA.  |
| <b>timezone</b><br>(required) | string  | Possible values: date timestamp in UTC.<br>Reporting time zone, for example: Europe/London, UTC.  |
| <b>status</b>                 | integer | For the full list of supported time zones please refer to <a href="#">PHP documentation</a> .<br>Status of the SLA.<br><br>Possible values:<br>0 - ( <i>default</i> ) disabled SLA;<br>1 - enabled SLA.                                   |
| <b>description</b>            | string  | Description of the SLA.   |

Note that for some methods (update, delete) the required/optional parameter combination is different.

### SLA Schedule

The SLA schedule object defines periods where the connected service(s) are scheduled to be in working order. It has the following properties.

| Property                         | Type    | Description   |
|----------------------------------|---------|---|
| <b>period_from</b><br>(required) | integer | Starting time of the recurrent weekly period of time (inclusive).<br><br>Possible values: number of seconds (counting from Sunday). |
| <b>period_to</b><br>(required)   | integer | Ending time of the recurrent weekly period of time (exclusive).<br><br>Possible values: number of seconds (counting from Sunday).   |

### SLA excluded downtime

The excluded downtime object defines periods where the connected service(s) are scheduled to be out of working order, without affecting SLI, e.g. undergoing planned maintenance.

| Property                         | Type    | Description  |
|----------------------------------|---------|--|
| <b>name</b><br>(required)        | string  | Name of the excluded downtime.   |
| <b>period_from</b><br>(required) | integer | Starting time of the excluded downtime (inclusive).                              |
| <b>period_to</b><br>(required)   | integer | Possible values: timestamp.<br>Ending time of the excluded downtime (exclusive). |
|                                  |         | Possible values: timestamp.  |

#### SLA service tag

The SLA service tag object links services to include in the calculations for the SLA. It has the following properties.

| Property                 | Type    | Description   |
|--------------------------|---------|---|
| <b>tag</b><br>(required) | string  | SLA service tag name.   |
| operator                 | integer | SLA service tag operator.<br><br>Possible values:<br>0 - (default) equals;<br>2 - contains. |
| value                    | string  | SLA service tag value.  |

#### sla.create

##### Description

object `sla.create(object/array SLAs)`

This method allows to create new SLA objects.

##### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

##### Parameters

(object/array) SLA objects to create.

Additionally to the [standard SLA properties](#), the method accepts the following parameters.

| Parameter                         | Type  | Description   |
|-----------------------------------|-------|---|
| <b>service_tags</b><br>(required) | array | SLA service tags to be created for the SLA.<br>At least one service tag must be specified.  |
| schedule                          | array | SLA schedule to be created for the SLA.<br>Specifying an empty parameter will be interpreted as a 24x7 schedule.<br>Default: 24x7 schedule. |
| excluded_downtime                 | array | SLA excluded downtimes to be created for the SLA.   |

##### Return values

(object) Returns an object containing the IDs of the created SLAs under the `slaids` property. The order of the returned IDs matches the order of the passed SLAs.

##### Examples

##### Creating an SLA

Instruct to create an SLA entry for: \* tracking uptime for SQL-engine related services; \* custom schedule of all weekdays excluding last hour on Saturday; \* an effective date of the last day of the year 2022; \* with 1 hour and 15 minutes long planned downtime starting at midnight on the 4th of July; \* SLA weekly report calculation will be on; \* the minimum acceptable SLO will be 99.9995%.

Request:



```

{
  "jsonrpc": "2.0",
  "method": "sla.create",
  "params": [
    {
      "name": "Database Uptime",
      "slo": "99.9995",
      "period": "1",
      "timezone": "America/Toronto",
      "description": "Provide excellent uptime for main database engines.",
      "effective_date": 1672444800,
      "status": 1,
      "schedule": [
        {
          "period_from": 0,
          "period_to": 601200
        }
      ],
      "service_tags": [
        {
          "tag": "Database",
          "operator": "0",
          "value": "MySQL"
        },
        {
          "tag": "Database",
          "operator": "0",
          "value": "PostgreSQL"
        }
      ],
      "excluded_downtimes": [
        {
          "name": "Software version upgrade rollout",
          "period_from": "1648760400",
          "period_to": "1648764900"
        }
      ]
    }
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "slais": [
      "5"
    ]
  },
  "id": 1
}

```

Source

CSla::create() in *ui/include/classes/api/services/CSla.php*.

## sla.delete

Description

object sla.delete(array slais)

This method allows to delete SLA entries.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the SLAs to delete.

Return values

(object) Returns an object containing the IDs of the deleted SLAs under the `slאים` property.

Examples

Deleting multiple SLAs

Delete two SLA entries.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "sla.delete",
  "params": [
    "4",
    "5"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "slאים": [
      "4",
      "5"
    ]
  },
  "id": 1
}
```

Source

`CSla::delete()` in `ui/include/classes/api/services/CSla.php`.

## **sla.get**

Description

integer/array `sla.get(object parameters)`

The method allows to retrieve SLA objects according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter               | Type         | Description  |
|-------------------------|--------------|--|
| slaid                   | string/array | Return only SLAs with the given IDs.   |
| serviceids              | string/array | Return only SLAs matching the specific services.   |
| selectSchedule          | query        | Return a schedule property with SLA schedules.   |
| selectExcludedDowntimes | query        | Supports count.<br>Return an excluded_downtimes property with SLA excluded downtimes.  |
| selectServiceTags       | query        | Supports count.<br>Return a service_tags property with SLA service tags.   |
| sortfield               | string/array | Supports count.<br>Sort the result by the given properties.  |
| countOutput             | boolean      | Possible values are: slaid, name, period, slo, effective_date, timezone, status and description.<br>These parameters are described in the <a href="#">reference commentary</a> . |
| editable                | boolean      |  |
| excludeSearch           | boolean      |  |
| filter                  | object       |  |
| limit                   | integer      |  |
| output                  | query        |  |
| preservekeys            | boolean      |  |
| search                  | object       |  |
| searchByAny             | boolean      |  |
| searchWildcardEnabled   | boolean      |  |
| sortorder               | string/array |  |
| startSearch             | boolean      |  |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving all SLAs

Retrieve all data about all SLAs and their properties.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "sla.get",
  "params": {
    "output": "extend",
    "selectSchedule": ["period_from", "period_to"],
    "selectExcludedDowntimes": ["name", "period_from", "period_to"],
    "selectServiceTags": ["tag", "operator", "value"],
    "preservekeys": true
  },
  "auth": "85dd04b94cbfad794616eb923be13c71",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "1": {
      "slaid": "1",
      "name": "Database Uptime",
```

```

        "period": "1",
        "slo": "99.9995",
        "effective_date": "1672444800",
        "timezone": "America/Toronto",
        "status": "1",
        "description": "Provide excellent uptime for main SQL database engines.",
        "service_tags": [
            {
                "tag": "Database",
                "operator": "0",
                "value": "MySQL"
            },
            {
                "tag": "Database",
                "operator": "0",
                "value": "PostgreSQL"
            }
        ],
        "schedule": [
            {
                "period_from": "0",
                "period_to": "601200"
            }
        ],
        "excluded_downtimes": [
            {
                "name": "Software version upgrade rollout",
                "period_from": "1648760400",
                "period_to": "1648764900"
            }
        ]
    },
    "id": 1
}

```

Source

CSla:get() in *ui/include/classes/api/services/CSla.php*.

## sla.getsli

Description

object sla.getsli(object parameters)

This method allows to calculate the Service Level Indicator (SLI) data for a Service Level Agreement (SLA).

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the SLA ID, reporting periods and, optionally, the IDs of the services - to calculate the SLI for.

| Parameter                  | Type    | Description   |
|----------------------------|---------|---|
| <b>slaid</b><br>(required) | string  | ID of the SLA to return availability information for.                               |
| period_from                | integer | Starting date (inclusive) to report the SLI for.<br><br>Possible values: timestamp. |

| Parameter  | Type         | Description   |
|------------|--------------|---|
| period_to  | integer      | Ending date (exclusive) to report the SLI for.                        |
| periods    | array        | Possible values: timestamp.<br>Preferred number of periods to report. |
| serviceids | string/array | Possible values: 1-100<br>IDs of services to return the SLI for.      |

#### Partitioning of periods

The following table demonstrates the arrangement of returned period slices based on combinations of parameters.

##### Note:

The returned periods will not precede the first available period based on the effective date of the SLA and will not exceed the current period.

| Parameters         | Description      |                |   |
|--------------------|------------------|----------------|---|
| <b>period_from</b> | <b>period_to</b> | <b>periods</b> |   |
| -                  | -                | -              | Return the last 20 periods.   |
| -                  | -                | specified      | Return the last periods specified by the <b>periods</b> parameter.  |
| -                  | specified        | -              | Return the last 20 periods before the specified <b>period_to</b> date.  |
| -                  | specified        | specified      | Return the last periods specified by the <b>periods</b> parameter before the specified <b>period_to</b> date.           |
| specified          | -                | -              | Return the first 20 periods starting with the specified <b>period_from</b> date.  |
| specified          | -                | specified      | Return the first periods specified by the <b>periods</b> parameter starting with the specified <b>period_from</b> date. |
| specified          | specified        | -              | Return up to 100 periods within the specified date range.   |
| specified          | specified        | specified      | Return periods specified by the <b>periods</b> parameter within the specified date range.                               |

#### Return values

(object) Returns the results of the calculation.

| Property   | Type  | Description  |
|------------|-------|--|
| periods    | array | List of the reported periods.<br><br>Each reported period is represented as an object consisting of:<br>- <i>period_from</i> - Starting date of the reported period (timestamp).<br>- <i>period_to</i> - Ending date of the reported period (timestamp).   |
| serviceids | array | Periods are sorted by <i>period_from</i> field ascending.<br>List of service IDs in the reported periods.  |
| sli        | array | The sorting order of the list is not defined. Even if <i>serviceids</i> parameter was passed to the <i>sla.getsli</i> method.<br>SLI data (as a <b>two-dimensional array</b> ) for each reported period and service.<br><br>The index of the <i>periods</i> property is used as the <b>first</b> dimension of the <i>sli</i> property.<br><br>The index of the <i>serviceids</i> property is used as the <b>second</b> dimension of the <i>sli</i> property. |

#### SLI data

The SLI data returned for each reported period and service consists of:

| Property           | Type    | Description   |
|--------------------|---------|---|
| uptime             | integer | Amount of time service spent in an <i>OK</i> state during scheduled uptime, less the excluded downtimes.  |
| downtime           | integer | Amount of time service spent in a <i>not OK</i> state during scheduled uptime, less the excluded downtimes.   |
| sli                | float   | SLI (per cent of total uptime), based on uptime and downtime.   |
| error_budget       | integer | Error budget (in seconds), based on the SLI and the SLO.  |
| excluded_downtimes | array   | Array of excluded downtimes in this reporting period.<br><br>Each object will contain the following parameters:<br>- <i>name</i> - Name of the excluded downtime.<br>- <i>period_from</i> - Starting date and time (inclusive) of the excluded downtime.<br>- <i>period_to</i> - Ending date and time (exclusive) of the excluded downtime.<br><br>Excluded downtimes are sorted by <i>period_from</i> field ascending. |

## Examples

### Calculating SLI

Retrieve SLI data on services with IDs "50", "60" and "70" that are linked to the SLA with ID "5". Retrieve data for 3 periods starting from Nov 01, 2021.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "sla.getsli",
  "params": {
    "slaid": "5",
    "serviceids": [
      50,
      60,
      70
    ],
    "periods": 3,
    "period_from": "1635724800"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "periods": [
      {
        "period_from": 1635724800,
        "period_to": 1638316800
      },
      {
        "period_from": 1638316800,
        "period_to": 1640995200
      },
      {
        "period_from": 1640995200,
        "period_to": 1643673600
      }
    ],
    "serviceids": [
      50,
      60,
      70
    ]
  }
}
```

```

],
"sli": [
  [
    {
      "uptime": 1186212,
      "downtime": 0,
      "sli": 100,
      "error_budget": 0,
      "excluded_downtimes": [
        {
          "name": "Excluded Downtime - 1",
          "period_from": 1637836212,
          "period_to": 1638316800
        }
      ]
    },
    {
      "uptime": 1186212,
      "downtime": 0,
      "sli": 100,
      "error_budget": 0,
      "excluded_downtimes": [
        {
          "name": "Excluded Downtime - 1",
          "period_from": 1637836212,
          "period_to": 1638316800
        }
      ]
    },
    {
      "uptime": 1186212,
      "downtime": 0,
      "sli": 100,
      "error_budget": 0,
      "excluded_downtimes": [
        {
          "name": "Excluded Downtime - 1",
          "period_from": 1637836212,
          "period_to": 1638316800
        }
      ]
    }
  ],
  [
    {
      "uptime": 1147548,
      "downtime": 0,
      "sli": 100,
      "error_budget": 0,
      "excluded_downtimes": [
        {
          "name": "Excluded Downtime - 1",
          "period_from": 1638439200,
          "period_to": 1639109652
        }
      ]
    },
    {
      "uptime": 1147548,
      "downtime": 0,
      "sli": 100,
      "error_budget": 0,
    }
  ]
]

```

```

        "excluded_downtimes": [
            {
                "name": "Excluded Downtime - 1",
                "period_from": 1638439200,
                "period_to": 1639109652
            }
        ]
    },
    {
        "uptime": 1147548,
        "downtime": 0,
        "sli": 100,
        "error_budget": 0,
        "excluded_downtimes": [
            {
                "name": "Excluded Downtime - 1",
                "period_from": 1638439200,
                "period_to": 1639109652
            }
        ]
    }
],
[
    {
        "uptime": 1674000,
        "downtime": 0,
        "sli": 100,
        "error_budget": 0,
        "excluded_downtimes": []
    },
    {
        "uptime": 1674000,
        "downtime": 0,
        "sli": 100,
        "error_budget": 0,
        "excluded_downtimes": []
    },
    {
        "uptime": 1674000,
        "downtime": 0,
        "sli": 100,
        "error_budget": 0,
        "excluded_downtimes": []
    }
]
],
{
    "id": 1
}

```

Source

CSla::getSli() in *ui/include/classes/api/services/CSla.php*

### sla.update

Description

object sla.update(object/array slaids)

This method allows to update existing SLA entries.



**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object/array) SLA properties to be updated.

The `slaid` property must be defined for each SLA, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard SLA properties](#), the method accepts the following parameters.

| Parameter          | Type  | Description  |
|--------------------|-------|--|
| service_tags       | array | SLA <a href="#">service tags</a> to replace the current SLA service tags.<br><br>At least one service tag must be specified.<br>SLA <a href="#">schedule</a> to replace the current one. |
| schedule           | array |  |
| excluded_downtimes | array | Specifying parameter as empty will be interpreted as a 24x7 schedule.<br>SLA <a href="#">excluded downtimes</a> to replace the current ones.   |

**Return values**

(object) Returns an object containing the IDs of the updated SLAs under the `slaids` property.

**Examples****Updating service tags**

Make SLA with ID "5" to be calculated at monthly intervals for NoSQL related services, without changing its schedule or excluded downtimes; set SLO to 95%.

**Request:**

```
{
  "jsonrpc": "2.0",
  "method": "sla.update",
  "params": [
    {
      "slaid": "5",
      "name": "NoSQL Database engines",
      "slo": "95",
      "period": 2,
      "service_tags": [
        {
          "tag": "Database",
          "operator": "0",
          "value": "Redis"
        },
        {
          "tag": "Database",
          "operator": "0",
          "value": "MongoDB"
        }
      ]
    }
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

**Response:**

```
{
  "jsonrpc": "2.0",
```

```

    "result": {
      "slaid": [
        "5"
      ]
    },
    "id": 1
  }
}

```

Changing the schedule of an SLA

Switch the SLA with ID "5" to a 24x7 schedule.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "service.update",
  "params": {
    "slaid": "5",
    "schedule": []
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "slaid": [
      "5"
    ]
  },
  "id": 1
}

```

Changing the excluded downtimes for an SLA

Add a planned 4 hour long RAM upgrade downtime on the 6th of April, 2022, while keeping (needs to be defined anew) a previously existing software upgrade planned on the 4th of July for the SLA with ID "5".

Request:

```

{
  "jsonrpc": "2.0",
  "method": "service.update",
  "params": {
    "slaid": "5",
    "excluded_downtimes": [
      {
        "name": "Software version upgrade rollout",
        "period_from": "1648760400",
        "period_to": "1648764900"
      },
      {
        "name": "RAM upgrade",
        "period_from": "1649192400",
        "period_to": "1649206800"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "slais": [
      "5"
    ]
  },
  "id": 1
}
```

Source

CSla::update() in *ui/include/classes/api/services/CSla.php*.

## Task

This class is designed to work with tasks (such as checking items or low-level discovery rules without config reload).

Object references:

- [Task](#)
- ['Check now' request object](#)
- ['Diagnostic information' request object](#)
- [Statistic request object](#)
- [Statistic result object](#)

Available methods:

- [task.create](#) - creating new tasks
- [task.get](#) - retrieving tasks

## > Task object

The following objects are directly related to the task API.

The task object has the following properties:

| Property                     | Type      | Description  |
|------------------------------|-----------|--|
| taskid                       | string    | <i>(readonly)</i> ID of the task.  |
| <b>type</b><br>(required)    | integer   | Type of the task.<br><br>Possible values:<br>1 - Diagnostic information;<br>6 - Check now.   |
| status                       | integer   | <i>(readonly)</i> Status of the task.<br><br>Possible values:<br>1 - new task;<br>2 - task in progress;<br>3 - task is completed;<br>4 - task is expired.  |
| clock                        | timestamp | <i>(readonly)</i> Time when the task was created.  |
| ttl                          | integer   | <i>(readonly)</i> The time in seconds after which task expires.  |
| proxy_hostid                 | string    | ID of the proxy about which diagnostic information statistic is collected.<br>Ignored for 'Check now' tasks.   |
| <b>request</b><br>(required) | object    | Task request object according to the task type:<br>Object of 'Check now' task is <a href="#">described in detail below</a> ;<br>Object of 'Diagnostic information' task is <a href="#">described in detail below</a> . |
| result                       | object    | <i>(readonly)</i> Result object of the diagnostic information task. May contain NULL if result is not yet ready. Result object is <a href="#">described in detail below</a> .  |

#### 'Check now' request object

The 'Check now' task request object has the following properties.

| Property | Type   | Description                               |
|----------|--------|---|
| itemid   | string | ID of item and low-level discovery rules. |

#### 'Diagnostic information' request object

The diagnostic information task request object has the following properties. Statistic request object for all types of properties is [described in detail below](#).

| Property      | Type   | Description   |
|---------------|--------|---|
| historycache  | object | History cache statistic request. Available on server and proxy.         |
| valuecache    | object | Items cache statistic request. Available on server.                     |
| preprocessing | object | Preprocessing manager statistic request. Available on server and proxy. |
| alerting      | object | Alert manager statistic request. Available on server.                   |
| lld           | object | LLD manager statistic request. Available on server.                     |

#### Statistic request object

Statistic request object is used to define what type of information should be collected about server/proxy internal processes. It has the following properties.

| Property | Type   | Description  |
|----------|--------|--|
| stats    | query  | Statistic object properties to be returned. The list of available fields for each type of diagnostic information statistic are <a href="#">described in detail below</a> .   |
| top      | object | <p>Default: <code>extend</code> will return all available statistic fields.</p> <p>Object to sort and limit returned statistic values. The list of available fields for each type of diagnostic information statistic are <a href="#">described in detail below</a>.</p> <p>Example:<br/>{ "source.alerts": 10 }</p> |

#### List of statistic fields available for each type of diagnostic information request

Following statistic fields can be requested for each type of diagnostic information request property.

| Diagnostic type | Available fields | Description  |
|-----------------|------------------|--|
| historycache    | items            | Number of cached items.  |
|                 | values           | Number of cached values.   |
|                 | memory           | Shared memory statistics (free space, number of used chunks, number of free chunks, max size of free chunk). |
|                 | memory.data      | History data cache shared memory statistics.   |
| valuecache      | memory.index     | History index cache shared memory statistics.  |
|                 | items            | Number of cached items.  |
|                 | values           | Number of cached values.   |
|                 | memory           | Shared memory statistics (free space, number of used chunks, number of free chunks, max size of free chunk). |
| preprocessing   | mode             | Value cache mode.  |
|                 | values           | Number of queued values.   |

| Diagnostic type | Available fields | Description                                       |
|-----------------|------------------|---|
| alerting<br>lld | preproc.values   | Number of queued values with preprocessing steps. |
|                 | alerts           | Number of queued alerts.                          |
|                 | rules            | Number of queued rules.                           |
|                 | values           | Number of queued values.                          |

List of sorting fields available for each type of diagnostic information request

Following statistic fields can be used to sort and limit requested information.

| Diagnostic type | Available fields | Type    |
|-----------------|------------------|---------|
| historycache    | values           | integer |
| valuecache      | values           | integer |
|                 | request.values   | integer |
| preprocessing   | values           | integer |
| alerting        | media.alerts     | integer |
|                 | source.alerts    | integer |
| lld             | values           | integer |

Statistic result object

Statistic result object is retrieved in `result` field of task object.

| Property | Type          | Description   |
|----------|---------------|---|
| status   | integer       | ( <i>readonly</i> ) Status of the task result.  |
| data     | string/object | Possible values:<br>-1 - error occurred during performing task;<br>0 - task result is created.<br>Results according the statistic request object of particular diagnostic information task. Contains error message string if error occurred during performing task. |

## task.create

Description

`object task.create(object/array tasks)`

This method allows to create a new task (such as collect diagnostic data or check items or low-level discovery rules without config reload).

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) A task to create.

The method accepts the following parameters.

| Parameter                 | Type    | Description   |
|---------------------------|---------|---|
| <b>type</b><br>(required) | integer | Task type.<br><br>Possible values:<br>1 - Diagnostic information;<br>6 - Check now. |

| Parameter                    | Type    | Description  |
|------------------------------|---------|--|
| <b>request</b><br>(required) | object  | Task request object according to the task type. Correct format of request object is described in <b>Task object</b> section. |
| proxy_hostid                 | integer | Proxy about which Diagnostic information task will collect data.   |
|                              |         | Ignored for 'Check now' tasks.   |

Note that 'Check now' tasks can be created only for the following types of items/discovery rules:

- Zabbix agent
- SNMPv1/v2/v3 agent
- Simple check
- Internal check
- External check
- Database monitor
- HTTP agent
- IPMI agent
- SSH agent
- TELNET agent
- Calculated check
- JMX agent

Return values

(object) Returns an object containing the IDs of the created tasks under the `taskids` property. One task is created for each item and low-level discovery rule. The order of the returned IDs matches the order of the passed `itemids`.

Examples

Creating a task

Create a task `check now` for two items. One is an item, the other is a low-level discovery rule.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "task.create",
  "params": [
    {
      "type": 6,
      "request": {
        "itemid": "10092"
      }
    },
    {
      "type": "6",
      "request": {
        "itemid": "10093"
      }
    }
  ],
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "taskids": [
      "1",
      "2"
    ]
  },
}
```

```
    "id": 1
}
```

Create a task diagnostic information task.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "task.create",
  "params": [
    {
      "type": 1,
      "request": {
        "alerting": {
          "stats": [
            "alerts"
          ],
          "top": {
            "media.alerts": 10
          }
        },
        "l1d": {
          "stats": "extend",
          "top": {
            "values": 5
          }
        }
      },
      "proxy_hostid": 0
    }
  ],
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 2
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "taskids": [
      "3"
    ]
  },
  "id": 2
}
```

See also

- [Task](#)
- ['Check now' request object](#)
- ['Diagnostic information' request object](#)
- [Statistic request object](#)

Source

CTask::create() in *ui/include/classes/api/services/CTask.php*.

## task.get

Description

integer/array task.get(object parameters)

The method allows to retrieve tasks according to the given parameters. Method returns details only about 'diagnostic information' tasks.

**Note:**

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter    | Type         | Description  |
|--------------|--------------|--|
| taskids      | string/array | Return only tasks with the given IDs.  |
| output       | query        | These parameters are described in the <a href="#">reference commentary</a> . |
| preservekeys | boolean      |  |

**Return values**

(integer/array) Returns an array of objects.

**Examples****Retrieve task by ID**

Retrieve all the data about the task with the ID "1".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "task.get",
  "params": {
    "output": "extend",
    "taskids": "1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "taskid": "1",
      "type": "7",
      "status": "3",
      "clock": "1601039076",
      "ttl": "3600",
      "proxy_hostid": null,
      "request": {
        "alerting": {
          "stats": [
            "alerts"
          ],
          "top": {
            "media.alerts": 10
          }
        },
        "l1d": {
          "stats": "extend",
          "top": {
            "values": 5
          }
        }
      }
    }
  ],
}
```



```

        "result": {
            "data": {
                "alerting": {
                    "alerts": 0,
                    "top": {
                        "media.alerts": []
                    },
                    "time": 0.000663
                },
                "lld": {
                    "rules": 0,
                    "values": 0,
                    "top": {
                        "values": []
                    },
                    "time": 0.000442
                }
            },
            "status": "0"
        }
    ],
    "id": 1
}

```

See also

- [Task](#)
- [Statistic result object](#)

Source

CTask::get() in *ui/include/classes/api/services/CTask.php*.

## Template

This class is designed to work with templates.

Object references:

- [Template](#)

Available methods:

- [template.create](#) - creating new templates
- [template.delete](#) - deleting templates
- [template.get](#) - retrieving templates
- [template.massadd](#) - adding related objects to templates
- [template.massremove](#) - removing related objects from templates
- [template.massupdate](#) - replacing or removing related objects from templates
- [template.update](#) - updating templates

## > Template object

The following objects are directly related to the `template` API.

Template

The template object has the following properties.

| Property                  | Type   | Description                             |
|---------------------------|--------|---|
| <code>templateid</code>   | string | ( <i>readonly</i> ) ID of the template. |
| <b>host</b><br>(required) | string | Technical name of the template.         |
| <code>description</code>  | text   | Description of the template.            |

| Property | Type   | Description   |
|----------|--------|---|
| name     | string | Visible name of the template.   |
| uuid     | string | Default: host property value.<br>Universal unique identifier, used for linking imported templates to already existing ones. Auto-generated, if not given. |

Note that for some methods (update, delete) the required/optional parameter combination is different.

Template tag

The template tag object has the following properties.

| Property                 | Type   | Description         |
|--------------------------|--------|---------------------|
| <b>tag</b><br>(required) | string | Template tag name.  |
| value                    | string | Template tag value. |

## template.create

Description

`object template.create(object/array templates)`

This method allows to create new templates.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Templates to create.

Additionally to the [standard template properties](#), the method accepts the following parameters.

| Parameter                   | Type         | Description  |
|-----------------------------|--------------|--|
| <b>groups</b><br>(required) | object/array | Host <a href="#">groups</a> to add the template to.<br><br>The host groups must have the <code>groupid</code> property defined.      |
| tags                        | object/array | Template <a href="#">tags</a> .  |
| templates                   | object/array | <a href="#">Templates</a> to be linked to the template.<br><br>The templates must have the <code>templateid</code> property defined. |
| macros                      | object/array | <a href="#">User macros</a> to be created for the template.  |

Return values

(object) Returns an object containing the IDs of the created templates under the `templateids` property. The order of the returned IDs matches the order of the passed templates.

Examples

Creating a template

Create a template with tags and link two templates to this template.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.create",
  "params": {
    "host": "Linux template",
```

```

    "groups": {
        "groupid": 1
    },
    "templates": [
        {
            "templateid": "11115"
        },
        {
            "templateid": "11116"
        }
    ],
    "tags": [
        {
            "tag": "Host name",
            "value": "{HOST.NAME}"
        }
    ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "templateids": [
            "11117"
        ]
    },
    "id": 1
}

```

Source

CTemplate::create() in `ui/include/classes/api/services/CTemplate.php`.

## template.delete

Description

object `template.delete(array templateIds)`

This method allows to delete templates.

Deleting a template will cause deletion of all template entities (items, triggers, graphs, etc.). To leave template entities with the hosts, but delete the template itself, first unlink the template from required hosts using one of these methods: [template.update](#), [template.massupdate](#), [host.update](#), [host.massupdate](#).

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the templates to delete.

Return values

(object) Returns an object containing the IDs of the deleted templates under the `templateids` property.

Examples

Deleting multiple templates

Delete two templates.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.delete",
  "params": [
    "13",
    "32"
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "13",
      "32"
    ]
  },
  "id": 1
}
```

Source

CTemplate::delete() in *ui/include/classes/api/services/CTemplate.php*.

## template.get

Description

integer/array template.get(object parameters)

The method allows to retrieve templates according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter         | Type         | Description   |
|-------------------|--------------|---|
| templateids       | string/array | Return only templates with the given template IDs.                  |
| groupids          | string/array | Return only templates that belong to the given host groups.         |
| parentTemplateids | string/array | Return only templates that are parent to the given templates.       |
| hostids           | string/array | Return only templates that are linked to the given hosts/templates. |
| graphids          | string/array | Return only templates that contain the given graphs.                |
| itemids           | string/array | Return only templates that contain the given items.                 |
| triggerids        | string/array | Return only templates that contain the given triggers.              |
| with_items        | flag         | Return only templates that have items.                              |
| with_triggers     | flag         | Return only templates that have triggers.                           |
| with_graphs       | flag         | Return only templates that have graphs.                             |
| with_httptests    | flag         | Return only templates that have web scenarios.                      |
| evaltype          | integer      | Rules for tag searching.  |

Possible values:  
0 - (default) And/Or;  
2 - Or.

| Parameter  | Type         | Description   |
|--|--------------|---|
| tags   | object/array | <p>Return only templates with given tags. Exact match by tag and case-sensitive or case-insensitive search by tag value depending on operator value.</p> <p>Format: [{"tag": "&lt;tag&gt;", "value": "&lt;value&gt;", "operator": "&lt;operator&gt;"}, ...].</p> <p>An empty array returns all templates.</p> <p>Possible operator values:</p> <ul style="list-style-type: none"> <li>0 - (default) Contains;</li> <li>1 - Equals;</li> <li>2 - Not like;</li> <li>3 - Not equal</li> <li>4 - Exists;</li> <li>5 - Not exists.</li> </ul> |
| selectGroups   | query        | Return the host groups that the template belongs to in the <b>groups</b> property.  |
| selectTags   | query        | Return template tags in the <b>tags</b> property.   |
| selectHosts  | query        | Return the hosts that are linked to the template in the <b>hosts</b> property.  |
| selectTemplates  | query        | <p>Supports count.</p> <p>Return templates to which the template is a child, in the <b>templates</b> property.</p>  |
| selectParentTemplates  | query        | <p>Supports count.</p> <p>Return templates to which the template is a parent, in the <b>parentTemplates</b> property.</p>   |
| selectHttpTests  | query        | <p>Supports count.</p> <p>Return the web scenarios from the template in the <b>httpTests</b> property.</p>  |
| selectItems  | query        | <p>Supports count.</p> <p>Return items from the template in the <b>items</b> property.</p>  |
| selectDiscoveries  | query        | <p>Supports count.</p> <p>Return low-level discoveries from the template in the <b>discoveries</b> property.</p>  |
| selectTriggers   | query        | <p>Supports count.</p> <p>Return triggers from the template in the <b>triggers</b> property.</p>  |
| selectGraphs   | query        | <p>Supports count.</p> <p>Return graphs from the template in the <b>graphs</b> property.</p>  |
| selectMacros   | query        | Supports count.<br>Return the macros from the template in the <b>macros</b> property..  |
| selectDashboards   | query        | Return dashboards from the template in the <b>dashboards</b> property.  |
| selectValueMaps  | query        | Supports count.<br>Return a <b>valuemaps</b> property with template value maps.   |
| limitSelects   | integer      | Limits the number of records returned by subselects.  |
| <p>Applies to the following subselects:</p> <ul style="list-style-type: none"> <li><b>selectTemplates</b> - results will be sorted by name;</li> <li><b>selectHosts</b> - sorted by host;</li> <li><b>selectParentTemplates</b> - sorted by host;</li> <li><b>selectItems</b> - sorted by name;</li> <li><b>selectDiscoveries</b> - sorted by name;</li> <li><b>selectTriggers</b> - sorted by description;</li> <li><b>selectGraphs</b> - sorted by name;</li> <li><b>selectDashboards</b> - sorted by name.</li> </ul> |              |   |

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| sortfield              | string/array | Sort the result by the given properties.   |
| countOutput            | boolean      | Possible values are: <code>hostid</code> , <code>host</code> , <code>name</code> , <code>status</code> .<br>These parameters are described in the <a href="#">reference commentary</a> . |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

##### Retrieving templates by name

Retrieve all data about two templates named "Linux" and "Windows".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.get",
  "params": {
    "output": "extend",
    "filter": {
      "host": [
        "Linux",
        "Windows"
      ]
    }
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "proxy_hostid": "0",
      "host": "Linux",
      "status": "3",
      "disable_until": "0",
      "error": "",
      "available": "0",
      "errors_from": "0",
      "lastaccess": "0",
      "ipmi_authtype": "0",
      "ipmi_privilege": "2",
      "ipmi_username": "",
      "ipmi_password": "",

```

```

    "ipmi_disable_until": "0",
    "ipmi_available": "0",
    "snmp_disable_until": "0",
    "snmp_available": "0",
    "maintenanceid": "0",
    "maintenance_status": "0",
    "maintenance_type": "0",
    "maintenance_from": "0",
    "ipmi_errors_from": "0",
    "snmp_errors_from": "0",
    "ipmi_error": "",
    "snmp_error": "",
    "jmx_disable_until": "0",
    "jmx_available": "0",
    "jmx_errors_from": "0",
    "jmx_error": "",
    "name": "Linux",
    "flags": "0",
    "templateid": "10001",
    "description": "",
    "tls_connect": "1",
    "tls_accept": "1",
    "tls_issuer": "",
    "tls_subject": "",
    "tls_psk_identity": "",
    "tls_psk": "",
    "uuid": "282ffe33afc74cccaf1524d9aa9dc502"
  },
  {
    "proxy_hostid": "0",
    "host": "Windows",
    "status": "3",
    "disable_until": "0",
    "error": "",
    "available": "0",
    "errors_from": "0",
    "lastaccess": "0",
    "ipmi_authtype": "0",
    "ipmi_privilege": "2",
    "ipmi_username": "",
    "ipmi_password": "",
    "ipmi_disable_until": "0",
    "ipmi_available": "0",
    "snmp_disable_until": "0",
    "snmp_available": "0",
    "maintenanceid": "0",
    "maintenance_status": "0",
    "maintenance_type": "0",
    "maintenance_from": "0",
    "ipmi_errors_from": "0",
    "snmp_errors_from": "0",
    "ipmi_error": "",
    "snmp_error": "",
    "jmx_disable_until": "0",
    "jmx_available": "0",
    "jmx_errors_from": "0",
    "jmx_error": "",
    "name": "Windows",
    "flags": "0",
    "templateid": "10081",
    "description": "",
    "tls_connect": "1",

```

```

        "tls_accept": "1",
        "tls_issuer": "",
        "tls_subject": "",
        "tls_psk_identity": "",
        "tls_psk": "",
        "uuid": "522d17e1834049be879287b7c0518e5d"
    }
],
    "id": 1
}

```

#### Retrieving hosts by template

Retrieve hosts that have the "10001" (*Linux by Zabbix agent*) template linked to them.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "template.get",
    "params": {
        "output": "templateid",
        "templateids": "10001",
        "selectHosts": ["hostid", "name"]
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "templateid": "10001",
            "hosts": [
                {
                    "hostid": "10084",
                    "name": "Zabbix server"
                },
                {
                    "hostid": "10603",
                    "name": "Host 1"
                },
                {
                    "hostid": "10604",
                    "name": "Host 2"
                }
            ]
        }
    ],
    "id": 1
}

```

#### Searching by template tags

Retrieve templates that have tag "Host name" equal to "{HOST.NAME}".

Request:

```

{
    "jsonrpc": "2.0",
    "method": "template.get",
    "params": {
        "output": ["hostid"],
        "selectTags": "extend",

```



```

    "evaltype": 0,
    "tags": [
      {
        "tag": "Host name",
        "value": "{HOST.NAME}",
        "operator": 1
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "10402",
      "tags": [
        {
          "tag": "Host name",
          "value": "{HOST.NAME}"
        }
      ]
    }
  ],
  "id": 1
}

```

See also

- [Host group](#)
- [Template](#)
- [User macro](#)
- [Host interface](#)

Source

CTemplate::get() in `ui/include/classes/api/services/CTemplate.php`.

## template.massadd

Description

object `template.massadd(object parameters)`

This method allows to simultaneously add multiple related objects to the given templates.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the templates to update and the objects to add to the templates.

The method accepts the following parameters.

| Parameter                      | Type         | Description   |
|--------------------------------|--------------|---|
| <b>templates</b><br>(required) | object/array | Templates to be updated.<br><br>The templates must have the <code>templateid</code> property defined. |

| Parameter      | Type         | Description  |
|----------------|--------------|--|
| groups         | object/array | Host groups to add the given templates to.   |
| macros         | object/array | The host groups must have the <code>groupid</code> property defined.<br>User macros to be created for the given templates. |
| templates_link | object/array | Templates to link to the given templates.<br>The templates must have the <code>templateid</code> property defined.         |

#### Return values

(object) Returns an object containing the IDs of the updated templates under the `templateids` property.

#### Examples

Link a group to templates

Add host group "2" to two templates.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.massadd",
  "params": {
    "templates": [
      {
        "templateid": "10085"
      },
      {
        "templateid": "10086"
      }
    ],
    "groups": [
      {
        "groupid": "2"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "10085",
      "10086"
    ]
  },
  "id": 1
}
```

Link two templates to a template

Link templates "10106" and "10104" to template.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.massadd",
  "params": {
    "templates": [
```

```

        {
            "templateid": "10073"
        }
    ],
    "templates_link": [
        {
            "templateid": "10106"
        },
        {
            "templateid": "10104"
        }
    ]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "templateids": [
            "10073"
        ]
    },
    "id": 1
}

```

See also

- [template.update](#)
- [Host](#)
- [Host group](#)
- [User macro](#)

Source

CTemplate::massAdd() in `ui/include/classes/api/services/CTemplate.php`.

## template.massremove

Description

object `template.massremove(object parameters)`

This method allows to remove related objects from multiple templates.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the templates to update and the objects that should be removed.

| Parameter                        | Type         | Description  |
|----------------------------------|--------------|--|
| <b>templateids</b><br>(required) | string/array | IDs of the templates to be updated.                                |
| groupids                         | string/array | Host groups to remove the given templates from.                    |
| macros                           | string/array | User macros to delete from the given templates.                    |
| templateids_clear                | string/array | Templates to unlink and clear from the given templates (upstream). |
| templateids_link                 | string/array | Templates to unlink from the given templates (upstream).           |

Return values

(object) Returns an object containing the IDs of the updated templates under the `templateids` property.

#### Examples

##### Removing templates from a group

Remove two templates from group "2".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.massremove",
  "params": {
    "templateids": [
      "10085",
      "10086"
    ],
    "groupids": "2"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "10085",
      "10086"
    ]
  },
  "id": 1
}
```

##### Unlinking templates from a host

Unlink templates "10106", "10104" from template "10085".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.massremove",
  "params": {
    "templateids": "10085",
    "templateids_link": [
      "10106",
      "10104"
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "10085"
    ]
  },
  "id": 1
}
```

See also

- [template.update](#)
- [User macro](#)

Source

CTemplate::massRemove() in *ui/include/classes/api/services/CTemplate.php*.

**template.massupdate**

Description

object `template.massupdate(object parameters)`

This method allows to simultaneously replace or remove related objects and update properties on multiple templates.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters containing the IDs of the templates to update and the objects to replace for the templates.

The method accepts the following parameters.

| Parameter                      | Type         | Description  |
|--------------------------------|--------------|--|
| <b>templates</b><br>(required) | object/array | Templates to be updated.   |
| groups                         | object/array | The templates must have the <code>templateid</code> property defined.<br>Host groups to replace the current host groups the templates belong to. |
| macros                         | object/array | The host groups must have the <code>groupid</code> property defined.<br>User macros to replace the current user macros on the given templates.   |
| templates_clear                | object/array | Templates to unlink and clear from the given templates.  |
| templates_link                 | object/array | The templates must have the <code>templateid</code> property defined.<br>Templates to replace the currently linked templates.                    |
|                                |              | The templates must have the <code>templateid</code> property defined.  |

Return values

(object) Returns an object containing the IDs of the updated templates under the `templateids` property.

Examples

Replacing host groups

Unlink and clear template "10091" from the given templates.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.massupdate",
  "params": {
    "templates": [
      {
        "templateid": "10085"
      },
      {
        "templateid": "10086"
      }
    ]
  },
}
```

```

        "templates_clear": [
            {
                "templateid": "10091"
            }
        ],
        "auth": "038e1d7b1735c6a5436ee9eae095879e",
        "id": 1
    }
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "templateids": [
            "10085",
            "10086"
        ]
    },
    "id": 1
}

```

See also

- [template.update](#)
- [template.massadd](#)
- [Host group](#)
- [User macro](#)

Source

CTemplate::massUpdate() in `ui/include/classes/api/services/CTemplate.php`.

## template.update

Description

`object template.update(object/array templates)`

This method allows to update existing templates.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Template properties to be updated.

The `templateid` property must be defined for each template, all other properties are optional. Only the given properties will be updated, all others will remain unchanged.

Additionally to the [standard template properties](#), the method accepts the following parameters.

| Parameter | Type         | Description   |
|-----------|--------------|---|
| groups    | object/array | Host <a href="#">groups</a> to replace the current host groups the templates belong to.                               |
| tags      | object/array | The host groups must have the <code>groupid</code> property defined.  |
| macros    | object/array | Template <a href="#">tags</a> to replace the current template tags.   |
|           |              | <a href="#">User macros</a> to replace the current user macros on the given templates.                                |
| templates | object/array | <a href="#">Templates</a> to replace the currently linked templates. Templates that are not passed are only unlinked. |

The templates must have the `templateid` property defined.

| Parameter  | Type         | Description  |
|--|--------------|--|
| templates_clear  | object/array | <b>Templates</b> to unlink and clear from the given templates. |
| The templates must have the templateid property defined. |              |  |

#### Return values

(object) Returns an object containing the IDs of the updated templates under the templateids property.

#### Examples

##### Changing the standard template properties

Change the technical name of the template to "Linux by Zabbix agent Custom", the visible name to "My template", and update the template description.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.update",
  "params": {
    "templateid": "10086",
    "host": "Linux by Zabbix agent Custom",
    "name": "My template",
    "description": "This is a custom Linux template."
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "10086"
    ]
  },
  "id": 1
}
```

##### Updating template groups

Replace all template groups for the given template with a different one.

##### Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.update",
  "params": {
    "templateid": "10086",
    "groups": [
      {
        "groupid": "24"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

##### Response:

```
{
  "jsonrpc": "2.0",
```

```
    "result": {
      "templateids": [
        "10086"
      ]
    },
    "id": 1
  }
}
```

#### Updating template tags

Replace all template tags with a different one.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.update",
  "params": {
    "templateid": "10086",
    "tags": [
      {
        "tag": "Host name",
        "value": "{HOST.NAME}"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "10086"
    ]
  },
  "id": 1
}
```

#### Updating template macros

Replace all template macros with a different one.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.update",
  "params": {
    "templateid": "10086",
    "macros": [
      {
        "macro": "{$MY_MACRO}",
        "value": "new_value"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
```



```
    "result": {
      "templateids": [
        "10086"
      ]
    },
    "id": 1
  }
```

#### Updating template linked templates

Unlink (without clearing) all templates from the given template and link a different one to it.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.update",
  "params": {
    "templateid": "10086",
    "templates": [
      {
        "templateid": "10087"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
      "10086"
    ]
  },
  "id": 1
}
```

#### Clearing template linked templates

Unlink and clear the given template from a specific linked template.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "template.update",
  "params": {
    "templateid": "10086",
    "templates_clear": [
      {
        "templateid": "10087"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "templateids": [
```

```

        "10086"
    ],
    },
    "id": 1
}

```

Source

CTemplate::update() in *ui/include/classes/api/services/CTemplate.php*.

## Template dashboard

This class is designed to work with template dashboards.

Object references:

- [Template dashboard](#)
- [Template dashboard page](#)
- [Template dashboard widget](#)
- [Template dashboard widget field](#)

Available methods:

- [templatedashboard.create](#) - creating new template dashboards
- [templatedashboard.delete](#) - deleting template dashboards
- [templatedashboard.get](#) - retrieving template dashboards
- [templatedashboard.update](#) - updating template dashboards

### > Template dashboard object

The following objects are directly related to the `templatedashboard` API.

Template dashboard

The template dashboard object has the following properties.

| Property                                     | Type    | Description   |
|--|---------|---|
| <code>dashboardid</code>                     | string  | <i>(readonly)</i> ID of the template dashboard.   |
| <b><code>name</code></b><br>(required)       | string  | Name of the template dashboard.   |
| <b><code>templateid</code></b><br>(required) | string  | ID of the template the dashboard belongs to.  |
| <code>display_period</code>                  | integer | Default page display period (in seconds).<br><br>Possible values: 10, 30, 60, 120, 600, 1800, 3600.   |
| <code>auto_start</code>                      | integer | Default: 30.<br>Auto start slideshow.<br><br>Possible values:<br>0 - do not auto start slideshow;<br>1 - <i>(default)</i> auto start slideshow. |
| <code>uuid</code>                            | string  | Universal unique identifier, used for linking imported template dashboards to already existing ones. Auto-generated, if not given.              |

Note that for some methods (update, delete) the required/optional parameter combination is different.

Template dashboard page

The template dashboard page object has the following properties.

| Property         | Type    | Description  |
|------------------|---------|--|
| dashboard_pageid | string  | ( <i>readonly</i> ) ID of the dashboard page.  |
| name             | string  | Dashboard page name.   |
| display_period   | integer | Default: empty string.<br>Dashboard page display period (in seconds).<br><br>Possible values: 0, 10, 30, 60, 120, 600, 1800, 3600. |
| widgets          | array   | Default: 0 (will use the default page display period).<br>Array of the <b>template dashboard widget</b> objects.                   |

#### Template dashboard widget

The template dashboard widget object has the following properties.

| Property                  | Type    | Description   |
|---------------------------|---------|---|
| widgetid                  | string  | ( <i>readonly</i> ) ID of the dashboard widget.   |
| <b>type</b><br>(required) | string  | Type of the dashboard widget.<br><br>Possible values:<br>clock - Clock;<br>graph - Graph (classic);<br>graphprototype - Graph prototype;<br>item - Item value;<br>plaintext - Plain text;<br>url - URL; |
| name                      | string  | Custom widget name.   |
| x                         | integer | A horizontal position from the left side of the dashboard.  |
| y                         | integer | Valid values range from 0 to 23.<br>A vertical position from the top of the dashboard.  |
| width                     | integer | Valid values range from 0 to 62.<br>The widget width.   |
| height                    | integer | Valid values range from 1 to 24.<br>The widget height.  |
| view_mode                 | integer | Valid values range from 2 to 32.<br>The widget view mode.   |
| fields                    | array   | Possible values:<br>0 - (default) default widget view;<br>1 - with hidden header;<br>Array of the <b>template dashboard widget field</b> objects.   |

#### Template dashboard widget field

The template dashboard widget field object has the following properties.

| Property                   | Type    | Description  |
|----------------------------|---------|--|
| <b>type</b><br>(required)  | integer | Type of the widget field.<br><br>Possible values:<br>0 - Integer;<br>1 - String;<br>4 - Item;<br>5 - Item prototype;<br>6 - Graph;<br>7 - Graph prototype. |
| name                       | string  | Widget field name.   |
| <b>value</b><br>(required) | mixed   | Widget field value depending on type.  |

## templatedashboard.create

### Description

object templatedashboard.create(object/array templateDashboards)

This method allows to create new template dashboards.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Template dashboards to create.

Additionally to the [standard template dashboard properties](#), the method accepts the following parameters.

| Parameter                  | Type  | Description   |
|----------------------------|-------|---|
| <b>pages</b><br>(required) | array | Template dashboard <b>pages</b> to be created for the dashboard. Dashboard pages will be ordered in the same order as specified. At least one dashboard page object is required for pages property. |

### Return values

(object) Returns an object containing the IDs of the created template dashboards under the dashboardids property. The order of the returned IDs matches the order of the passed template dashboards.

### Examples

#### Creating a template dashboard

Create a template dashboard named "Graphs" with one Graph widget on a single dashboard page.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "templatedashboard.create",
  "params": {
    "templateid": "10318",
    "name": "Graphs",
    "pages": [
      {
        "widgets": [
          {
            "type": "graph",
            "x": 0,
            "y": 0,
            "width": 12,
```

```

        "height": 5,
        "view_mode": 0,
        "fields": [
            {
                "type": 6,
                "name": "graphid",
                "value": "1123"
            }
        ]
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "dashboardids": [
            "32"
        ]
    },
    "id": 1
}

```

See also

- [Template dashboard page](#)
- [Template dashboard widget](#)
- [Template dashboard widget field](#)

Source

CTemplateDashboard::create() in *ui/include/classes/api/services/CTemplateDashboard.php*.

## templatedashboard.delete

Description

object templatedashboard.delete(array templateDashboardIds)

This method allows to delete template dashboards.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the template dashboards to delete.

Return values

(object) Returns an object containing the IDs of the deleted template dashboards under the dashboardids property.

Examples

Deleting multiple template dashboards

Delete two template dashboards.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "templatedashboard.delete",
  "params": [
    "45",
    "46"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "45",
      "46"
    ]
  },
  "id": 1
}
```

Source

CTemplateDashboard::delete() in *ui/include/classes/api/services/CTemplateDashboard.php*.

## templatedashboard.get

Description

integer/array templatedashboard.get(object parameters)

The method allows to retrieve template dashboards according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| dashboardids           | string/array | Return only template dashboards with the given IDs.                              |
| templateids            | string/array | Return only template dashboards that belong to the given templates.              |
| selectPages            | query        | Return a <b>pages</b> property with template dashboard pages, correctly ordered. |
| sortfield              | string/array | Sort the result by the given properties.   |
|                        |              | Possible values are: dashboardid and name.                                       |
| countOutput            | boolean      | These parameters are described in the <a href="#">reference commentary</a> .     |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |

| Parameter   | Type    | Description |
|-------------|---------|-------------|
| startSearch | boolean |             |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving template dashboards

Retrieve all template dashboards with widgets for a specified template.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "templatedashboard.get",
  "params": {
    "output": "extend",
    "selectPages": "extend",
    "templateids": "10001"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "dashboardid": "23",
      "name": "Docker overview",
      "templateid": "10001",
      "display_period": "30",
      "auto_start": "1",
      "uuid": "6dfcbe0bc5ad400ea9c1c2dd7649282f",
      "pages": [
        {
          "dashboard_pageid": "1",
          "name": "",
          "display_period": "0",
          "widgets": [
            {
              "widgetid": "220",
              "type": "graph",
              "name": "",
              "x": "0",
              "y": "0",
              "width": "12",
              "height": "5",
              "view_mode": "0",
              "fields": [
                {
                  "type": "6",
                  "name": "graphid",
                  "value": "1125"
                }
              ]
            }
          ]
        }
      ]
    }
  ],
  "id": 1
}
```

```

        "widgetid": "221",
        "type": "graph",
        "name": "",
        "x": "12",
        "y": "0",
        "width": "12",
        "height": "5",
        "view_mode": "0",
        "fields": [
            {
                "type": "6",
                "name": "graphid",
                "value": "1129"
            }
        ]
    },
    {
        "widgetid": "222",
        "type": "graph",
        "name": "",
        "x": "0",
        "y": "5",
        "width": "12",
        "height": "5",
        "view_mode": "0",
        "fields": [
            {
                "type": "6",
                "name": "graphid",
                "value": "1128"
            }
        ]
    },
    {
        "widgetid": "223",
        "type": "graph",
        "name": "",
        "x": "12",
        "y": "5",
        "width": "12",
        "height": "5",
        "view_mode": "0",
        "fields": [
            {
                "type": "6",
                "name": "graphid",
                "value": "1126"
            }
        ]
    },
    {
        "widgetid": "224",
        "type": "graph",
        "name": "",
        "x": "0",
        "y": "10",
        "width": "12",
        "height": "5",
        "view_mode": "0",
        "fields": [
            {
                "type": "6",

```



```

        "name": "graphid",
        "value": "1127"
    }
    ]
    }
    ]
    }
    ],
    "id": 1
}

```

See also

- [Template dashboard page](#)
- [Template dashboard widget](#)
- [Template dashboard widget field](#)

Source

CTemplateDashboard::get() in `ui/include/classes/api/services/CTemplateDashboard.php`.

## templatedashboard.update

Description

object templatedashboard.update(object/array templateDashboards)

This method allows to update existing template dashboards.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Template dashboard properties to be updated.

The `dashboardid` property must be specified for each dashboard, all other properties are optional. Only the specified properties will be updated.

Additionally to the [standard template dashboard properties](#), the method accepts the following parameters.

| Parameter | Type  | Description   |
|-----------|-------|---|
| pages     | array | <p>Template dashboard <a href="#">pages</a> to replace the existing dashboard pages.</p> <p>Dashboard pages are updated by the <code>dashboard_pageid</code> property. New dashboard pages will be created for objects without <code>dashboard_pageid</code> property and the existing dashboard pages will be deleted if not reused. Dashboard pages will be ordered in the same order as specified. Only the specified properties of the dashboard pages will be updated. At least one dashboard page object is required for <code>pages</code> property.</p> |

Return values

(object) Returns an object containing the IDs of the updated template dashboards under the `dashboardids` property.

Examples

Renaming a template dashboard

Rename a template dashboard to "Performance graphs".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "templatedashboard.update",
  "params": {
    "dashboardid": "23",
    "name": "Performance graphs"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "dashboardids": [
      "23"
    ]
  },
  "id": 1
}
```

Updating template dashboard pages

Rename the first dashboard page, replace widgets on the second dashboard page and add a new page as the third one. Delete all other dashboard pages.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "templatedashboard.update",
  "params": {
    "dashboardid": "2",
    "pages": [
      {
        "dashboard_pageid": 1,
        "name": 'Renamed Page'
      },
      {
        "dashboard_pageid": 2,
        "widgets": [
          {
            "type": "clock",
            "x": 0,
            "y": 0,
            "width": 4,
            "height": 3
          }
        ]
      },
      {
        "display_period": 60
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
```

```

        "dashboardids": [
            "2"
        ],
        "id": 2
    }
}

```

See also

- [Template dashboard widget](#)
- [Template dashboard widget field](#)

Source

CTemplateDashboard::update() in `ui/include/classes/api/services/CTemplateDashboard.php`.

## Token

This class is designed to work with tokens.

Object references:

- [Token](#)

Available methods:

- [token.create](#) - create new tokens
- [token.delete](#) - delete tokens
- [token.get](#) - retrieve tokens
- [token.update](#) - update tokens
- [token.generate](#) - generate tokens

## > Token object

The following objects are directly related to the token API.

Token

The token object has the following properties.

| Property                  | Type      | Description   |
|---------------------------|-----------|---|
| tokenid                   | string    | <i>(readonly)</i> ID of the token.  |
| <b>name</b><br>(required) | string    | Name of the token.  |
| description               | text      | Description of the token.   |
| userid                    | string    | <i>(readonly for update)</i> A user the token has been assigned to.   |
| lastaccess                | timestamp | <i>Default: current user.</i><br><i>(readonly)</i> Most recent date and time the token was authenticated.         |
| status                    | integer   | Zero if the token has never been authenticated.<br>Token status.  |
| expires_at                | timestamp | Possible values:<br>0 - <i>(default)</i> enabled token;<br>1 - disabled token.<br>Token expiration date and time. |
| created_at                | timestamp | Zero for never-expiring tokens.<br><i>(readonly)</i> Token creation date and time.                                |
| creator_userid            | string    | <i>(readonly)</i> The creator user of the token.  |

Note that for some methods (update, delete) the required/optional parameter combination is different.

## token.create

### Description

object token.create(object/array tokens)

This method allows to create new tokens.

#### Note:

The *Manage API tokens* **permission** is required for the user role to manage tokens for other users.

#### Attention:

A token created by this method also has to be **generated** before it is usable.

### Parameters

(object/array) Tokens to create.

The method accepts tokens with the **standard token properties**.

### Return values

(object) Returns an object containing the IDs of the created tokens under the **tokenids** property. The order of the returned IDs matches the order of the passed tokens.

### Examples

Create a token

Create an enabled token that never expires and authenticates user of ID 2.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "token.create",
  "params": {
    "name": "Your token",
    "userid": "2"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "tokenids": [
      "188"
    ]
  },
  "id": 1
}
```

Create a disabled token that expires at January 21st, 2021. This token will authenticate current user.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "token.create",
  "params": {
    "name": "Your token",
    "status": "1",
    "expires_at": "1611238072"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

```
    "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "tokenids": [
      "189"
    ]
  },
  "id": 1
}
```

Source

CToken::create() in *ui/include/classes/api/services/CToken.php*.

### token.delete

Description

object token.delete(array tokenids)

This method allows to delete tokens.

#### Note:

The *Manage API tokens permission* is required for the user role to manage tokens for other users.

Parameters

(array) IDs of the tokens to delete.

Return values

(object) Returns an object containing the IDs of the deleted tokens under the tokenids property.

Examples

Delete multiple tokens

Delete two tokens.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "token.delete",
  "params": [
    "188",
    "192"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "tokenids": [
      "188",
      "192"
    ]
  },
  "id": 1
}
```

Source

CToken::delete() in *ui/include/classes/api/services/CToken.php*.

## token.generate

Description

object token.generate(array tokenids)

This method allows to generate tokens.

### Note:

The *Manage API tokens permission* is required for the user role to manage tokens for other users.

### Attention:

A token can be generated by this method only if it has been *created*.

Parameters

(array) IDs of the tokens to generate.

Return values

(array) Returns an array of objects containing the ID of the generated token under the *tokenid* property and generated authorization string under *token* property.

| Property | Type   | Description  |
|----------|--------|--|
| tokenid  | string | ID of the token.                                   |
| token    | string | The generated authorization string for this token. |

Examples

Generate multiple tokens

Generate two tokens.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "token.generate",
  "params": [
    "1",
    "2"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "tokenid": "1",
      "token": "bbcfce79a2d95037502f7e9a534906d3466c9a1484beb6ea0f4e7be28e8b8ce2"
    },
    {
      "tokenid": "2",
      "token": "fa1258a83d518eabd87698a96bd7f07e5a6ae8aeb8463cae33d50b91dd21bd6d"
    }
  ],
  "id": 0
}
```

Source

CToken::generate() in *ui/include/classes/api/services/CToken.php*.

## token.get

Description

integer/array token.get(object parameters)

The method allows to retrieve tokens according to the given parameters.

### Note:

Only *Super admin* user type is allowed to view tokens for other users.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| tokenids               | string/array | Return only tokens with the given IDs.  |
| userids                | string/array | Return only tokens created for the given users.   |
| token                  | string       | Return only tokens created for the given <i>Auth token</i> .  |
| valid_at               | timestamp    | Return only tokens, which are valid (not expired) at the given date and time.   |
| expired_at             | timestamp    | Return only tokens, which are expired (not valid) at the given date and time.   |
| sortfield              | string/array | Sort the result by the given properties.<br><br>Possible values are: <code>tokenid</code> , <code>name</code> , <code>lastaccess</code> , <code>status</code> , <code>expires_at</code> and <code>created_at</code> .<br>These parameters are described in the <a href="#">reference commentary</a> . |
| countOutput            | boolean      |   |
| excludeSearch          | boolean      |   |
| filter                 | object       |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

Examples

Retrieve a token

Retrieve all data for the token with ID "2".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "token.get",
  "params": {
    "output": "extend",
    "tokenids": "2"
  },
}
```

```
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "tokenid": "1",
      "name": "The Token",
      "description": "",
      "userid": "1",
      "lastaccess": "0",
      "status": "0",
      "expires_at": "1609406220",
      "created_at": "1611239454",
      "creator_userid": "1"
    }
  ],
  "id": 1
}
```

Source

CToken::get() in `ui/include/classes/api/services/CToken.php`.

## token.update

Description

object token.update(object/array tokens)

This method allows to update existing tokens.

### Note:

The *Manage API tokens* **permission** is required for the user role to manage tokens for other users.

Parameters

(object/array) Token properties to be updated.

The `tokenid` property must be defined for each token, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

The method accepts tokens with the **standard token properties**.

Return values

(object) Returns an object containing the IDs of the updated tokens under the `tokenids` property.

Examples

Remove token expiry

Remove expiry date from token.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "token.update",
  "params": {
    "tokenid": "2",
    "expires_at": "0"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
}
```



```
}
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "tokenids": [
      "2"
    ]
  },
  "id": 1
}
```

Source

CToken::update() in *ui/include/classes/api/services/CToken.php*.

## Trend

This class is designed to work with trend data.

Object references:

- [Trend](#)

Available methods:

- [trend.get](#) - retrieving trends

### > Trend object

The following objects are directly related to the `trend` API.

#### Note:

Trend objects differ depending on the item's type of information. They are created by the Zabbix server and cannot be modified via the API.

#### Float trend

The float trend object has the following properties.

| Property  | Type      | Description  |
|-----------|-----------|--|
| clock     | timestamp | Timestamp of an hour for which the value was calculated. E. g. timestamp of 04:00:00 means values calculated for period 04:00:00-04:59:59. |
| itemid    | integer   | ID of the related item.  |
| num       | integer   | Number of values that were available for the hour.   |
| value_min | float     | Hourly minimum value.  |
| value_avg | float     | Hourly average value.  |
| value_max | float     | Hourly maximum value.  |

#### Integer trend

The integer trend object has the following properties.

| Property | Type      | Description  |
|----------|-----------|--|
| clock    | timestamp | Timestamp of an hour for which the value was calculated. E. g. timestamp of 04:00:00 means values calculated for period 04:00:00-04:59:59. |
| itemid   | integer   | ID of the related item.  |

| Property  | Type    | Description  |
|-----------|---------|--|
| num       | integer | Number of values that were available for the hour. |
| value_min | integer | Hourly minimum value.                              |
| value_avg | integer | Hourly average value.                              |
| value_max | integer | Hourly maximum value.                              |

## trend.get

### Description

integer/array trend.get(object parameters)

The method allows to retrieve trend data according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter   | Type         | Description  |
|-------------|--------------|--|
| itemids     | string/array | Return only trends with the given item IDs.                              |
| time_from   | timestamp    | Return only values that have been collected after or at the given time.  |
| time_till   | timestamp    | Return only values that have been collected before or at the given time. |
| countOutput | boolean      | Count the number of retrieved objects.                                   |
| limit       | integer      | Limit the amount of retrieved objects.                                   |
| output      | query        | Set <b>Trend object</b> properties to be returned.                       |

### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

### Examples

#### Retrieving item trend data

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trend.get",
  "params": {
    "output": [
      "itemid",
      "clock",
      "num",
      "value_min",
      "value_avg",
      "value_max",
    ],
    "itemids": [
      "23715"
    ],
    "limit": "1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
}
```

```
    "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "itemid": "23715",
      "clock": "1446199200",
      "num": "60",
      "value_min": "0.165",
      "value_avg": "0.2168",
      "value_max": "0.35",
    }
  ],
  "id": 1
}
```

Source

CTrend::get() in `ui/include/classes/api/services/CTrend.php`.

## Trigger

This class is designed to work with triggers.

Object references:

- [Trigger](#)

Available methods:

- [trigger.adddependencies](#) - adding new trigger dependencies
- [trigger.create](#) - creating new triggers
- [trigger.delete](#) - deleting triggers
- [trigger.deletedependencies](#) - deleting trigger dependencies
- [trigger.get](#) - retrieving triggers
- [trigger.update](#) - updating triggers

### > Trigger object

The following objects are directly related to the `trigger` API.

Trigger

The trigger object has the following properties.

| Property                         | Type   | Description  |
|----------------------------------|--------|--|
| triggerid                        | string | ( <i>readonly</i> ) ID of the trigger.   |
| <b>description</b><br>(required) | string | Name of the trigger.   |
| <b>expression</b><br>(required)  | string | Reduced trigger expression.  |
| event_name                       | string | Event name generated by the trigger.   |
| opdata                           | string | Operational data.  |
| comments                         | string | Additional description of the trigger.   |
| error                            | string | ( <i>readonly</i> ) Error text if there have been any problems when updating the state of the trigger. |

| Property            | Type      | Description   |
|---------------------|-----------|---|
| flags               | integer   | <i>(readonly)</i> Origin of the trigger.<br><br>Possible values are:<br>0 - <i>(default)</i> a plain trigger;<br>4 - a discovered trigger.                                      |
| lastchange          | timestamp | <i>(readonly)</i> Time when the trigger last changed its state.   |
| priority            | integer   | Severity of the trigger.<br><br>Possible values are:<br>0 - <i>(default)</i> not classified;<br>1 - information;<br>2 - warning;<br>3 - average;<br>4 - high;<br>5 - disaster.  |
| state               | integer   | <i>(readonly)</i> State of the trigger.<br><br>Possible values:<br>0 - <i>(default)</i> trigger state is up to date;<br>1 - current trigger state is unknown.                   |
| status              | integer   | Whether the trigger is enabled or disabled.<br><br>Possible values are:<br>0 - <i>(default)</i> enabled;<br>1 - disabled.   |
| templateid          | string    | <i>(readonly)</i> ID of the parent template trigger.  |
| type                | integer   | Whether the trigger can generate multiple problem events.<br><br>Possible values are:<br>0 - <i>(default)</i> do not generate multiple events;<br>1 - generate multiple events. |
| url                 | string    | URL associated with the trigger.  |
| value               | integer   | <i>(readonly)</i> Whether the trigger is in OK or problem state.<br><br>Possible values are:<br>0 - <i>(default)</i> OK;<br>1 - problem.  |
| recovery_mode       | integer   | OK event generation mode.<br><br>Possible values are:<br>0 - <i>(default)</i> Expression;<br>1 - Recovery expression;<br>2 - None.  |
| recovery_expression | string    | Reduced trigger recovery expression.  |
| correlation_mode    | integer   | OK event closes.<br><br>Possible values are:<br>0 - <i>(default)</i> All problems;<br>1 - All problems if tag values match.   |
| correlation_tag     | string    | Tag for matching.   |
| manual_close        | integer   | Allow manual close.<br><br>Possible values are:<br>0 - <i>(default)</i> No;<br>1 - Yes.   |
| uuid                | string    | Universal unique identifier, used for linking imported triggers to already existing ones. Used only for triggers on templates.<br>Auto-generated, if not given.                 |

Note that for some methods (update, delete) the required/optional parameter combination is different.

## Trigger tag

The trigger tag object has the following properties.

| Property                 | Type   | Description        |
|--------------------------|--------|--------------------|
| <b>tag</b><br>(required) | string | Trigger tag name.  |
| value                    | string | Trigger tag value. |

## trigger.adddependencies

### Description

object trigger.adddependencies(object/array triggerDependencies)

This method allows to create new trigger dependencies.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Trigger dependencies to create.

Each trigger dependency has the following parameters:

| Parameter                               | Type   | Description                                    |
|---|--------|--|
| <b>triggerid</b><br>(required)          | string | ID of the dependent trigger.                   |
| <b>dependsOnTriggerid</b><br>(required) | string | ID of the trigger that the trigger depends on. |

### Return values

(object) Returns an object containing the IDs of the dependent triggers under the `triggerids` property.

### Examples

Add a trigger dependency

Make trigger "14092" dependent on trigger "13565."

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.adddependencies",
  "params": {
    "triggerid": "14092",
    "dependsOnTriggerid": "13565"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "14092"
    ]
  },
}
```

```
    "id": 1
}
```

See also

- [trigger.update](#)
- [Trigger dependencies](#)

Source

CTrigger::addDependencies() in *ui/include/classes/api/services/CTrigger.php*.

## trigger.create

Description

object trigger.create(object/array triggers)

This method allows to create new triggers.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Triggers to create.

Additionally to the [standard trigger properties](#) the method accepts the following parameters.

| Parameter    | Type  | Description  |
|--------------|-------|--|
| dependencies | array | Triggers that the trigger is dependent on.   |
| tags         | array | The triggers must have the triggerid property defined.<br>Trigger <a href="#">tags</a> . |

### Attention:

The trigger expression has to be given in its expanded form.

Return values

(object) Returns an object containing the IDs of the created triggers under the `triggerids` property. The order of the returned IDs matches the order of the passed triggers.

Examples

Creating a trigger

Create a trigger with a single trigger dependency.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.create",
  "params": [
    {
      "description": "Processor load is too high on {HOST.NAME}",
      "expression": "last(/Linux server/system.cpu.load[percpu,avg1])>5",
      "dependencies": [
        {
          "triggerid": "17367"
        }
      ]
    }
  ],
  "id": 1
}
```

```

        "description": "Service status",
        "expression": "length(last(/Linux server/log[/var/log/system,Service .* has stopped]))<>0",
        "dependencies": [
            {
                "triggerid": "17368"
            }
        ],
        "tags": [
            {
                "tag": "service",
                "value": "{{ITEM.VALUE}.regsub(\"Service (.*?) has stopped\", \"\\\\1\")}"
            },
            {
                "tag": "error",
                "value": ""
            }
        ]
    }
],
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "triggerids": [
            "17369",
            "17370"
        ]
    },
    "id": 1
}

```

Source

CTTrigger::create() in `ui/include/classes/api/services/CTTrigger.php`.

## trigger.delete

Description

object trigger.delete(array triggerIds)

This method allows to delete triggers.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the triggers to delete.

Return values

(object) Returns an object containing the IDs of the deleted triggers under the `triggerids` property.

Examples

Delete multiple triggers

Delete two triggers.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.delete",
  "params": [
    "12002",
    "12003"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "12002",
      "12003"
    ]
  },
  "id": 1
}
```

Source

CTrigger::delete() in *ui/include/classes/api/services/CTrigger.php*.

## trigger.deletedependencies

Description

object trigger.deletedependencies(string/array triggers)

This method allows to delete all trigger dependencies from the given triggers.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(string/array) Triggers to delete the trigger dependencies from.

Return values

(object) Returns an object containing the IDs of the affected triggers under the `triggerids` property.

Examples

Deleting dependencies from multiple triggers

Delete all dependencies from two triggers.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.deleteDependencies",
  "params": [
    {
      "triggerid": "14544"
    },
    {
      "triggerid": "14545"
    }
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
}
```



```

    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "14544",
      "14545"
    ]
  },
  "id": 1
}

```

See also

- [trigger.update](#)

Source

CTrigger::deleteDependencies() in *ui/include/classes/api/services/CTrigger.php*.

## trigger.get

Description

integer/array trigger.get(object parameters)

The method allows to retrieve triggers according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter                   | Type         | Description  |
|-----------------------------|--------------|--|
| triggerids                  | string/array | Return only triggers with the given IDs.   |
| groupids                    | string/array | Return only triggers that belong to hosts from the given host groups.  |
| templateids                 | string/array | Return only triggers that belong to the given templates.   |
| hostids                     | string/array | Return only triggers that belong to the given hosts.   |
| itemids                     | string/array | Return only triggers that contain the given items.   |
| functions                   | string/array | Return only triggers that use the given functions.   |
| group                       | string       | Refer to the <a href="#">supported function</a> page for a list of supported functions. Return only triggers that belong to hosts from the host group with the given name. |
| host                        | string       | Return only triggers that belong to host with the given technical name.  |
| inherited                   | boolean      | If set to <code>true</code> return only triggers inherited from a template.  |
| templated                   | boolean      | If set to <code>true</code> return only triggers that belong to templates.   |
| dependent                   | boolean      | If set to <code>true</code> return only triggers that have dependencies. If set to <code>false</code> return only triggers that do not have dependencies.                  |
| monitored                   | flag         | Return only enabled triggers that belong to monitored hosts and contain only enabled items.  |
| active                      | flag         | Return only enabled triggers that belong to monitored hosts.   |
| maintenance                 | boolean      | If set to <code>true</code> return only enabled triggers that belong to hosts in maintenance.  |
| withUnacknowledgedEvents    | flag         | Return only triggers that have unacknowledged events.  |
| withAcknowledgedEvents      | flag         | Return only triggers with all events acknowledged.   |
| withLastEventUnacknowledged | flag         | Return only triggers with the last event unacknowledged.   |

| Parameter              | Type             | Description  |
|------------------------|------------------|--|
| skipDependent          | flag             | Skip triggers in a problem state that are dependent on other triggers. Note that the other triggers are ignored if disabled, have disabled items or disabled item hosts.   |
| lastChangeSince        | timestamp        | Return only triggers that have changed their state after the given time.   |
| lastChangeTill         | timestamp        | Return only triggers that have changed their state before the given time.  |
| only_true              | flag             | Return only triggers that have recently been in a problem state.   |
| min_severity           | integer          | Return only triggers with severity greater or equal than the given severity.   |
| evaltype               | integer          | Rules for tag searching.<br><br>Possible values:<br>0 - (default) And/Or;<br>2 - Or.   |
| tags                   | array of objects | Return only triggers with given tags. Exact match by tag and case-sensitive or case-insensitive search by tag value depending on operator value.<br>Format: [{"tag": "<tag>", "value": "<value>", "operator": "<operator>"}, ...].<br>An empty array returns all triggers.<br><br>Possible operator types:<br>0 - (default) Like;<br>1 - Equal;<br>2 - Not like;<br>3 - Not equal<br>4 - Exists;<br>5 - Not exists.  |
| expandComment          | flag             | Expand macros in the trigger description.  |
| expandDescription      | flag             | Expand macros in the name of the trigger.  |
| expandExpression       | flag             | Expand functions and macros in the trigger expression.   |
| selectGroups           | query            | Return the host groups that the trigger belongs to in the <b>groups</b> property.  |
| selectHosts            | query            | Return the hosts that the trigger belongs to in the <b>hosts</b> property.   |
| selectItems            | query            | Return items contained by the trigger in the <b>items</b> property.  |
| selectFunctions        | query            | Return functions used in the trigger in the <b>functions</b> property.<br><br>The function objects represent the functions used in the trigger expression and has the following properties:<br><b>functionid</b> - ( <i>string</i> ) ID of the function;<br><b>itemid</b> - ( <i>string</i> ) ID of the item used in the function;<br><b>function</b> - ( <i>string</i> ) name of the function;<br><b>parameter</b> - ( <i>string</i> ) parameter passed to the function. Query parameter is replaced by \$ symbol in returned string. |
| selectDependencies     | query            | Return triggers that the trigger depends on in the <b>dependencies</b> property.   |
| selectDiscoveryRule    | query            | Return the <b>low-level discovery rule</b> that created the trigger.   |
| selectLastEvent        | query            | Return the last significant trigger event in the <b>lastEvent</b> property.  |
| selectTags             | query            | Return the trigger tags in <b>tags</b> property.   |
| selectTriggerDiscovery | query            | Return the trigger discovery object in the <b>triggerDiscovery</b> property. The trigger discovery objects link the trigger to a trigger prototype from which it was created.<br><br>It has the following properties:<br><b>parent_triggerid</b> - ( <i>string</i> ) ID of the trigger prototype from which the trigger has been created.  |

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| filter                 | object       | Return only those results that exactly match the given filter.<br><br>Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.<br><br>Supports additional filters:<br>host - technical name of the host that the trigger belongs to;<br>hostid - ID of the host that the trigger belongs to. |
| limitSelects           | integer      | Limits the number of records returned by subselects.  |
| sortfield              | string/array | Applies to the following subselects:<br>selectHosts - results will be sorted by host.<br><b>Sort</b> the result by the given properties.<br><br>Possible values are: triggerid, description, status, priority, lastchange and hostname.   |
| countOutput            | boolean      | These parameters are described in the <a href="#">reference commentary</a> .  |
| editable               | boolean      |   |
| excludeSearch          | boolean      |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving data by trigger ID

Retrieve all data and the functions used in trigger "14062".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.get",
  "params": {
    "triggerids": "14062",
    "output": "extend",
    "selectFunctions": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "triggerid": "14062",
      "expression": "{13513}<10m",
      "description": "{HOST.NAME} has been restarted (uptime < 10m)",
      "url": "",

```

```

        "status": "0",
        "value": "0",
        "priority": "2",
        "lastchange": "0",
        "comments": "The host uptime is less than 10 minutes",
        "error": "",
        "templateid": "10016",
        "type": "0",
        "state": "0",
        "flags": "0",
        "recovery_mode": "0",
        "recovery_expression": "",
        "correlation_mode": "0",
        "correlation_tag": "",
        "manual_close": "0",
        "opdata": "",
        "functions": [
            {
                "functionid": "13513",
                "itemid": "24350",
                "triggerid": "14062",
                "parameter": "$",
                "function": "last"
            }
        ]
    },
    "id": 1
}

```

Retrieving triggers in problem state

Retrieve the ID, name and severity of all triggers in problem state and sort them by severity in descending order.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "trigger.get",
    "params": {
        "output": [
            "triggerid",
            "description",
            "priority"
        ],
        "filter": {
            "value": 1
        },
        "sortfield": "priority",
        "sortorder": "DESC"
    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": [
        {
            "triggerid": "13907",
            "description": "Zabbix self-monitoring processes < 100% busy",
            "priority": "4"
        },
    ],
}

```

```

    {
      "triggerid": "13824",
      "description": "Zabbix discoverer processes more than 75% busy",
      "priority": "3"
    }
  ],
  "id": 1
}

```

Retrieving a specific trigger with tags

Retrieve a specific trigger with tags.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "trigger.get",
  "params": {
    "output": [
      "triggerid",
      "description"
    ],
    "selectTags": "extend",
    "triggerids": [
      "17578"
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "triggerid": "17370",
      "description": "Service status",
      "tags": [
        {
          "tag": "service",
          "value": "{{ITEM.VALUE}.regsub(\"Service (.*) has stopped\", \"\\1\")}"
        },
        {
          "tag": "error",
          "value": ""
        }
      ]
    }
  ],
  "id": 1
}

```

See also

- [Discovery rule](#)
- [Item](#)
- [Host](#)
- [Host group](#)

Source

CTrigger::get() in `ui/include/classes/api/services/CTrigger.php`.

## trigger.update

### Description

object trigger.update(object/array triggers)

This method allows to update existing triggers.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Trigger properties to be updated.

The `triggerid` property must be defined for each trigger, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard trigger properties](#) the method accepts the following parameters.

| Parameter    | Type  | Description  |
|--------------|-------|--|
| dependencies | array | Triggers that the trigger is dependent on.   |
| tags         | array | The triggers must have the <code>triggerid</code> property defined. Trigger <a href="#">tags</a> . |

#### Attention:

The trigger expression has to be given in its expanded form.

### Return values

(object) Returns an object containing the IDs of the updated triggers under the `triggerids` property.

### Examples

#### Enabling a trigger

Enable a trigger, that is, set its status to 0.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.update",
  "params": {
    "triggerid": "13938",
    "status": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "13938"
    ]
  },
  "id": 1
}
```

#### Replacing triggers tags

Replace tags for trigger.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "trigger.update",
  "params": {
    "triggerid": "13938",
    "tags": [
      {
        "tag": "service",
        "value": "{ITEM.VALUE}.regsub(\"Service (.*) has stopped\", \"\\1\")"
      },
      {
        "tag": "error",
        "value": ""
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "13938"
    ]
  },
  "id": 1
}
```

See also

- [trigger.adddependencies](#)
- [trigger.deletedependencies](#)

Source

CTrigger::update() in *ui/include/classes/api/services/CTrigger.php*.

## Trigger prototype

This class is designed to work with trigger prototypes.

Object references:

- [Trigger prototype](#)

Available methods:

- [triggerprototype.create](#) - creating new trigger prototypes
- [triggerprototype.delete](#) - deleting trigger prototypes
- [triggerprototype.get](#) - retrieving trigger prototypes
- [triggerprototype.update](#) - updating trigger prototypes

## > Trigger prototype object

The following objects are directly related to the triggerprototype API.

Trigger prototype

The trigger prototype object has the following properties.

| Property                         | Type    | Description   |
|----------------------------------|---------|---|
| triggerid                        | string  | ( <i>readonly</i> ) ID of the trigger prototype.  |
| <b>description</b><br>(required) | string  | Name of the trigger prototype.  |
| <b>expression</b><br>(required)  | string  | Reduced trigger expression.   |
| event_name                       | string  | Event name generated by the trigger.  |
| opdata                           | string  | Operational data.   |
| comments                         | string  | Additional comments to the trigger prototype.   |
| priority                         | integer | Severity of the trigger prototype.<br><br>Possible values:<br>0 - ( <i>default</i> ) not classified;<br>1 - information;<br>2 - warning;<br>3 - average;<br>4 - high;<br>5 - disaster.                          |
| status                           | integer | Whether the trigger prototype is enabled or disabled.<br><br>Possible values:<br>0 - ( <i>default</i> ) enabled;<br>1 - disabled.   |
| templateid                       | string  | ( <i>readonly</i> ) ID of the parent template trigger prototype.  |
| type                             | integer | Whether the trigger prototype can generate multiple problem events.<br><br>Possible values:<br>0 - ( <i>default</i> ) do not generate multiple events;<br>1 - generate multiple events.                         |
| url                              | string  | URL associated with the trigger prototype.  |
| recovery_mode                    | integer | OK event generation mode.<br><br>Possible values are:<br>0 - ( <i>default</i> ) Expression;<br>1 - Recovery expression;<br>2 - None.  |
| recovery_expression              | string  | Reduced trigger recovery expression.  |
| correlation_mode                 | integer | OK event closes.<br><br>Possible values are:<br>0 - ( <i>default</i> ) All problems;<br>1 - All problems if tag values match.   |
| correlation_tag                  | string  | Tag for matching.   |
| manual_close                     | integer | Allow manual close.<br><br>Possible values are:<br>0 - ( <i>default</i> ) No;<br>1 - Yes.   |
| discover                         | integer | Trigger prototype discovery status.<br><br>Possible values:<br>0 - ( <i>default</i> ) new triggers will be discovered;<br>1 - new triggers will not be discovered and existing triggers will be marked as lost. |
| uuid                             | string  | Universal unique identifier, used for linking imported trigger prototypes to already existing ones. Used only for trigger prototypes on templates. Auto-generated, if not given.                                |

Note that for some methods (update, delete) the required/optional parameter combination is different.

Trigger prototype tag



The trigger prototype tag object has the following properties.

| Property                 | Type   | Description                  |
|--------------------------|--------|------------------------------|
| <b>tag</b><br>(required) | string | Trigger prototype tag name.  |
| value                    | string | Trigger prototype tag value. |

## triggerprototype.create

Description

object triggerprototype.create(object/array triggerPrototypes)

This method allows to create new trigger prototypes.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Trigger prototypes to create.

Additionally to the [standard trigger prototype properties](#) the method accepts the following parameters.

| Parameter    | Type  | Description  |
|--------------|-------|--|
| dependencies | array | Triggers and trigger prototypes that the trigger prototype is dependent on.                        |
| tags         | array | The triggers must have the triggerid property defined.<br>Trigger prototype <a href="#">tags</a> . |

### Attention:

The trigger expression has to be given in its expanded form and must contain at least one item prototype.

Return values

(object) Returns an object containing the IDs of the created trigger prototypes under the `triggerids` property. The order of the returned IDs matches the order of the passed trigger prototypes.

Examples

Creating a trigger prototype

Create a trigger prototype to detect when a file system has less than 20% free disk space.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "triggerprototype.create",
  "params": {
    "description": "Free disk space is less than 20% on volume {#FSNAME}",
    "expression": "last(/Zabbix server/vfs.fs.size[{#FSNAME},pfree])<20",
    "tags": [
      {
        "tag": "volume",
        "value": "{#FSNAME}"
      },
      {
        "tag": "type",
        "value": "{#FSTYPE}"
      }
    ]
  }
}
```

```
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "17372"
    ]
  },
  "id": 1
}
```

Source

CTriggerPrototype::create() in *ui/include/classes/api/services/CTriggerPrototype.php*.

### triggerprototype.delete

Description

object triggerprototype.delete(array triggerPrototypeIds)

This method allows to delete trigger prototypes.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the trigger prototypes to delete.

Return values

(object) Returns an object containing the IDs of the deleted trigger prototypes under the `triggerids` property.

Examples

Deleting multiple trigger prototypes

Delete two trigger prototypes.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "triggerprototype.delete",
  "params": [
    "12002",
    "12003"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "12002",
      "12003"
    ]
  }
}
```

```

    },
    "id": 1
}

```

Source

CTriggerPrototype::delete() in *ui/include/classes/api/services/CTriggerPrototype.php*.

## triggerprototype.get

Description

integer/array triggerprototype.get(object parameters)

The method allows to retrieve trigger prototypes according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter           | Type         | Description   |
|---------------------|--------------|---|
| active              | flag         | Return only enabled trigger prototypes that belong to monitored hosts.  |
| discoveryids        | string/array | Return only trigger prototypes that belong to the given LLD rules.  |
| functions           | string/array | Return only triggers that use the given functions.  |
| group               | string       | Refer to the <a href="#">Supported functions</a> page for a list of supported functions.<br>Return only trigger prototypes that belong to hosts from the host groups with the given name. |
| groupids            | string/array | Return only trigger prototypes that belong to hosts from the given host groups.   |
| host                | string       | Return only trigger prototypes that belong to hosts with the given name.  |
| hostids             | string/array | Return only trigger prototypes that belong to the given hosts.  |
| inherited           | boolean      | If set to <code>true</code> return only trigger prototypes inherited from a template.   |
| maintenance         | boolean      | If set to <code>true</code> return only enabled trigger prototypes that belong to hosts in maintenance.   |
| min_severity        | integer      | Return only trigger prototypes with severity greater or equal than the given severity.  |
| monitored           | flag         | Return only enabled trigger prototypes that belong to monitored hosts and contain only enabled items.   |
| templated           | boolean      | If set to <code>true</code> return only trigger prototypes that belong to templates.  |
| templateids         | string/array | Return only trigger prototypes that belong to the given templates.  |
| triggerids          | string/array | Return only trigger prototypes with the given IDs.  |
| expandExpression    | flag         | Expand functions and macros in the trigger expression.  |
| selectDependencies  | query        | Return trigger prototypes and triggers that the trigger prototype depends on in the <code>dependencies</code> property.   |
| selectDiscoveryRule | query        | Return the <a href="#">LLD rule</a> that the trigger prototype belongs to.  |
| selectFunctions     | query        | Return functions used in the trigger prototype in the <code>functions</code> property.  |

The function objects represent the functions used in the trigger expression and has the following properties:

`functionid` - (*string*) ID of the function;

`itemid` - (*string*) ID of the item used in the function;

`function` - (*string*) name of the function;

`parameter` - (*string*) parameter passed to the function. Query parameter is replaced by `$` symbol in returned string.

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| selectGroups           | query        | Return the host groups that the trigger prototype belongs to in the <b>groups</b> property.   |
| selectHosts            | query        | Return the hosts that the trigger prototype belongs to in the <b>hosts</b> property.  |
| selectItems            | query        | Return items and item prototypes used the trigger prototype in the <b>items</b> property.   |
| selectTags             | query        | Return the trigger prototype tags in <b>tags</b> property.  |
| filter                 | object       | Return only those results that exactly match the given filter.<br><br>Accepts an array, where the keys are property names, and the values are either a single value or an array of values to match against.<br><br>Supports additional filters:<br>host - technical name of the host that the trigger prototype belongs to;<br>hostid - ID of the host that the trigger prototype belongs to. |
| limitSelects           | integer      | Limits the number of records returned by subselects.  |
| sortfield              | string/array | Applies to the following subselects:<br>selectHosts - results will be sorted by host.<br>Sort the result by the given properties.<br><br>Possible values are: triggerid, description, status and priority.<br>These parameters are described in the <b>reference commentary</b> .   |
| countOutput            | boolean      |   |
| editable               | boolean      |   |
| excludeSearch          | boolean      |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieve trigger prototypes from an LLD rule

Retrieve all trigger prototypes and their functions from an LLD rule.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "triggerprototype.get",
  "params": {
    "output": "extend",
    "selectFunctions": "extend",
    "discoveryids": "22450"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "triggerid": "13272",
      "expression": "{12598}<20",
      "description": "Free inodes is less than 20% on volume {#FSNAME}",
      "url": "",
      "status": "0",
      "priority": "2",
      "comments": "",
      "templateid": "0",
      "type": "0",
      "flags": "2",
      "recovery_mode": "0",
      "recovery_expression": "",
      "correlation_mode": "0",
      "correlation_tag": "",
      "manual_close": "0",
      "opdata": "",
      "discover": "0",
      "functions": [
        {
          "functionid": "12598",
          "itemid": "22454",
          "triggerid": "13272",
          "parameter": "$",
          "function": "last"
        }
      ]
    },
    {
      "triggerid": "13266",
      "expression": "{13500}<20",
      "description": "Free disk space is less than 20% on volume {#FSNAME}",
      "url": "",
      "status": "0",
      "priority": "2",
      "comments": "",
      "templateid": "0",
      "type": "0",
      "flags": "2",
      "recovery_mode": "0",
      "recovery_expression": "",
      "correlation_mode": "0",
      "correlation_tag": "",
      "manual_close": "0",
      "opdata": "",
      "discover": "0",
      "functions": [
        {
          "functionid": "13500",
          "itemid": "22686",
          "triggerid": "13266",
          "parameter": "$",
          "function": "last"
        }
      ]
    }
  ],
  "id": 1
}

```

Retrieving a specific trigger prototype with tags

Request:

```
{
  "jsonrpc": "2.0",
  "method": "triggerprototype.get",
  "params": {
    "output": [
      "triggerid",
      "description"
    ],
    "selectTags": "extend",
    "triggerids": [
      "17373"
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "triggerid": "17373",
      "description": "Free disk space is less than 20% on volume {#FSNAME}",
      "tags": [
        {
          "tag": "volume",
          "value": "{#FSNAME}"
        },
        {
          "tag": "type",
          "value": "{#FSTYPE}"
        }
      ]
    }
  ],
  "id": 1
}
```

See also

- [Discovery rule](#)
- [Item](#)
- [Host](#)
- [Host group](#)

Source

CTriggerPrototype::get() in `ui/include/classes/api/services/CTriggerPrototype.php`.

## triggerprototype.update

Description

object triggerprototype.update(object/array triggerPrototypes)

This method allows to update existing trigger prototypes.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

## Parameters

(object/array) **Trigger prototype properties** to be updated.

The triggerid property must be defined for each trigger prototype, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the **standard trigger prototype properties** the method accepts the following parameters.

| Parameter    | Type  | Description   |
|--------------|-------|---|
| dependencies | array | Triggers and trigger prototypes that the trigger prototype is dependent on.               |
| tags         | array | The triggers must have the triggerid property defined.<br>Trigger prototype <b>tags</b> . |

### Attention:

The trigger expression has to be given in its expanded form and must contain at least one item prototype.

## Return values

(object) Returns an object containing the IDs of the updated trigger prototypes under the triggerids property.

## Examples

### Enabling a trigger prototype

Enable a trigger prototype, that is, set its status to 0.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "triggerprototype.update",
  "params": {
    "triggerid": "13938",
    "status": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "triggerids": [
      "13938"
    ]
  },
  "id": 1
}
```

### Replacing trigger prototype tags

Replace tags for one trigger prototype.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "triggerprototype.update",
  "params": {
    "triggerid": "17373",
    "tags": [
      {
        "tag": "volume",

```

```

        "value": "{#FSNAME}"
    },
    {
        "tag": "type",
        "value": "{#FSTYPE}"
    }
]
},
"auth": "038e1d7b1735c6a5436ee9eae095879e",
"id": 1
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": {
        "triggerids": [
            "17373"
        ]
    },
    "id": 1
}

```

Source

CTriggerPrototype::update() in *ui/include/classes/api/services/CTriggerPrototype.php*.

## User

This class is designed to work with users.

Object references:

- [User](#)

Available methods:

- [user.checkauthentication](#) - checking and prolonging user sessions
- [user.create](#) - creating new users
- [user.delete](#) - deleting users
- [user.get](#) - retrieving users
- [user.login](#) - logging in to the API
- [user.logout](#) - logging out of the API
- [user.unblock](#) - unblocking users
- [user.update](#) - updating users

### > User object

The following objects are directly related to the user API.

User

The user object has the following properties.

| Property                             | Type      | Description  |
|--------------------------------------|-----------|--|
| userid                               | string    | <i>(readonly)</i> ID of the user.                              |
| <b>username</b><br><i>(required)</i> | string    | User name.   |
| <b>roleid</b><br><i>(required)</i>   | string    | Role ID of the user.   |
| attempt_clock                        | timestamp | <i>(readonly)</i> Time of the last unsuccessful login attempt. |
| attempt_failed                       | integer   | <i>(readonly)</i> Recent failed login attempt count.           |



| Property              | Type    | Description   |
|-----------------------|---------|---|
| attempt_ip            | string  | ( <i>readonly</i> ) IP address from where the last unsuccessful login attempt came from.  |
| autologin             | integer | Whether to enable auto-login.<br><br>Possible values:<br>0 - ( <i>default</i> ) auto-login disabled;<br>1 - auto-login enabled.   |
| autologout            | string  | User session life time. Accepts seconds and time unit with suffix. If set to 0s, the session will never expire.   |
| lang                  | string  | Default: 15m.<br>Language code of the user's language, for example, en_US.  |
| name                  | string  | Default: default - system default.<br>Name of the user.   |
| refresh               | string  | Automatic refresh period. Accepts seconds or time unit with suffix (e.g., 30s, 90s, 1m, 1h).  |
| rows_per_page         | integer | Default: 30s.<br>Amount of object rows to show per page.  |
| surname               | string  | Default: 50.<br>Surname of the user.  |
| theme                 | string  | User's theme.<br><br>Possible values:<br>default - ( <i>default</i> ) system default;<br>blue-theme - Blue;<br>dark-theme - Dark.   |
| url                   | string  | URL of the page to redirect the user to after logging in.   |
| timezone              | string  | User's time zone, for example, Europe/London, UTC.<br><br>Default: default - system default.<br><br>For the full list of supported time zones please refer to <a href="#">PHP documentation</a> . |
| alias<br>(deprecated) | string  | This property is deprecated, please use username instead.<br>User alias.  |

Note that for some methods (update, delete) the required/optional parameter combination is different.

## Media

The media object has the following properties.

| Property                         | Type         | Description  |
|----------------------------------|--------------|--|
| <b>mediatypeid</b><br>(required) | string       | ID of the media type used by the media.  |
| <b>sendto</b><br>(required)      | string/array | Address, user name or other identifier of the recipient.<br><br>If type of <b>Media type</b> is e-mail, values are represented as array. For other types of <b>Media types</b> , value is represented as a string. |
| <b>active</b>                    | integer      | Whether the media is enabled.<br><br>Possible values:<br>0 - ( <i>default</i> ) enabled;<br>1 - disabled.  |

| Property        | Type    | Description  |
|-----------------|---------|--|
| <b>severity</b> | integer | <p>Trigger severities to send notifications about.</p> <p>Possible bitmap values:</p> <ul style="list-style-type: none"> <li>1 - Not classified;</li> <li>2 - Information;</li> <li>4 - Warning;</li> <li>8 - Average;</li> <li>16 - High;</li> <li>32 - Disaster.</li> </ul> <p>This is a bitmask field; any sum of possible bitmap values is acceptable (for example, 48 for Average, High, and Disaster).</p> |
| <b>period</b>   | string  | <p>Default: 63.</p> <p>Time when the notifications can be sent as a <b>time period</b> or user macros separated by a semicolon.</p> <p>Default: 1-7,00:00-24:00</p>  |

## user.checkAuthentication

### Description

object `user.checkAuthentication`

This method checks and prolongs user session.

#### Attention:

Calling the **user.checkAuthentication** method with the parameter `sessionid` set prolongs user session by default.

### Parameters

The method accepts the following parameters.

| Parameter              | Type    | Description  |
|------------------------|---------|--|
| <code>extend</code>    | boolean | <p>Whether to prolong the user session.</p> <p>Default value: "true". Setting the value to "false" allows to check the user session without prolonging it.</p> |
| <code>sessionid</code> | string  | <p>Used if <code>sessionid</code> is set.</p> <p>User session ID.</p>  |
| <code>token</code>     | string  | <p><b>Required</b> if token is not set.</p> <p>User <b>API token</b>.</p> <p><b>Required</b> if <code>sessionid</code> is not set.</p>                         |

### Return values

(object) Returns an object containing information about user.

### Examples

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.checkAuthentication",
  "params": {
    "sessionid": "673b8ba11562a35da902c66cf5c23fa2"
  }
}
```

```

    },
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "userid": "1",
    "username": "Admin",
    "name": "Zabbix",
    "surname": "Administrator",
    "url": "",
    "autologin": "1",
    "autologout": "0",
    "lang": "ru_RU",
    "refresh": "0",
    "theme": "default",
    "attempt_failed": "0",
    "attempt_ip": "127.0.0.1",
    "attempt_clock": "1355919038",
    "rows_per_page": "50",
    "timezone": "Europe/Riga",
    "roleid": "3",
    "type": 3,
    "sessionid": "673b8ba11562a35da902c66cf5c23fa2",
    "debug_mode": 0,
    "userip": "127.0.0.1",
    "gui_access": 0
  },
  "id": 1
}

```

**Note:**

Response is similar to [User.login](#) call response with "userData" parameter set to true (the difference is that user data is retrieved by session id and not by username / password).

Source

CUser::checkAuthentication() in *ui/include/classes/api/services/CUser.php*.

## user.create

Description

object user.create(object/array users)

This method allows to create new users.

**Note:**

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Note:**

The strength of user password is validated according the password policy rules defined by Authentication API. See [Authentication API](#) for more information.

Parameters

(object/array) Users to create.

Additionally to the [standard user properties](#), the method accepts the following parameters.

| Parameter                    | Type   | Description   |
|------------------------------|--------|---|
| <b>passwd</b><br>(required)  | string | User's password.  |
| <b>usrgrps</b><br>(required) | array  | Can be omitted if user is added only to groups that have LDAP access.<br>User <b>groups</b> to add the user to. |
| medias                       | array  | The user groups must have the usrgrpid property defined.<br>User <b>media</b> to be created.                    |
| user_medias<br>(deprecated)  | array  | This parameter is deprecated, please use medias instead.<br>User <b>media</b> to be created.                    |

#### Return values

(object) Returns an object containing the IDs of the created users under the `userids` property. The order of the returned IDs matches the order of the passed users.

#### Examples

##### Creating a user

Create a new user, add him to a user group and create a new media for him.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.create",
  "params": {
    "username": "John",
    "passwd": "Doe123",
    "roleid": "5",
    "usrgrps": [
      {
        "usrgrpid": "7"
      }
    ],
    "medias": [
      {
        "mediatypeid": "1",
        "sendto": [
          "support@company.com"
        ],
        "active": 0,
        "severity": 63,
        "period": "1-7,00:00-24:00"
      }
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "userids": [
      "12"
    ]
  },
  "id": 1
}
```

See also

- [Authentication](#)
- [Media](#)
- [User group](#)
- [Role](#)

Source

CUser::create() in *ui/include/classes/api/services/CUser.php*.

## user.delete

Description

`object user.delete(array users)`

This method allows to delete users.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of users to delete.

Return values

(object) Returns an object containing the IDs of the deleted users under the `userids` property.

Examples

Deleting multiple users

Delete two users.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.delete",
  "params": [
    "1",
    "5"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "userids": [
      "1",
      "5"
    ]
  },
  "id": 1
}
```

Source

CUser::delete() in *ui/include/classes/api/services/CUser.php*.

## user.get

Description

`integer/array user.get(object parameters)`

The method allows to retrieve users according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

**Note:**

Since Zabbix 6.0.38, when requesting user media, permissions, or role information, *Admin* and *User* type users may retrieve data only about their own user. For an example, see [Retrieving users as Admin](#).

| Parameter        | Type         | Description   |
|------------------|--------------|---|
| mediaids         | string/array | Return only users that use the given media.   |
| mediatypeids     | string/array | Return only users that use the given media types.   |
| userids          | string/array | Return only users with the given IDs.   |
| usrgrpids        | string/array | Return only users that belong to the given user groups.   |
| getAccess        | flag         | Adds additional information about user permissions.<br><br>Adds the following properties for each user:<br>gui_access - ( <i>integer</i> ) user's frontend authentication method. Refer to the gui_access property of the <a href="#">user group object</a> for a list of possible values.<br>debug_mode - ( <i>integer</i> ) indicates whether debug is enabled for the user. Possible values: 0 - debug disabled, 1 - debug enabled.<br>users_status - ( <i>integer</i> ) indicates whether the user is disabled. Possible values: 0 - user enabled, 1 - user disabled. |
| selectMedias     | query        | Return media used by the user in the <a href="#">medias</a> property.   |
| selectMediatypes | query        | Return media types used by the user in the <a href="#">mediatypes</a> property.   |
| selectUsrgrps    | query        | Return user groups that the user belongs to in the <a href="#">usrgrps</a> property.  |
| selectRole       | query        | See <a href="#">usergroup.get</a> for restrictions based on user type.  |
| filter           | object       | Return user role in the <a href="#">role</a> property.<br>Return only those results that exactly match the given filter.  |
|                  |              | Accepts an object, where the keys are property names, and the values are either a single value or an array of values to match against.  |
|                  |              | Does not support properties of text <a href="#">data type</a> .   |
|                  |              | Possible <a href="#">User object</a> properties for <i>Admin</i> and <i>User</i> type users when requesting data on users in their user group (since Zabbix 6.0.38):<br>userid, name, surname, username.  |
| output           | query        | <a href="#">User object</a> properties to be returned.<br><br>Since Zabbix 6.0.38, <i>Admin</i> and <i>User</i> type users may retrieve only the following properties:<br>- For their own user: userid, attempt_clock, attempt_failed, attempt_ip, autologin, autologout, lang, name, refresh, roleid, rows_per_page, surname, theme, timezone, url, username.<br>- For users in their user group: userid, name, surname, username.<br><br>Default: <code>extend</code> .   |

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| search                 | object       | Return results that match the given pattern (case-insensitive).<br><br>Accepts an object, where the keys are property names, and the values are strings to search for. If no additional options are given, this will perform a LIKE "%...%" search.<br><br>Supports only properties of string and text <b>data type</b> .<br><br>Possible <b>User object</b> properties for <i>Admin</i> and <i>User</i> type users when requesting data on users in their user group (since Zabbix 6.0.38): name, surname, username.<br><br>Sort the result by the given properties.<br><br>Possible values are: userid and username.<br>These parameters are described in the <b>reference commentary</b> . |
| sortfield              | string/array |   |
| countOutput            | boolean      |   |
| editable               | boolean      |   |
| excludeSearch          | boolean      |   |
| limit                  | integer      |   |
| preservekeys           | boolean      |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving users

Retrieve all of the configured users.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.get",
  "params": {
    "output": "extend"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "userid": "1",
      "username": "Admin",
      "name": "Zabbix",
      "surname": "Administrator",
      "url": "",
      "autologin": "1",
      "autologout": "0",
      "lang": "en_US",
      "refresh": "0s",
      "theme": "default",

```

```

        "attempt_failed": "0",
        "attempt_ip": "",
        "attempt_clock": "0",
        "rows_per_page": "50",
        "timezone": "default",
        "roleid": "3"
    },
    {
        "userid": "2",
        "username": "guest",
        "name": "",
        "surname": "",
        "url": "",
        "autologin": "0",
        "autologout": "15m",
        "lang": "default",
        "refresh": "30s",
        "theme": "default",
        "attempt_failed": "0",
        "attempt_ip": "",
        "attempt_clock": "0",
        "rows_per_page": "50",
        "timezone": "default",
        "roleid": "4"
    },
    {
        "userid": "3",
        "username": "user",
        "name": "Zabbix",
        "surname": "User",
        "url": "",
        "autologin": "0",
        "autologout": "0",
        "lang": "ru_RU",
        "refresh": "15s",
        "theme": "dark-theme",
        "attempt_failed": "0",
        "attempt_ip": "",
        "attempt_clock": "0",
        "rows_per_page": "100",
        "timezone": "default",
        "roleid": "1"
    }
],
    "id": 1
}

```

Retrieving users as *Admin*

As an *Admin* type user, retrieve detailed data about your own user and limited data for users in your user group.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "user.get",
    "params": {
        "output": "extend",
        "getAccess": true,
        "selectMedias": "extend",
        "selectMediatypes": "extend",
        "selectUsrgrps": "extend",
        "selectRole": "extend"
    }
},

```



```
    "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "userid": "1",
      "username": "Admin",
      "name": "Zabbix",
      "surname": "Administrator",
      "usrgrps": [
        {
          "usrgrpid": "7",
          "name": "Zabbix administrators",
          "gui_access": "0",
          "users_status": "0",
          "debug_mode": "0"
        }
      ]
    },
    {
      "userid": "3",
      "username": "database-admin",
      "name": "John",
      "surname": "Doe",
      "url": "",
      "autologin": "0",
      "autologout": "0",
      "lang": "default",
      "refresh": "30s",
      "theme": "default",
      "attempt_failed": "0",
      "attempt_ip": "",
      "attempt_clock": "0",
      "rows_per_page": "50",
      "timezone": "default",
      "roleid": "2",
      "gui_access": "0",
      "debug_mode": "0",
      "users_status": "0",
      "usrgrps": [
        {
          "usrgrpid": "7",
          "name": "Zabbix administrators",
          "gui_access": "0",
          "users_status": "0",
          "debug_mode": "0"
        }
      ]
    },
    {
      "medias": [
        {
          "mediaid": "2",
          "userid": "3",
          "mediatypeid": "1",
          "sendto": [
            "john.doe@example.com"
          ],
          "active": "0",
          "severity": "63",
          "period": "1-7,00:00-24:00"
        }
      ]
    }
  ]
}
```

```

    }
  ],
  "mediatypes": [
    {
      "mediatypeid": "1",
      "type": "0",
      "name": "Email",
      "status": "0",
      "description": "",
      "maxattempts": "3"
    }
  ],
  "role": {
    "roleid": "2",
    "name": "Admin role",
    "type": "2",
    "readonly": "0"
  }
}
],
"id": 1
}

```

Retrieving user data

Retrieve data of a user with ID "12".

Request:

```

{
  "jsonrpc": "2.0",
  "method": "user.get",
  "params": {
    "output": ["userid", "username"],
    "selectRole": "extend",
    "userids": "12"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "userid": "12",
      "username": "John",
      "role": {
        "roleid": "5",
        "name": "Operator",
        "type": "1",
        "readonly": "0"
      }
    }
  ],
  "id": 1
}

```

See also

- [Media](#)
- [Media type](#)
- [User group](#)
- [Role](#)

Source

CUser::get() in ui/include/classes/api/services/CUser.php.

## user.login

Description

string/object user.login(object parameters)

This method allows to log in to the API and generate an authentication token.

### Warning:

When using this method, you also need to do **user.logout** to prevent the generation of a large number of open session records.

### Attention:

This method is only available to unauthenticated users and must be called without the auth parameter in the JSON-RPC request.

Parameters

(object) Parameters containing the user name and password.

The method accepts the following parameters.

| Parameter                     | Type   | Description  |
|-------------------------------|--------|--|
| <b>password</b><br>(required) | string | User password.   |
| <b>username</b><br>(required) | string | User name.   |
| userData                      | flag   | Return information about the authenticated user.                         |
| user<br>(deprecated)          | string | This parameter is deprecated, please use username instead.<br>User name. |

Return values

(string/object) If the userData parameter is used, returns an object containing information about the authenticated user.

Additionally to the **standard user properties**, the following information is returned:

| Property   | Type    | Description  |
|------------|---------|--|
| debug_mode | integer | Whether debug mode is enabled for the user.  |
| gui_access | integer | Refer to the debug_mode property of the <b>User group object</b> for a list of possible values.<br>User's authentication method to the frontend.                           |
| sessionid  | string  | Refer to the gui_access property of the <b>User group object</b> for a list of possible values.<br>Authentication token, which must be used in the following API requests. |
| type       | integer | User type.<br>Refer to the type property of the <b>Role object</b> for a list of possible values.  |
| userip     | string  | IP address of the user.  |

### Note:

If a user has been successfully authenticated after one or more failed attempts, the method will return the current values for the attempt\_clock, attempt\_failed and attempt\_ip properties and then reset them.

If the userData parameter is not used, the method returns an authentication token.

**Note:**

The generated authentication token should be remembered and used in the `auth` parameter of the following JSON-RPC requests. It is also required when using HTTP authentication.

**Examples****Authenticating a user**

Authenticate a user.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.login",
  "params": {
    "username": "Admin",
    "password": "zabbix"
  },
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": "0424bd59b807674191e7d77572075f33",
  "id": 1
}
```

**Requesting authenticated user's information**

Authenticate and return additional information about the user.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.login",
  "params": {
    "username": "Admin",
    "password": "zabbix",
    "userData": true
  },
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "userid": "1",
    "username": "Admin",
    "name": "Zabbix",
    "surname": "Administrator",
    "url": "",
    "autologin": "1",
    "autologout": "0",
    "lang": "ru_RU",
    "refresh": "0",
    "theme": "default",
    "attempt_failed": "0",
    "attempt_ip": "127.0.0.1",
    "attempt_clock": "1355919038",
    "rows_per_page": "50",
    "timezone": "Europe/Riga",
    "roleid": "3",
  }
}
```

```

        "type": 3,
        "userip": "127.0.0.1",
        "debug_mode": 0,
        "gui_access": 0,
        "sessionid": "5b56eee8be445e98f0bd42b435736e42"
    },
    "id": 1
}

```

See also

- [user.logout](#)

Source

CUser::login() in *ui/include/classes/api/services/CUser.php*.

## user.logout

Description

string/object `user.logout(array)`

This method allows to log out of the API and invalidates the current authentication token.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) The method accepts an empty array.

Return values

(boolean) Returns true if the user has been logged out successfully.

Examples

Logging out

Log out from the API.

Request:

```

{
    "jsonrpc": "2.0",
    "method": "user.logout",
    "params": [],
    "id": 1,
    "auth": "16a46baf181ef9602e1687f3110abf8a"
}

```

Response:

```

{
    "jsonrpc": "2.0",
    "result": true,
    "id": 1
}

```

See also

- [user.login](#)

Source

CUser::login() in *ui/include/classes/api/services/CUser.php*.

## user.unblock

### Description

`object user.unblock(array userids)`

This method allows to unblock users.

#### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(array) IDs of users to unblock.

### Return values

(object) Returns an object containing the IDs of the unblocked users under the `userids` property.

### Examples

Unblocking multiple users

Unblock two users.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.unblock",
  "params": [
    "1",
    "5"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "userids": [
      "1",
      "5"
    ]
  },
  "id": 1
}
```

### Source

`CUser::unblock()` in `ui/include/classes/api/services/CUser.php`.

## user.update

### Description

`object user.update(object/array users)`

This method allows to update existing users.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Note:**

The strength of user password is validated according to the password policy rules defined by Authentication API. See [Authentication API](#) for more information.

**Parameters**

(object/array) User properties to be updated.

The `userid` property must be defined for each user, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard user properties](#), the method accepts the following parameters.

| Parameter                                | Type   | Description  |
|--|--------|--|
| <code>passwd</code>                      | string | User's password.   |
| <code>usrgrps</code>                     | array  | Can be empty string if user belongs to or is moved only to groups that have LDAP access.<br>User <a href="#">groups</a> to replace existing user groups. |
| <code>medias</code>                      | array  | The user groups must have the <code>usrgrpid</code> property defined.<br>User <a href="#">media</a> to replace existing media.                           |
| <code>user_medias</code><br>(deprecated) | array  | This parameter is deprecated, please use <code>medias</code> instead.<br>User <a href="#">media</a> to replace existing media.                           |

**Return values**

(object) Returns an object containing the IDs of the updated users under the `userids` property.

**Examples****Renaming a user**

Rename a user to John Doe.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.update",
  "params": {
    "userid": "1",
    "name": "John",
    "surname": "Doe"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "userids": [
      "1"
    ]
  },
  "id": 1
}
```

**Changing user role**

Change a role of a user.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "user.update",
  "params": {
    "userid": "12",
    "roleid": "6"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "userids": [
      "12"
    ]
  },
  "id": 1
}
```

See also

- [Authentication](#)

Source

CUser::update() in *ui/include/classes/api/services/CUser.php*.

## User group

This class is designed to work with user groups.

Object references:

- [User group](#)

Available methods:

- [usergroup.create](#) - creating new user groups
- [usergroup.delete](#) - deleting user groups
- [usergroup.get](#) - retrieving user groups
- [usergroup.update](#) - updating user groups

## > User group object

The following objects are directly related to the usergroup API.

User group

The user group object has the following properties.

| Property                  | Type    | Description  |
|---------------------------|---------|--|
| usrgrpId                  | string  | <i>(readonly)</i> ID of the user group.  |
| <b>name</b><br>(required) | string  | Name of the user group.  |
| debug_mode                | integer | Whether debug mode is enabled or disabled.<br><br>Possible values are:<br>0 - <i>(default)</i> disabled;<br>1 - enabled. |



| Property     | Type    | Description  |
|--------------|---------|--|
| gui_access   | integer | Frontend authentication method of the users in the group.<br><br>Possible values:<br>0 - <i>(default)</i> use the system default authentication method;<br>1 - use internal authentication;<br>2 - use LDAP authentication;<br>3 - disable access to the frontend. |
| users_status | integer | Whether the user group is enabled or disabled.<br><br>Possible values are:<br>0 - <i>(default)</i> enabled;<br>1 - disabled.   |

Note that for some methods (update, delete) the required/optional parameter combination is different.

#### Permission

The permission object has the following properties.

| Property                        | Type    | Description  |
|---------------------------------|---------|--|
| <b>id</b><br>(required)         | string  | ID of the host group to add permission to.   |
| <b>permission</b><br>(required) | integer | Access level to the host group.<br><br>Possible values:<br>0 - access denied;<br>2 - read-only access;<br>3 - read-write access. |

#### Tag based permission

The tag based permission object has the following properties.

| Property                     | Type   | Description                                |
|------------------------------|--------|--|
| <b>groupid</b><br>(required) | string | ID of the host group to add permission to. |
| <b>tag</b>                   | string | Tag name.                                  |
| <b>value</b>                 | string | Tag value.                                 |

### usergroup.create

#### Description

`object usergroup.create(object/array userGroups)`

This method allows to create new user groups.

#### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(object/array) User groups to create.

Additionally to the [standard user group properties](#), the method accepts the following parameters.

| Parameter   | Type         | Description  |
|-------------|--------------|--|
| rights      | object/array | <a href="#">Permissions</a> to assign to the group           |
| tag_filters | array        | <a href="#">Tag based permissions</a> to assign to the group |

| Parameter                                       | Type         | Description                            |
|---|--------------|--|
| users   | object/array | <b>Users</b> to add to the user group. |
| The user must have the userid property defined. |              |  |

#### Return values

(object) Returns an object containing the IDs of the created user groups under the `usrgrpids` property. The order of the returned IDs matches the order of the passed user groups.

#### Examples

##### Creating a user group

Create a user group, which denies access to host group "2", and add a user to it.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usergroup.create",
  "params": {
    "name": "Operation managers",
    "rights": {
      "permission": 0,
      "id": "2"
    },
    "users": [
      {"userid": "12"}
    ]
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "usrgrpids": [
      "20"
    ]
  },
  "id": 1
}
```

See also

- **Permission**

Source

`CUserGroup::create()` in `ui/include/classes/api/services/CUserGroup.php`.

#### **usergroup.delete**

##### Description

object `usergroup.delete(array userGroupIds)`

This method allows to delete user groups.

##### **Note:**

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See **User roles** for more information.

## Parameters

(array) IDs of the user groups to delete.

## Return values

(object) Returns an object containing the IDs of the deleted user groups under the `usrgrpids` property.

## Examples

### Deleting multiple user groups

Delete two user groups.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "usergroup.delete",
  "params": [
    "20",
    "21"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "usrgrpids": [
      "20",
      "21"
    ]
  },
  "id": 1
}
```

## Source

`CUserGroup::delete()` in `ui/include/classes/api/services/CUserGroup.php`.

## usergroup.get

### Description

`integer/array usergroup.get(object parameters)`

The method allows to retrieve user groups according to the given parameters.

#### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

## Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter | Type         | Description   |
|-----------|--------------|---|
| status    | integer      | Return only user groups with the given status.  |
| userids   | string/array | Refer to the <a href="#">user group page</a> for a list of supported statuses.<br>Return only user groups that contain the given users. |
| usrgrpids | string/array | Return only user groups with the given IDs.   |

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| selectTagFilters       | query        | Return user group tag based permissions in the <code>tag_filters</code> property.<br><br>It has the following properties:<br><code>groupid</code> - (string) ID of the host group;<br><code>tag</code> - (string) tag name;<br><code>value</code> - (string) tag value.   |
| selectUsers            | query        | Return the users from the user group in the <code>users</code> property.  |
| selectRights           | query        | See <code>user.get</code> for restrictions based on user type.<br>Return user group rights in the <code>rights</code> property.<br><br>It has the following properties:<br><code>permission</code> - (integer) access level to the host group;<br><code>id</code> - (string) ID of the host group.                      |
| limitSelects           | integer      | Refer to the <a href="#">user group page</a> for a list of access levels to host groups.  |
| output                 | query        | Limits the number of records returned by subselects.<br><code>User group object</code> properties to be returned.   |
| sortfield              | string/array | Since Zabbix 6.0.38, <i>Admin</i> and <i>User</i> type users may retrieve only the following properties: <code>usrgrp_id</code> , <code>name</code> , <code>gui_access</code> , <code>users_status</code> , <code>debug_mode</code> .<br><br>Default: <code>extend</code> .<br>Sort the result by the given properties. |
| countOutput            | boolean      | Possible values are: <code>usrgrp_id</code> , <code>name</code> .   |
| editable               | boolean      | These parameters are described in the <a href="#">reference commentary</a> .  |
| excludeSearch          | boolean      |   |
| filter                 | object       |   |
| limit                  | integer      |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the `countOutput` parameter has been used.

#### Examples

Retrieving enabled user groups

Retrieve all enabled user groups.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usergroup.get",
  "params": {
    "output": "extend",
    "status": 0
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "usrgrpid": "7",
      "name": "Zabbix administrators",
      "gui_access": "0",
      "users_status": "0",
      "debug_mode": "1"
    },
    {
      "usrgrpid": "8",
      "name": "Guests",
      "gui_access": "0",
      "users_status": "0",
      "debug_mode": "0"
    },
    {
      "usrgrpid": "11",
      "name": "Enabled debug mode",
      "gui_access": "0",
      "users_status": "0",
      "debug_mode": "1"
    },
    {
      "usrgrpid": "12",
      "name": "No access to the frontend",
      "gui_access": "2",
      "users_status": "0",
      "debug_mode": "0"
    },
    {
      "usrgrpid": "14",
      "name": "Read only",
      "gui_access": "0",
      "users_status": "0",
      "debug_mode": "0"
    },
    {
      "usrgrpid": "18",
      "name": "Deny",
      "gui_access": "0",
      "users_status": "0",
      "debug_mode": "0"
    }
  ],
  "id": 1
}
```

See also

- [User](#)

Source

`CUserGroup::get()` in `ui/include/classes/api/services/CUserGroup.php`.

## **usergroup.update**

Description

`object usergroup.update(object/array userGroups)`

This method allows to update existing user groups.

**Note:**

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

**Parameters**

(object/array) User group properties to be updated.

The `usrgrpid` property must be defined for each user group, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard user group properties](#), the method accepts the following parameters.

| Parameter   | Type         | Description  |
|---|--------------|--|
| rights  | object/array | <a href="#">Permissions</a> to replace the current permissions assigned to the user group.           |
| tag_filters   | array        | <a href="#">Tag based permissions</a> to replace the current permissions assigned to the user group. |
| users   | object/array | <a href="#">Users</a> to replace the current users assigned to the user group.                       |
| The user must have only the <code>userid</code> property defined. |              |  |

**Return values**

(object) Returns an object containing the IDs of the updated user groups under the `usrgrpids` property.

**Examples**

Disabling a user group

Disable a user group.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usergroup.update",
  "params": {
    "usrgrpid": "17",
    "users_status": "1"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "usrgrpids": [
      "17"
    ]
  },
  "id": 1
}
```

See also

- [Permission](#)

Source

`CUserGroup::update()` in `ui/include/classes/api/services/CUserGroup.php`.

## User macro

This class is designed to work with host and global macros.

Object references:

- [Global macro](#)
- [Host macro](#)

Available methods:

- [usermacro.create](#) - creating new host macros
- [usermacro.createglobal](#) - creating new global macros
- [usermacro.delete](#) - deleting host macros
- [usermacro.deleteglobal](#) - deleting global macros
- [usermacro.get](#) - retrieving host and global macros
- [usermacro.update](#) - updating host macros
- [usermacro.updateglobal](#) - updating global macros

### > User macro object

The following objects are directly related to the `usermacro` API.

Global macro

The global macro object has the following properties.

| Property                   | Type    | Description  |
|----------------------------|---------|--|
| globalmacroid              | string  | <i>(readonly)</i> ID of the global macro.  |
| <b>macro</b><br>(required) | string  | Macro string.  |
| <b>value</b><br>(required) | string  | Value of the macro.  |
| type                       | integer | Type of macro.<br><br>Possible values:<br>0 - <i>(default)</i> Text macro;<br>1 - Secret macro;<br>2 - Vault secret. |
| description                | string  | Description of the macro.  |

Note that for some methods (update, delete) the required/optional parameter combination is different.

Host macro

The host macro object defines a macro available on a host, host prototype or template. It has the following properties.

| Property                    | Type    | Description  |
|-----------------------------|---------|--|
| hostmacroid                 | string  | <i>(readonly)</i> ID of the host macro.  |
| <b>hostid</b><br>(required) | string  | ID of the host that the macro belongs to.  |
| <b>macro</b><br>(required)  | string  | Macro string.  |
| <b>value</b><br>(required)  | string  | Value of the macro.  |
| type                        | integer | Type of macro.<br><br>Possible values:<br>0 - <i>(default)</i> Text macro;<br>1 - Secret macro;<br>2 - Vault secret. |

| Property    | Type   | Description               |
|-------------|--------|---------------------------|
| description | string | Description of the macro. |

Note that for some methods (update, delete) the required/optional parameter combination is different.

## usermacro.create

Description

object usermacro.create(object/array hostMacros)

This method allows to create new host macros.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Host macros to create.

The method accepts host macros with the [standard host macro properties](#).

Return values

(object) Returns an object containing the IDs of the created host macros under the `hostmacroids` property. The order of the returned IDs matches the order of the passed host macros.

Examples

Creating a host macro

Create a host macro "{\$SNMP\_COMMUNITY}" with the value "public" on host "10198".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.create",
  "params": {
    "hostid": "10198",
    "macro": "{$SNMP_COMMUNITY}",
    "value": "public"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostmacroids": [
      "11"
    ]
  },
  "id": 1
}
```

Source

CUserMacro::create() in `ui/include/classes/api/services/CUserMacro.php`.

## usermacro.createglobal

Description



`object usermacro.createglobal(object/array globalMacros)`

This method allows to create new global macros.

**Note:**

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Global macros to create.

The method accepts global macros with the [standard global macro properties](#).

Return values

(object) Returns an object containing the IDs of the created global macros under the `globalmacroids` property. The order of the returned IDs matches the order of the passed global macros.

Examples

Creating a global macro

Create a global macro "{\$SNMP\_COMMUNITY}" with value "public".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.createglobal",
  "params": {
    "macro": "{$SNMP_COMMUNITY}",
    "value": "public"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "globalmacroids": [
      "6"
    ]
  },
  "id": 1
}
```

Source

`CUserMacro::createGlobal()` in `ui/include/classes/api/services/CUserMacro.php`.

## **usermacro.delete**

Description

`object usermacro.delete(array hostMacroIds)`

This method allows to delete host macros.

**Note:**

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the host macros to delete.

Return values

(object) Returns an object containing the IDs of the deleted host macros under the `hostmacroids` property.

#### Examples

Deleting multiple host macros

Delete two host macros.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.delete",
  "params": [
    "32",
    "11"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "hostmacroids": [
      "32",
      "11"
    ]
  },
  "id": 1
}
```

#### Source

CUserMacro::delete() in `ui/include/classes/api/services/CUserMacro.php`.

### usermacro.deleteglobal

#### Description

object usermacro.deleteglobal(array globalMacroIds)

This method allows to delete global macros.

#### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

#### Parameters

(array) IDs of the global macros to delete.

#### Return values

(object) Returns an object containing the IDs of the deleted global macros under the `globalmacroids` property.

#### Examples

Deleting multiple global macros

Delete two global macros.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.deleteglobal",
  "params": [
    "32",
```

```

        "11"
    ],
    "auth": "3a57200802b24cda67c4e4010b50c065",
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "globalmacroids": [
      "32",
      "11"
    ]
  },
  "id": 1
}

```

Source

CUserMacro::deleteGlobal() in *ui/include/classes/api/services/CUserMacro.php*.

## usermacro.get

Description

integer/array usermacro.get(object parameters)

The method allows to retrieve host and global macros according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter       | Type         | Description   |
|-----------------|--------------|---|
| globalmacro     | flag         | Return global macros instead of host macros.  |
| globalmacroids  | string/array | Return only global macros with the given IDs.   |
| groupids        | string/array | Return only host macros that belong to hosts or templates from the given host groups.                                       |
| hostids         | string/array | Return only macros that belong to the given hosts or templates.   |
| hostmacroids    | string/array | Return only host macros with the given IDs.   |
| inherited       | boolean      | If set to <code>true</code> return only host prototype user macros inherited from a template.                               |
| selectGroups    | query        | Return host groups that the host macro belongs to in the <b>groups</b> property.  |
| selectHosts     | query        | Used only when retrieving host macros.<br>Return hosts that the host macro belongs to in the <b>hosts</b> property.         |
| selectTemplates | query        | Used only when retrieving host macros.<br>Return templates that the host macro belongs to in the <b>templates</b> property. |
| sortfield       | string/array | Used only when retrieving host macros.<br>Sort the result by the given properties.  |
| countOutput     | boolean      | Possible value: <code>macro</code> .<br>These parameters are described in the <a href="#">reference commentary</a> .        |

| Parameter              | Type         | Description |
|------------------------|--------------|-------------|
| editable               | boolean      |             |
| excludeSearch          | boolean      |             |
| filter                 | object       |             |
| limit                  | integer      |             |
| output                 | query        |             |
| preservekeys           | boolean      |             |
| search                 | object       |             |
| searchByAny            | boolean      |             |
| searchWildcardsEnabled | boolean      |             |
| sortorder              | string/array |             |
| startSearch            | boolean      |             |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

Retrieving host macros for a host

Retrieve all host macros defined for host "10198".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.get",
  "params": {
    "output": "extend",
    "hostids": "10198"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostmacroid": "9",
      "hostid": "10198",
      "macro": "{$INTERFACE}",
      "value": "eth0",
      "description": "",
      "type": "0"
    },
    {
      "hostmacroid": "11",
      "hostid": "10198",
      "macro": "{$SNMP_COMMUNITY}",
      "value": "public",
      "description": "",
      "type": "0"
    }
  ],
  "id": 1
}
```

Retrieving global macros

Retrieve all global macros.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.get",
  "params": {
    "output": "extend",
    "globalmacro": true
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "globalmacroid": "6",
      "macro": "{$SNMP_COMMUNITY}",
      "value": "public",
      "description": "",
      "type": "0"
    }
  ],
  "id": 1
}
```

Source

CUserMacro::get() in `ui/include/classes/api/services/CUserMacro.php`.

## usermacro.update

Description

object usermacro.update(object/array hostMacros)

This method allows to update existing host macros.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) **Host macro properties** to be updated.

The `hostmacroid` property must be defined for each host macro, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Return values

(object) Returns an object containing the IDs of the updated host macros under the `hostmacroids` property.

Examples

Changing the value of a host macro

Change the value of a host macro to "public".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "usermacro.update",
  "params": {
    "hostmacroid": "1",
    "value": "public"
  }
}
```

```

    },
    "auth": "038e1d7b1735c6a5436ee9eae095879e",
    "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "hostmacroids": [
      "1"
    ]
  },
  "id": 1
}

```

Source

CUserMacro::update() in *ui/include/classes/api/services/CUserMacro.php*.

## usermacro.updateglobal

Description

object usermacro.updateglobal(object/array globalMacros)

This method allows to update existing global macros.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) **Global macro properties** to be updated.

The globalmacroid property must be defined for each global macro, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Return values

(object) Returns an object containing the IDs of the updated global macros under the globalmacroids property.

Examples

Changing the value of a global macro

Change the value of a global macro to "public".

Request:

```

{
  "jsonrpc": "2.0",
  "method": "usermacro.updateglobal",
  "params": {
    "globalmacroid": "1",
    "value": "public"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "globalmacroids": [
      "1"
    ]
  }
}

```

```
    ],
    },
    "id": 1
}
```

Source

CUserMacro::updateGlobal() in *ui/include/classes/api/services/CUserMacro.php*.

## Value map

This class is designed to work with value maps.

Object references:

- [Value map](#)

Available methods:

- [valuemap.create](#) - creating new value maps
- [valuemap.delete](#) - deleting value maps
- [valuemap.get](#) - retrieving value maps
- [valuemap.update](#) - updating value maps

## > Value map object

The following objects are directly related to the `valuemap` API.

Value map

The value map object has the following properties.

| Property                                   | Type   | Description  |
|--|--------|--|
| <code>valuemapid</code>                    | string | ( <i>readonly</i> ) ID of the value map.   |
| <b><code>hostid</code></b><br>(required)   | id     | Value map host or template ID.   |
| <b><code>name</code></b><br>(required)     | string | Name of the value map.   |
| <b><code>mappings</code></b><br>(required) | array  | Value mappings for current value map. The mapping object is <a href="#">described in detail below</a> .  |
| <code>uuid</code>                          | string | Universal unique identifier, used for linking imported value maps to already existing ones. Used only for value maps on templates. Auto-generated, if not given. |

Note that for some methods (update, delete) the required/optional parameter combination is different.

Value mappings

The value mappings object defines value mappings of the value map. It has the following properties.

| Property          | Type    | Description   |
|-------------------|---------|---|
| <code>type</code> | integer | Mapping match type. For type equal 0,1,2,3,4 <code>value</code> field cannot be empty, for type 5 <code>value</code> field should be empty. |

Possible values:

- 0 - (default) exact match ;
- 1 - mapping will be applied if value is greater or equal<sup>1</sup>;
- 2 - mapping will be applied if value is less or equal<sup>1</sup>;
- 3 - mapping will be applied if value is in range (ranges are inclusive), allow to define multiple ranges separated by comma character<sup>1</sup>;
- 4 - mapping will be applied if value match regular expression<sup>2</sup>;
- 5 - default value, mapping will be applied if no other match were found.

| Property                      | Type   | Description   |
|-------------------------------|--------|---|
| <b>value</b><br>(required)    | string | Original value.   |
| <b>newvalue</b><br>(required) | string | Is not required for mapping of type "default".<br>Value to which the original value is mapped to. |

<sup>1</sup> supported only for items having value type "numeric unsigned", "numeric float".

<sup>2</sup> supported only for items having value type "character".

## valuemap.create

Description

object valuemap.create(object/array valuemaps)

This method allows to create new value maps.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) Value maps to create.

The method accepts value maps with the [standard value map properties](#).

Return values

(object) Returns an object containing the IDs of the created value maps the `valuemapids` property. The order of the returned IDs matches the order of the passed value maps.

Examples

Creating a value map

Create one value map with two mappings.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "valuemap.create",
  "params": {
    "hostid": "50009",
    "name": "Service state",
    "mappings": [
      {
        "type": "1",
        "value": "1",
        "newvalue": "Up"
      },
      {
        "type": "5",
        "newvalue": "Down"
      }
    ]
  },
  "auth": "57562fd409b3b3b9a4d916d45207bbcb",
  "id": 1
}
```

Response:



```
{
  "jsonrpc": "2.0",
  "result": {
    "valuemapids": [
      "1"
    ]
  },
  "id": 1
}
```

Source

CValueMap::create() in *ui/include/classes/api/services/CValueMap.php*.

## valuemap.delete

Description

object valuemap.delete(array valuemapids)

This method allows to delete value maps.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See **User roles** for more information.

Parameters

(array) IDs of the value maps to delete.

Return values

(object) Returns an object containing the IDs of the deleted value maps under the *valuemapids* property.

Examples

Deleting multiple value maps

Delete two value maps.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "valuemap.delete",
  "params": [
    "1",
    "2"
  ],
  "auth": "57562fd409b3b3b9a4d916d45207bbcb",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "valuemapids": [
      "1",
      "2"
    ]
  },
  "id": 1
}
```

Source

CValueMap::delete() in *ui/include/classes/api/services/CValueMap.php*.

**valuemap.get**

Description

integer/array valuemap.get(object parameters)

The method allows to retrieve value maps according to the given parameters.

**Note:**

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| valuemapids            | string/array | Return only value maps with the given IDs.   |
| selectMappings         | query        | Return the value mappings for current value map in the <b>mappings</b> property.   |
| sortfield              | string/array | Supports count.<br>Sort the result by the given properties.<br><br>Possible values are: <b>valuemapid</b> , <b>name</b> .<br>These parameters are described in the <b>reference commentary</b> . |
| countOutput            | boolean      |  |
| editable               | boolean      |  |
| excludeSearch          | boolean      |  |
| filter                 | object       |  |
| limit                  | integer      |  |
| output                 | query        |  |
| preservekeys           | boolean      |  |
| search                 | object       |  |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      |  |
| sortorder              | string/array |  |
| startSearch            | boolean      |  |

Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the **countOutput** parameter has been used.

Examples

Retrieving value maps

Retrieve all configured value maps.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "valuemap.get",
  "params": {
    "output": "extend"
  },
  "auth": "57562fd409b3b3b9a4d916d45207bbcb",
  "id": 1
}
```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "valuemapid": "4",
      "name": "APC Battery Replacement Status"
    },
    {
      "valuemapid": "5",
      "name": "APC Battery Status"
    },
    {
      "valuemapid": "7",
      "name": "Dell Open Manage System Status"
    }
  ],
  "id": 1
}

```

Retrieve one value map with its mappings.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "valuemap.get",
  "params": {
    "output": "extend",
    "selectMappings": "extend",
    "valuemapids": ["4"]
  },
  "auth": "57562fd409b3b3b9a4d916d45207bbcb",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "valuemapid": "4",
      "name": "APC Battery Replacement Status",
      "mappings": [
        {
          "type": "0",
          "value": "1",
          "newvalue": "unknown"
        },
        {
          "type": "0",
          "value": "2",
          "newvalue": "notInstalled"
        },
        {
          "type": "0",
          "value": "3",
          "newvalue": "ok"
        },
        {
          "type": "0",
          "value": "4",
          "newvalue": "failed"
        }
      ]
    }
  ]
}

```

```

        "type": "0",
        "value": "5",
        "newvalue": "highTemperature"
    },
    {
        "type": "0",
        "value": "6",
        "newvalue": "replaceImmediately"
    },
    {
        "type": "0",
        "value": "7",
        "newvalue": "lowCapacity"
    }
]
},
{id": 1
}

```

Source

CValueMap::get() in `ui/include/classes/api/services/CValueMap.php`.

## valuemap.update

Description

object valuemap.update(object/array valuemaps)

This method allows to update existing value maps.

### Note:

This method is only available to *Super admin* user type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object/array) **Value map properties** to be updated.

The valuemapid property must be defined for each value map, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Return values

(object) Returns an object containing the IDs of the updated value maps under the valuemapid property.

Examples

Changing value map name

Change value map name to "Device status".

Request:

```

{
    "jsonrpc": "2.0",
    "method": "valuemap.update",
    "params": {
        "valuemapid": "2",
        "name": "Device status"
    },
    "auth": "57562fd409b3b3b9a4d916d45207bbcb",
    "id": 1
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "valuemapids": [
      "2"
    ]
  },
  "id": 1
}
```

Changing mappings for one value map.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "valuemap.update",
  "params": {
    "valuemapid": "2",
    "mappings": [
      {
        "type": "0",
        "value": "0",
        "newvalue": "Online"
      },
      {
        "type": "0",
        "value": "1",
        "newvalue": "Offline"
      }
    ]
  },
  "auth": "57562fd409b3b3b9a4d916d45207bbcb",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "valuemapids": [
      "2"
    ]
  },
  "id": 1
}
```

Source

CValueMap::update() in *ui/include/classes/api/services/CValueMap.php*.

## Web scenario

This class is designed to work with web scenarios.

Object references:

- [Web scenario](#)
- [Scenario step](#)

Available methods:

- [httptest.create](#) - creating new web scenarios
- [httptest.delete](#) - deleting web scenarios

- [httptest.get](#) - retrieving web scenarios
- [httptest.update](#) - updating web scenarios

## > Web scenario object

The following objects are directly related to the webcheck API.

Web scenario

The web scenario object has the following properties.

| Property                    | Type                                 | Description  |
|-----------------------------|--------------------------------------|--|
| httptestid                  | string                               | ( <i>readonly</i> ) ID of the web scenario.  |
| <b>hostid</b><br>(required) | string                               | ID of the host that the web scenario belongs to.   |
| <b>name</b><br>(required)   | string                               | Name of the web scenario.  |
| agent                       | string                               | User agent string that will be used by the web scenario.   |
| authentication              | integer                              | Default: Zabbix<br>Authentication method that will be used by the web scenario.<br><br>Possible values:<br>0 - ( <i>default</i> ) none;<br>1 - basic HTTP authentication;<br>2 - NTLM authentication.  |
| delay                       | string                               | Execution interval of the web scenario. Accepts seconds, time unit with suffix and user macro.   |
| headers                     | array of <a href="#">HTTP fields</a> | Default: 1m.<br>HTTP headers that will be sent when performing a request.  |
| http_password               | string                               | Password used for basic HTTP or NTLM authentication.   |
| http_proxy                  | string                               | Proxy that will be used by the web scenario given as <i>http://[username[:password]]@[proxy.example.com][:port]</i> .  |
| http_user                   | string                               | User name used for basic HTTP or NTLM authentication.  |
| nextcheck                   | timestamp                            | ( <i>readonly</i> ) Time of the next web scenario execution.   |
| retries                     | integer                              | Number of times a web scenario will try to execute each step before failing.   |
| ssl_cert_file               | string                               | Default: 1.<br>Name of the SSL certificate file used for client authentication (must be in PEM format).  |
| ssl_key_file                | string                               | Name of the SSL private key file used for client authentication (must be in PEM format).   |
| ssl_key_password            | string                               | SSL private key password.  |
| status                      | integer                              | Whether the web scenario is enabled.<br><br>Possible values are:<br>0 - ( <i>default</i> ) enabled;<br>1 - disabled.   |
| templateid                  | string                               | ( <i>readonly</i> ) ID of the parent template web scenario.  |
| variables                   | array of <a href="#">HTTP fields</a> | Web scenario variables.  |
| verify_host                 | integer                              | Whether to validate that the host name for the connection matches the one in the host's certificate.<br><br>Possible values are:<br>0 - ( <i>default</i> ) skip host verification;<br>1 - verify host. |
| verify_peer                 | integer                              | Whether to validate that the host's certificate is authentic.<br><br>Possible values are:<br>0 - ( <i>default</i> ) skip peer verification;<br>1 - verify peer.  |

| Property | Type   | Description   |
|----------|--------|---|
| uuid     | string | Global unique identifier, used for linking imported web scenarios to already existing ones. Used only for web scenarios on templates. |

Note that for some methods (update, delete) the required/optional parameter combination is different.

#### Web scenario tag

The web scenario tag object has the following properties.

| Property                 | Type   | Description             |
|--------------------------|--------|-------------------------|
| <b>tag</b><br>(required) | string | Web scenario tag name.  |
| value                    | string | Web scenario tag value. |

#### Scenario step

The scenario step object defines a specific web scenario check. It has the following properties.

| Property                  | Type                           | Description  |
|---------------------------|--------------------------------|--|
| httpstepid                | string                         | <i>(readonly)</i> ID of the scenario step.   |
| <b>name</b><br>(required) | string                         | Name of the scenario step.   |
| <b>no</b><br>(required)   | integer                        | Sequence number of the step in a web scenario.   |
| <b>url</b><br>(required)  | string                         | URL to be checked.   |
| follow_redirects          | integer                        | Whether to follow HTTP redirects.<br><br>Possible values are:<br>0 - don't follow redirects;<br>1 - <i>(default)</i> follow redirects.                                       |
| headers                   | array of HTTP fields           | HTTP headers that will be sent when performing a request. Scenario step headers will overwrite headers specified for the web scenario.                                       |
| httptestid                | string                         | <i>(readonly)</i> ID of the web scenario that the step belongs to.   |
| posts                     | string<br>array of HTTP fields | HTTP POST variables as a string (raw post data) or as an array of HTTP fields (form field data).   |
| required                  | string                         | Text that must be present in the response.   |
| retrieve_mode             | integer                        | Part of the HTTP response that the scenario step must retrieve.<br><br>Possible values are:<br>0 - <i>(default)</i> only body;<br>1 - only headers;<br>2 - headers and body. |
| status_codes              | string                         | Ranges of required HTTP status codes separated by commas.  |
| timeout                   | string                         | Request timeout in seconds. Accepts seconds, time unit with suffix and user macro.<br><br>Default: 15s. Maximum: 1h. Minimum: 1s.  |
| variables                 | array of HTTP fields           | Scenario step variables.   |
| query_fields              | array of HTTP fields           | Query fields - array of HTTP fields that will be added to URL when performing a request  |

#### HTTP field

The HTTP field object defines a name and value that is used to specify variable, HTTP header, POST form field data of query field data. It has the following properties.

| Property                   | Type   | Description                                     |
|----------------------------|--------|---|
| <b>name</b><br>(required)  | string | Name of header / variable / POST or GET field.  |
| <b>value</b><br>(required) | string | Value of header / variable / POST or GET field. |

## httptest.create

### Description

object httptest.create(object/array webScenarios)

This method allows to create new web scenarios.

#### Note:

Creating a web scenario will automatically create a set of **web monitoring items**.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See **User roles** for more information.

### Parameters

(object/array) Web scenarios to create.

Additionally to the **standard web scenario properties**, the method accepts the following parameters.

| Parameter                  | Type  | Description                 |
|----------------------------|-------|-----------------------------|
| <b>steps</b><br>(required) | array | Web scenario <b>steps</b> . |
| tags                       | array | Web scenario <b>tags</b> .  |

### Return values

(object) Returns an object containing the IDs of the created web scenarios under the `httptestids` property. The order of the returned IDs matches the order of the passed web scenarios.

### Examples

#### Creating a web scenario

Create a web scenario to monitor the company home page. The scenario will have two steps, to check the home page and the "About" page and make sure they return the HTTP status code 200.

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "httptest.create",
  "params": {
    "name": "Homepage check",
    "hostid": "10085",
    "steps": [
      {
        "name": "Homepage",
        "url": "http://example.com",
        "status_codes": "200",
        "no": 1
      },
      {
        "name": "Homepage / About",
        "url": "http://example.com/about",
        "status_codes": "200",
        "no": 2
      }
    ]
  }
}
```



```

    }
  ],
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "httpstestids": [
      "5"
    ]
  },
  "id": 1
}

```

See also

- [Scenario step](#)

Source

CHttpTest::create() in `ui/include/classes/api/services/CHttpTest.php`.

## httpstest.delete

Description

object httpstest.delete(array webScenarioIds)

This method allows to delete web scenarios.

### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(array) IDs of the web scenarios to delete.

Return values

(object) Returns an object containing the IDs of the deleted web scenarios under the `httpstestids` property.

Examples

Deleting multiple web scenarios

Delete two web scenarios.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "httpstest.delete",
  "params": [
    "2",
    "3"
  ],
  "auth": "3a57200802b24cda67c4e4010b50c065",
  "id": 1
}

```

Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "httptestids": [
      "2",
      "3"
    ]
  },
  "id": 1
}
```

Source

CHttpTest::delete() in *ui/include/classes/api/services/CHttpTest.php*.

## httptest.get

Description

integer/array httptest.get(object parameters)

The method allows to retrieve web scenarios according to the given parameters.

### Note:

This method is available to users of any type. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

Parameters

(object) Parameters defining the desired output.

The method supports the following parameters.

| Parameter      | Type             | Description   |
|----------------|------------------|---|
| groupids       | string/array     | Return only web scenarios that belong to the given host groups.   |
| hostids        | string/array     | Return only web scenarios that belong to the given hosts.   |
| httptestids    | string/array     | Return only web scenarios with the given IDs.   |
| inherited      | boolean          | If set to <code>true</code> return only web scenarios inherited from a template.  |
| monitored      | boolean          | If set to <code>true</code> return only enabled web scenarios that belong to monitored hosts.   |
| templated      | boolean          | If set to <code>true</code> return only web scenarios that belong to templates.   |
| templateids    | string/array     | Return only web scenarios that belong to the given templates.   |
| expandName     | flag             | Expand macros in the name of the web scenario.  |
| expandStepName | flag             | Expand macros in the names of scenario steps.   |
| evaltype       | integer          | Rules for tag searching.<br><br>Possible values:<br>0 - (default) And/Or;<br>2 - Or.  |
| tags           | array of objects | Return only web scenarios with given tags. Exact match by tag and case-sensitive or case-insensitive search by tag value depending on operator value.<br>Format: [{"tag": "<tag>", "value": "<value>", "operator": "<operator>"}, ...].<br>An empty array returns all web scenarios.<br><br>Possible operator types:<br>0 - (default) Like;<br>1 - Equal;<br>2 - Not like;<br>3 - Not equal<br>4 - Exists;<br>5 - Not exists. |

| Parameter              | Type         | Description   |
|------------------------|--------------|---|
| selectHosts            | query        | Return the hosts that the web scenario belongs to as an array in the <b>hosts</b> property.                       |
| selectSteps            | query        | Return web scenario steps in the <b>steps</b> property.   |
| selectTags             | query        | Supports count.<br>Return the web scenario tags in <b>tags</b> property.  |
| sortfield              | string/array | Sort the result by the given properties.  |
| countOutput            | boolean      | Possible values are: httpstestid and name.<br>These parameters are described in the <b>reference commentary</b> . |
| editable               | boolean      |   |
| excludeSearch          | boolean      |   |
| filter                 | object       |   |
| limit                  | integer      |   |
| output                 | query        |   |
| preservekeys           | boolean      |   |
| search                 | object       |   |
| searchByAny            | boolean      |   |
| searchWildcardsEnabled | boolean      |   |
| sortorder              | string/array |   |
| startSearch            | boolean      |   |

#### Return values

(integer/array) Returns either:

- an array of objects;
- the count of retrieved objects, if the countOutput parameter has been used.

#### Examples

##### Retrieving a web scenario

Retrieve all data about web scenario "4".

Request:

```
{
  "jsonrpc": "2.0",
  "method": "httpstest.get",
  "params": {
    "output": "extend",
    "selectSteps": "extend",
    "httpstestids": "9"
  },
  "auth": "038e1d7b1735c6a5436ee9eae095879e",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": [
    {
      "httpstestid": "9",
      "name": "Homepage check",
      "nextcheck": "0",
      "delay": "1m",
      "status": "0",
      "variables": [],
      "agent": "Zabbix",
      "authentication": "0",
      "http_user": "",
      "http_password": ""
    }
  ]
}
```

```

        "hostid": "10084",
        "templateid": "0",
        "http_proxy": "",
        "retries": "1",
        "ssl_cert_file": "",
        "ssl_key_file": "",
        "ssl_key_password": "",
        "verify_peer": "0",
        "verify_host": "0",
        "headers": [],
        "steps": [
            {
                "httpstepid": "36",
                "httptestid": "9",
                "name": "Homepage",
                "no": "1",
                "url": "http://example.com",
                "timeout": "15s",
                "posts": "",
                "required": "",
                "status_codes": "200",
                "variables": [
                    {
                        "name": "{var}",
                        "value": "12"
                    }
                ],
                "follow_redirects": "1",
                "retrieve_mode": "0",
                "headers": [],
                "query_fields": []
            },
            {
                "httpstepid": "37",
                "httptestid": "9",
                "name": "Homepage / About",
                "no": "2",
                "url": "http://example.com/about",
                "timeout": "15s",
                "posts": "",
                "required": "",
                "status_codes": "200",
                "variables": [],
                "follow_redirects": "1",
                "retrieve_mode": "0",
                "headers": [],
                "query_fields": []
            }
        ]
    },
    "id": 1
}

```

See also

- [Host](#)
- [Scenario step](#)

Source

CHttpTest::get() in `ui/include/classes/api/services/CHttpTest.php`.

## httptest.update

### Description

object httptest.update(object/array webScenarios)

This method allows to update existing web scenarios.

#### Note:

This method is only available to *Admin* and *Super admin* user types. Permissions to call the method can be revoked in user role settings. See [User roles](#) for more information.

### Parameters

(object/array) Web scenario properties to be updated.

The `httptestid` property must be defined for each web scenario, all other properties are optional. Only the passed properties will be updated, all others will remain unchanged.

Additionally to the [standard web scenario properties](#), the method accepts the following parameters.

| Parameter | Type  | Description   |
|-----------|-------|---|
| steps     | array | Scenario <a href="#">steps</a> to replace existing steps. |
| tags      | array | Web scenario <a href="#">tags</a> .                       |

### Return values

(object) Returns an object containing the IDs of the updated web scenarios under the `httptestid` property.

### Examples

#### Enabling a web scenario

Enable a web scenario, that is, set its status to "0".

#### Request:

```
{
  "jsonrpc": "2.0",
  "method": "httptest.update",
  "params": {
    "httptestid": "5",
    "status": 0
  },
  "auth": "700ca65537074ec963db7efabda78259",
  "id": 1
}
```

#### Response:

```
{
  "jsonrpc": "2.0",
  "result": {
    "httptestids": [
      "5"
    ]
  },
  "id": 1
}
```

### See also

- [Scenario step](#)

### Source

CHttpRequest::update() in `ui/include/classes/api/services/CHttpRequest.php`.

## Appendix 1. Reference commentary

### Notation Data types

The Zabbix API supports the following data types as input:

| Type      | Description   |
|-----------|---|
| boolean   | A boolean value, accepts either <code>true</code> or <code>false</code> .   |
| flag      | The value is considered to be <code>true</code> if it is passed and not equal to <code>null</code> ; otherwise, it is considered to be <code>false</code> .   |
| integer   | A whole number.   |
| float     | A floating point number.  |
| string    | A text string.  |
| text      | A longer text string.   |
| timestamp | A Unix timestamp.   |
| array     | An ordered sequence of values, that is, a plain array.  |
| object    | An associative array.   |
| query     | A value which defines, what data should be returned.<br><br>Can be defined as an array of property names to return only specific properties, or as one of the predefined values:<br><code>extend</code> - returns all object properties;<br><code>count</code> - returns the number of retrieved records, supported only by certain subselects. |

#### Attention:

Zabbix API always returns values as strings or arrays only.

### Property labels

Some of the objects properties are marked with short labels to describe their behavior. The following labels are used:

- *readonly* - the value of the property is set automatically and cannot be defined or changed by the client;
- *constant* - the value of the property can be set when creating an object, but cannot be changed after.

**Reserved ID value "0"** Reserved ID value "0" can be used to filter elements and to remove referenced objects. For example, to remove a referenced proxy from a host, `proxy_hostid` should be set to 0 ("`proxy_hostid`": "0") or to filter hosts monitored by server option `proxyids` should be set to 0 ("`proxyids`": "0").

**Common "get" method parameters** The following parameters are supported by all `get` methods:

| Parameter                  | Type    | Description   |
|----------------------------|---------|---|
| <code>countOutput</code>   | boolean | Return the number of records in the result instead of the actual data.  |
| <code>editable</code>      | boolean | If set to <code>true</code> , return only objects that the user has write permissions to.   |
| <code>excludeSearch</code> | boolean | Default: <code>false</code> .<br>Return results that do not match the criteria given in the <code>search</code> parameter.  |
| <code>filter</code>        | object  | Return only those results that exactly match the given filter.<br><br>Accepts an object, where the keys are property names (e.g., Host object properties in <code>host.get</code> , Item object properties in <code>item.get</code> , etc.), and the values are either a single value or an array of values to match against.<br><br>Does not support properties of text <b>data type</b> .<br><br>Note that some methods have specific functionality for this parameter, which is described on the method page (e.g., the <code>filter</code> parameter in <code>host.get</code> also supports Host interface properties). |
| <code>limit</code>         | integer | Limit the number of records returned.   |

| Parameter              | Type         | Description  |
|------------------------|--------------|--|
| output                 | query        | Object properties to be returned.  |
| preservekeys           | boolean      | Default: extend.<br>Use IDs as keys in the resulting array.  |
| search                 | object       | Return results that match the given pattern (case-insensitive).<br><br>Accepts an object, where the keys are property names (e.g., Host object properties in <code>host.get</code> , Item object properties in <code>item.get</code> , etc.), and the values are strings to search for. If no additional options are given, this will perform a LIKE <code>"%...%"</code> search.<br><br>Supports only properties of string and text <b>data type</b> .<br><br>Note that some methods have specific functionality for this parameter, which is described on the method page (e.g., the <code>search</code> parameter in <code>host.get</code> also supports Host interface properties).<br><br>If set to <code>true</code> , return results that match any of the criteria given in the <code>filter</code> or <code>search</code> parameter instead of all of them. |
| searchByAny            | boolean      |  |
| searchWildcardsEnabled | boolean      | Default: <code>false</code> .<br>If set to <code>true</code> , enables the use of <code>"*"</code> as a wildcard character in the <code>search</code> parameter.   |
| sortfield              | string/array | Default: <code>false</code> .<br>Sort the result by the given properties. Refer to a specific API get method description for a list of properties that can be used for sorting. Macros are not expanded before sorting.  |
| sortorder              | string/array | If no value is specified, data will be returned unsorted.<br>Order of sorting. If an array is passed, each value will be matched to the corresponding property given in the <code>sortfield</code> parameter.<br><br>Possible values are:<br>ASC - (default) ascending;<br>DESC - descending.  |
| startSearch            | boolean      | The search parameter will compare the beginning of fields, that is, perform a LIKE <code>"...%"</code> search instead.<br><br>Ignored if <code>searchWildcardsEnabled</code> is set to <code>true</code> .   |

#### Examples User permission check

Does the user have permission to write to hosts whose names begin with "MySQL" or "Linux" ?

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "countOutput": true,
    "search": {
      "host": ["MySQL", "Linux"]
    },
    "editable": true,
    "startSearch": true,
    "searchByAny": true
  },
  "auth": "766b71ee543230a1182ca5c44d353e36",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
```

```
"result": "0",
"id": 1
}
```

**Note:**

Zero result means no hosts with read/write permissions.

### Mismatch counting

Count the number of hosts whose names do not contain the substring "ubuntu"

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "countOutput": true,
    "search": {
      "host": "ubuntu"
    },
    "excludeSearch": true
  },
  "auth": "766b71ee543230a1182ca5c44d353e36",
  "id": 1
}
```

Response:

```
{
  "jsonrpc": "2.0",
  "result": "44",
  "id": 1
}
```

### Searching for hosts using wildcards

Find hosts whose name contains word "server" and have interface ports "10050" or "10071". Sort the result by host name in descending order and limit it to 5 hosts.

Request:

```
{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["hostid", "host"],
    "selectInterfaces": ["port"],
    "filter": {
      "port": ["10050", "10071"]
    },
    "search": {
      "host": "*server*"
    },
    "searchWildcardsEnabled": true,
    "searchByAny": true,
    "sortfield": "host",
    "sortorder": "DESC",
    "limit": 5
  },
  "auth": "766b71ee543230a1182ca5c44d353e36",
  "id": 1
}
```

Response:



```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "hostid": "50003",
      "host": "WebServer-Tomcat02",
      "interfaces": [
        {
          "port": "10071"
        }
      ]
    },
    {
      "hostid": "50005",
      "host": "WebServer-Tomcat01",
      "interfaces": [
        {
          "port": "10071"
        }
      ]
    },
    {
      "hostid": "50004",
      "host": "WebServer-Nginx",
      "interfaces": [
        {
          "port": "10071"
        }
      ]
    },
    {
      "hostid": "99032",
      "host": "MySQL server 01",
      "interfaces": [
        {
          "port": "10050"
        }
      ]
    },
    {
      "hostid": "99061",
      "host": "Linux server 01",
      "interfaces": [
        {
          "port": "10050"
        }
      ]
    }
  ],
  "id": 1
}

```

Searching for hosts using wildcards with "preservekeys"

If you add the parameter "preservekeys" to the previous request, the result is returned as an associative array, where the keys are the id of the objects.

Request:

```

{
  "jsonrpc": "2.0",
  "method": "host.get",
  "params": {
    "output": ["hostid", "host"],

```

```

    "selectInterfaces": ["port"],
    "filter": {
      "port": ["10050", "10071"]
    },
    "search": {
      "host": "*server*"
    },
    "searchWildcardsEnabled": true,
    "searchByAny": true,
    "sortfield": "host",
    "sortorder": "DESC",
    "limit": 5,
    "preservekeys": true
  },
  "auth": "766b71ee543230a1182ca5c44d353e36",
  "id": 1
}

```

Response:

```

{
  "jsonrpc": "2.0",
  "result": {
    "50003": {
      "hostid": "50003",
      "host": "WebServer-Tomcat02",
      "interfaces": [
        {
          "port": "10071"
        }
      ]
    },
    "50005": {
      "hostid": "50005",
      "host": "WebServer-Tomcat01",
      "interfaces": [
        {
          "port": "10071"
        }
      ]
    },
    "50004": {
      "hostid": "50004",
      "host": "WebServer-Nginx",
      "interfaces": [
        {
          "port": "10071"
        }
      ]
    },
    "99032": {
      "hostid": "99032",
      "host": "MySQL server 01",
      "interfaces": [
        {
          "port": "10050"
        }
      ]
    },
    "99061": {
      "hostid": "99061",
      "host": "Linux server 01",
      "interfaces": [

```

```

        {
            "port": "10050"
        }
    ]
},
"id": 1
}

```

## Appendix 2. Changes from 5.4 to 6.0

### Backward incompatible changes action

Changes:

[ZBXNEXT-6920](#) `action.create`, `action.update`: added strict validation of the methods parameters.

[ZBXNEXT-6755](#) `action.create`, `action.update`: renamed parameter `acknowledge_operations` to `update_operations`.

[ZBXNEXT-6755](#) `action.get`: renamed parameter `selectAcknowledgeOperations` to `selectUpdateOperations`.

auditlog

Changes:

[ZBXNEXT-6715](#) dropped support of property `note`.

[ZBXNEXT-6715](#) dropped support of `resourcetype` values (2 - *Configuration of Zabbix*, 7 - *Graph element*).

[ZBXNEXT-6715](#) dropped support of action values (5 - *Enable*, 6 - *Disable*).

[ZBXNEXT-6718](#) dropped support of action value (3 - *Login*).

[ZBXNEXT-6715](#) `auditlog.get`: dropped support of parameter `selectDetails`.

host group

Changes:

[ZBXNEXT-6868](#) `hostgroup.massupdate`: `hosts` and `templates` fields are now required.

[ZBXNEXT-6868](#) `hostgroup.massadd`, `hostgroup.massupdate`, `hostgroup.massremove`: added strict validation of the method parameters.

host prototype

Changes:

[ZBXNEXT-6959](#) `hostprototype.get`: dropped support of properties `group_prototypeid`, `hostid`, `templateid` of group link and group prototype API objects.

[ZBXNEXT-6959](#) `hostprototype.update`: dropped the ability to modify the readonly fields `host`, `name`, `custom_interfaces`, `interfaces`, `groupLinks`, `groupPrototypes`, `templates`, `tags`, `macros`, `inventory_mode` of inherited host prototypes.

[ZBXNEXT-6959](#) `hostprototype.create`, `hostprototype.update`, `hostprototype.delete`: added strict validation of the method parameters.

iconmap

Changes:

[ZBXNEXT-6914](#) `iconmap.create`, `iconmap.update`: dropped support of the icon mapping object property `sortorder`.

maintenance

Changes:

[ZBXNEXT-6890](#) `maintenance.create`, `maintenance.update`, `maintenance.delete`: added strict validation of the methods parameters.

[ZBXNEXT-6890](#) `maintenance.get`, `maintenance.update`: dropped support for parameter `timeperiodid` of the `timeperiod` object.

mediatype

Changes:

[ZBXNEXT-6885](#) `mediatype.create`, `mediatype.update`: added strict validation of the methods parameters.

role

Changes:

[ZBXNEXT-6787](#) dropped support of value `manage_services` for name property in action object.

[ZBXNEXT-3022](#) dropped support of value `configuration.services` for name property in UI object.

service

Changes:

[ZBXNEXT-6999](#) added `uuid`, `description` and `created_at` properties.

[ZBXNEXT-6999](#) dropped support for the `showsla`, `goodsla` and `times` properties.

[ZBXNEXT-6800](#) changed status value "0" meaning from "OK" to "Not classified".

[ZBXNEXT-3022](#) dropped support of `service.adddependencies`, `service.addtimes`, `service.deletedependencies`, `service.deletetimes`.

[ZBXNEXT-6674](#) dropped support of property `triggerid`.

[ZBXNEXT-6999](#) `service.get`: dropped support for `showsla`, `selectAlarms`, `selectTimes` parameters.

[ZBXNEXT-6999](#) `service.getsla`: dropped support for the method.

[ZBXNEXT-6999](#) `sla.get`, `sla.create`, `sla.update`, `sla.delete`, `sla.getsli` methods added.

[ZBXNEXT-6999](#) `service.get`: added support for sorting by `serviceid`, `status` and `created_at`.

[ZBXNEXT-6999](#) `service.get`: added support for `slaids` parameter; added support for filtering by `uuid`.

[ZBXNEXT-6999](#) `service.create`, `service.update`: dropped support for `showsla`, `goodsla` and `times` parameters.

[ZBXNEXT-2406](#) `service.getsla`: removed `status` and `problems` properties from response of request with `intervals` parameter.

[ZBXNEXT-3022](#) `service.create`, `service.update`: dropped support of parameters `dependencies` and `parentid`.

[ZBXNEXT-3022](#) `service.get`: dropped support of parameters `selectParent`, `selectDependencies` and `selectParentDependencies`.

[ZBXNEXT-6674](#) `service.get`: dropped support of parameter `selectTrigger`.

template

Changes:

[ZBXNEXT-6867](#) `template.create`, `template.update`, `template.delete`, `template.massadd`, `template.massupdate`, `template.massremove`: added strict validation of the methods parameters.

[ZBXNEXT-6867](#) `template.create`, `template.update`, `template.massadd`, `template.massupdate`: dropped support of parameter `hosts`.

[ZBXNEXT-6867](#) `template.massremove`: dropped support of parameter `hostids`.

trigger

Changes:

[ZBXNEXT-6867](#) `trigger.adddependencies`, `trigger.deletedependencies`: dropped the ability to edit the dependencies of inherited triggers.

## Other changes and bug fixes `action`

Changes:

[ZBXNEXT-6755](#) added new `conditiontype` values (27 - *Service*, 28 - *Service name*).

[ZBXNEXT-6250](#) `action.get`, `action.create`, `action.update`: added new property `notify_if_canceled`.

auditlog

Changes:

[ZBXNEXT-6999](#) added new `resourcetype` (48 - *SLA*).

[ZBXNEXT-6923](#) added new `resourcetype` (47 - *High availability node*).

[ZBXNEXT-6718](#) added support of action values (8 - *Login*, 9 - *Failed login*, 10 - *History clear*).

[ZBXNEXT-6715](#) added support of properties: `username`, `recordsetid`, `details`.

authentication

Changes:

[ZBXNEXT-4029](#) added new password policy fields `passwd_min_length` and `passwd_check_rules`.

dashboard

Changes:

[ZBXNEXT-6999](#) added new widget type `slareport` and widget field types (*9 - Service, 10 - SLA*).

[ZBXNEXT-6966](#) added new widget type `item`.

history

Changes:

[ZBXNEXT-6714](#) added new API method `history.clear`.

housekeeping

Changes:

[ZBXNEXT-6755](#) added support of property `hk_events_service`.

item

Changes:

[ZBXNEXT-7049](#) `item.get`, `item.create`, `item.update`: added the third parameter to the Prometheus pattern preprocessing step. The second parameter will now determine an aggregation method: `value`, `label`, `function`. The third parameter will now contain Prometheus output for the aggregation method `label` or an aggregation function for the aggregation method `function`.

item prototype

Changes:

[ZBXNEXT-7049](#) `itemprototype.get`, `itemprototype.create`, `itemprototype.update`: added the third parameter to the Prometheus pattern preprocessing step. The second parameter will now determine an aggregation method: `value`, `label`, `function`. The third parameter will now contain Prometheus output for the aggregation method `label` or an aggregation function for the aggregation method `function`.

maintenance

Changes:

[ZBXNEXT-6890](#) `maintenance.create`, `maintenance.update`: the parameter `groupids` is now deprecated. Use `groups` instead.

[ZBXNEXT-6890](#) `maintenance.create`, `maintenance.update`: the parameter `hostids` is now deprecated. Use `hosts` instead.

[ZBXNEXT-6890](#) `maintenance.create`, `maintenance.update`: changed the type of parameters `groups`, `hosts`, `timeperiods` and `tags` from `array` to `object/array`.

mediatype

Changes:

[ZBXNEXT-6755](#) message template object: added support of `conditiontype` value: *4 - (event created on service status update)*.

proxy

Changes:

[ZBXNEXT-6889](#) `proxy.create`, `proxy.update`: dropped support of `interface.interfaceid` and `interface.hostid` properties.

regexp

Changes:

[ZBXNEXT-6717](#) added `regexp.get`, `regexp.create`, `regexp.update` and `regexp.delete` API.

role

Changes:

[ZBXNEXT-6787](#) added support of new properties `services.read.mode`, `services.read.list`, `services.read.tag`.

`services.write.mode`, `services.write.list` and `services.write.tag`.

[ZBXNEXT-3022](#) added support of value `manage_services` for name property in action object.

[ZBXNEXT-6999](#) added support of value `manage_sla` for name property in action object.

## service

Changes:

[ZBXNEXT-6787](#) added new property `readonly`.

[ZBXNEXT-6800](#) added support of properties `weight`, `propagation_rule` and `propagation_value`.

[ZBXNEXT-6800](#) added support of status value (-1 - OK).

[ZBXNEXT-2406](#) `service.get`: added support of parameters `deep_parentids` and `selectProblemEvents`.

[ZBXNEXT-6800](#) `service.create`, `service.update`: added support of parameter `status_rules`.

[ZBXNEXT-6800](#) `service.get`: added support of parameter `selectStatusRules`.

[ZBXNEXT-6800](#) `service.get`: added support of count for parameter `selectAlarms`.

[ZBXNEXT-3022](#) `service.create`, `service.update`: added support of parameters `children`, `parents` and `tags`.

[ZBXNEXT-3022](#) `service.get`: added support of parameters `evaltype`, `tags`, `selectChildren`, `selectParents`, `selectTags`.

[ZBXNEXT-3022](#) `service.get`: added support of parameters `problem_tags`, `without_problem_tags` and `selectProblemTags`.

[ZBXNEXT-6674](#) `service.create`, `service.update`: added support of parameter `problem_tags`.

## settings

Changes:

[ZBXNEXT-6945](#) `settings.get`, `settings.update`: added support of parameters `geomaps_tile_provider`, `geomaps_tile_url`, `geomaps_max_zoom` and `geomaps_attribution`.

[ZBXNEXT-6715](#) `settings.get`, `settings.update`: added support of parameter `auditlog_enabled`.

## sla

Changes:

[ZBXNEXT-6999](#) added new API `sla` with methods: `sla.create`, `sla.delete`, `sla.get`, `sla.getsli`, `sla.update`.

## templatedashboard

Changes:

[ZBXNEXT-6966](#) added support of new widget type `item`.

## user

Changes:

[ZBXNEXT-6718](#) added new method `user.unblock`.

[ZBXNEXT-4029](#) `user.create`, `user.update`: implemented password strength validation according the password policy.

## usergroup

Changes:

[ZBXNEXT-6866](#) `usergroup.create`, `usergroup.update`: `userid` parameter is now deprecated. Use `users` instead.

## Zabbix API changes in 6.0

### 6.0.39 alert

Changes:

[ZBX-26023](#) `alert.get`: *Admin* and *User* type users may now retrieve "message" (0) type alert data about users in their user group.

### 6.0.38 alert

Changes:

[ZBX-26258](#) `alert.get`: Parameter `selectUsers` now returns data based on the restrictions added to `user.get` method.

[ZBX-26258](#) `alert.get`: *Admin* and *User* type users may now retrieve "message" (0) type alert data only about their own user.

mediatype

Changes:

[ZBX-26258](#) `mediatype.get`: parameter `selectUsers` now returns data based on the restrictions added to `user.get` method.

role

Changes:

[ZBX-26258](#) `role.get`: parameter `selectUsers` now returns data based on the restrictions added to `user.get` method.

user

Changes:

[ZBX-26258](#) `user.get`: when requesting user media, permissions, or role information, *Admin* and *User* type users may retrieve data only about their own user.

[ZBX-26258](#) `user.get`: *Admin* and *User* type users may now retrieve only the following **User object** properties for their own user: `userid`, `attempt_clock`, `attempt_failed`, `attempt_ip`, `autologin`, `autologout`, `lang`, `name`, `refresh`, `roleid`, `rows_per_page`, `surname`, `theme`, `timezone`, `url`, `username`. For users in their user group: `userid`, `name`, `surname`, `username`.

usergroup

Changes:

[ZBX-26258](#) `usergroup.get`: parameter `selectUsers` now returns data based on the restrictions added to `user.get` method.

#### **6.0.34** mediatype

Changes:

[ZBX-25385](#) `mediatype.get`: parameter `selectMessageTemplates` is now supported only for *Super admin* type users.

[ZBX-25385](#) `mediatype.get`: *Admin* type users may now retrieve only the following **Media type object** properties: `mediatypeid`, `name`, `type`, `status`, `maxattempts`.

[ZBX-25385](#) `mediatype.get`: when requesting user-related information of media types, *Admin* type users may now retrieve only data about their own user.

#### **6.0.22** hostprototype

Changes:

[ZBX-23284](#) `hostprototype.get`, `hostprototype.update`: returned support for `group_prototypeid` property of Group prototype objects.

#### **6.0.19** action

Changes:

[ZBX-21804](#) `action.create`, `action.get`, `action.update`, `action.delete`: removed requirement of write permissions for hosts, host groups, templates, triggers, proxy.

#### **6.0.15** script

Changes:

[ZBX-19466](#) changed validation of `script` object to be unique by combination of 2 properties: `name` and `menu_path`.

#### **6.0.14** user

Changes:

[ZBXNEXT-8012](#) `user.checkAuthentication`: added new parameter `token`.

### 6.0.13 configuration

Changes:

[ZBXNEXT-7951](#) `configuration.import, configuration.importcompare: option deleteMissing: true` for `templateLinkage` will now unlink missing templates (instead of unlink and clear).

discoveryrule

Changes:

[ZBXNEXT-7951](#) `discoveryrule.update`: the parameter `uuid` can now be updated.

graph

Changes:

[ZBXNEXT-7951](#) `graph.update`: the parameter `uuid` can now be updated.

graphprototype

Changes:

[ZBXNEXT-7951](#) `graphprototype.update`: the parameter `uuid` can now be updated.

hostgroup

Changes:

[ZBXNEXT-7951](#) `hostgroup.update`: the parameter `uuid` can now be updated.

hostprototype

Changes:

[ZBXNEXT-7951](#) `hostprototype.update`: the parameter `uuid` can now be updated.

httptest

Changes:

[ZBXNEXT-7951](#) `httptest.update`: the parameter `uuid` can now be updated.

item

Changes:

[ZBXNEXT-7951](#) `item.update`: the parameter `uuid` can now be updated.

itemprototype

Changes:

[ZBXNEXT-7951](#) `itemprototype.update`: the parameter `uuid` can now be updated.

template

Changes:

[ZBXNEXT-7951](#) `template.update`: the parameter `uuid` can now be updated.

templatedashboard

Changes:

[ZBXNEXT-7951](#) `templatedashboard.update`: the parameter `uuid` can now be updated.

trigger

Changes:

[ZBXNEXT-7951](#) `trigger.update`: the parameter `uuid` can now be updated.

triggerprototype



Changes:

[ZBXNEXT-7951](#) `triggerprototype.update`: the parameter `uuid` can now be updated.

`valuemap`

Changes:

[ZBXNEXT-7951](#) `valuemap.update`: the parameter `uuid` can now be updated.

### 6.0.9 user

Changes:

[ZBXNEXT-7971](#) `user.create`, `user.update`: increased max length of the "url" field to 2048 characters.

### 6.0.7 graph

Changes:

[ZBX-7706](#) `graph.get`: Graph availability doesn't depend on permissions to items specified in graph "ymin\_itemid" and "ymax\_itemid" fields.

Graph having MIN or MAX Y axis linked to inaccessible items will still be accessible but MIN/MAX Y axis works the same way as if specified calculation method is "Calculated".

`graphprototype`

Changes:

[ZBX-7706](#) `graphprototype.get`: Graph prototype availability doesn't depend on permissions to items specified in graph prototype "ymin\_itemid" and "ymax\_itemid" fields.

### 6.0.3 discoveryrule

Bug fixes:

[ZBX-19118](#) `discoveryrule.create`, `discoveryrule.update`: property `interfaceid` is no longer required to create/update a HTTP agent type LLD rule.

`item`

Bug fixes:

[ZBX-19118](#) `item.create`, `item.update`: property `interfaceid` is no longer required to create/update a HTTP agent type item.

`itemprototype`

Bug fixes:

[ZBX-19118](#) `itemprototype.create`, `itemprototype.update`: property `interfaceid` is no longer required to create/update a HTTP agent type item prototype.

## 20 Modules

**Overview** It is possible to enhance Zabbix frontend functionality by adding third-party modules or by developing your own modules without the need to change the source code of Zabbix.

Note that the module code will run with the same privileges as Zabbix source code. This means:

- third-party modules can be harmful. You must trust the modules you are installing;
- Errors in a third-party module code may crash the frontend. If this happens, just remove the module code from the frontend. As soon as you reload Zabbix frontend, you'll see a note saying that some modules are absent. Go to **Module administration** (in *Administration* → *General* → *Modules*) and click *Scan directory* again to remove non-existent modules from the database.

**Installation** Please always read the installation manual for a particular module. It is recommended to install new modules one by one to catch failures easily.

Just before you install a module:

- Make sure you have downloaded the module from a trusted source. Installation of harmful code may lead to consequences, such as data loss
- Different versions of the same module (same ID) can be installed in parallel, but only a single version can be enabled at once

Steps to install a module:

- Unpack your module within its own folder in the `modules` folder of the Zabbix frontend
- Ensure that your module folder contains at least the `manifest.json` file
- Navigate to **Module administration** and click the *Scan directory* button
- New module will appear in the list along with its version, author, description and status
- Enable module by clicking on its status

Troubleshooting:

| Problem   | Solution  |
|---|---|
| <i>Module did not appear in the list</i>                              | Make sure that the <code>manifest.json</code> file exists in <code>modules/your-module/</code> folder of the Zabbix frontend. If it does that means the module does not suit the current Zabbix version. If <code>manifest.json</code> file does not exist, you have probably unpacked in the wrong directory.              |
| <i>Frontend crashed</i>   | The module code is not compatible with the current Zabbix version or server configuration. Please delete module files and reload the frontend. You'll see a notice that some modules are absent. Go to <b>Module administration</b> and click <i>Scan directory</i> again to remove non-existent modules from the database. |
| <i>Error message about identical namespace, ID or actions appears</i> | New module tried to register a namespace, ID or actions which are already registered by other enabled modules. Disable the conflicting module (mentioned in error message) prior to enabling the new one.   |
| <i>Technical error messages appear</i>                                | Report errors to the developer of the module.   |

**Developing modules** Modules are written in PHP language. Model-view-controller (MVC) software pattern design is preferred, as it is also used in Zabbix frontend and will ease the development. PHP strict typing is also welcome but not mandatory.

Please note that with modules you can easily add new menu items and respective views and actions to Zabbix frontend. Currently it is not possible to register new API or create new database tables through modules.

Module structure

Each module is a directory (placed within the `modules` directory) with sub-directories containing controllers, views and any other code:

|  |            |   |
|--|------------|---|
| <code>example_module_directory/</code>         | (required) |   |
| <code>  manifest.json</code>                   | (required) | Metadata and action definition.           |
| <code>  Module.php</code>                      |            | Module initialization and event handling. |
| <code>  actions/</code>                        |            | Action controller files.                  |
| <code>SomethingView.php</code>                 |            |   |
| <code>SomethingCreate.php</code>               |            |   |
| <code>SomethingDelete.php</code>               |            |   |
| <code>data_export/</code>                      |            |   |
| <code>ExportAsXml.php</code>                   |            |   |
| <code>ExportAsExcel.php</code>                 |            |   |
| <code>views/</code>                            |            | View files.                               |
| <code>example.something.view.php</code>        |            |   |
| <code>example.something.delete.php</code>      |            |   |
| <code>js/</code>                               |            | JavaScript files used in views.           |
| <code>example.something.view.js.php</code>     |            |   |
| <code>partials/</code>                         |            | View partial files.                       |
| <code>example.something.reusable.php</code>    |            |   |
| <code>js/</code>                               |            | JavaScript files used in partials.        |
| <code>example.something.reusable.js.php</code> |            |   |

As you can see, the only mandatory file within the custom module directory is `manifest.json`. The module will not register without this file. `Module.php` is responsible for registering menu items and processing events such as `'onBeforeAction'` and `'onTerminate'`. The *actions*, *views* and *partials* directories contain PHP and JavaScript code needed for module actions.

## Naming convention

Before you create a module, it is important to agree on the naming convention for different module items such as directories and files so that we could keep things well organized. You can also find examples above, in the [Module structure](#) section.

| Item                          | Naming rules  | Example                              |
|-------------------------------|---|--------------------------------------|
| <i>Module directory</i>       | Lowercase [a-z], underscore and decimal digits  | example_v2                           |
| <i>Action subdirectories</i>  | Lowercase [a-z] and underscore character  | data_export                          |
| <i>Action files</i>           | CamelCase, ending with action type  | SomethingView.php                    |
| <i>View and partial files</i> | Lowercase [a-z]<br>Words separated with dot<br>Prefixed by <code>module.</code> followed by module name<br>Ending with action type and <code>.php</code> file extension | module.example.something.view.php    |
| <i>Javascript files</i>       | The same rules apply as for view and partial files, except the <code>.js.php</code> file extension.   | module.example.something.view.js.php |

Note that the 'module' prefix and name inclusion is mandatory for view and partial file names, unless you need to override Zabbix core views or partials. This rule, however, does not apply to action file names.

## Manifest preparation

Each module is expected to have a `manifest.json` file with the following fields in JSON format:

| Parameter                     | Required | Type   | Default | Description   |
|-------------------------------|----------|--------|---------|---|
| <code>manifest_version</code> | Yes      | Double | -       | Manifest version of the module. Currently supported version is <b>1</b> . |
| <code>id</code>               | Yes      | String | -       | Module ID. Only one module with given ID can be enabled at the same time. |
| <code>name</code>             | Yes      | String | -       | Module name as displayed in the Administration section.                   |
| <code>version</code>          | Yes      | String | -       | Module version as displayed in the Administration section.                |
| <code>namespace</code>        | Yes      | String | -       | PHP namespace for <code>Module.php</code> and action classes.             |
| <code>author</code>           | No       | String | ""      | Module author as displayed in the Administration section.                 |
| <code>url</code>              | No       | String | ""      | Module URL as displayed in the Administration section.                    |
| <code>description</code>      | No       | String | ""      | Module description as displayed in the Administration section.            |
| <code>actions</code>          | No       | Object | {}      | Actions to register with this module. See Actions.                        |
| <code>config</code>           | No       | Object | {}      | Module configuration.   |

For reference, please see an example of `manifest.json` in the [Reference](#) section.

## Actions

The module will have control over frontend actions defined within the `actions` object in the `manifest.json` file. This way new actions are defined. In the same way you may redefine existing actions. Each key of actions should represent the action name and the corresponding value should contain `class` and optionally `layout` and `view` keys.

One action is defined by four counterparts: name, controller, view and layout. Data validation and preparation is typically done in the controller, output formatting is done in the view or partials, and the layout is responsible for decorating the page with elements such as menu, header, footer and others.

Module actions must be defined in the `manifest.json` file as `actions` object:

| Parameter           | Required | Type   | Default       | Description   |
|---------------------|----------|--------|---------------|---|
| <code>key</code>    | Yes      | String | -             | Action name, in lowercase [a-z], separating words with dot.   |
| <code>class</code>  | Yes      | String | -             | Action class name, including subdirectory path (if used) within the <code>actions</code> directory. |
| <code>layout</code> | No       | String | "layout.html" | Action layout.  |
| <code>view</code>   | No       | String | null          | Action view.  |

There are several predefined layouts, like `layout.json` or `layout.xml`. These are intended for actions which produce different result than an HTML. You may explore predefined layouts in the `app/views/` directory or even create your own.

Sometimes it is necessary to only redefine the view part of some action leaving the controller intact. In such case just place the necessary view and/or partial files inside the `views` directory of the module.

For reference, please see an example action controller file in the [Reference](#) section. Please do not hesitate to explore current actions of Zabbix source code, located in the `app/` directory.

### Module.php

This optional PHP file is responsible for module initialization as well as event handling. Class 'Module' is expected to be defined in this file, extending base class `\Core\CModule`. The Module class must be defined within the namespace specified in the `manifest.json` file.

```
<?php

namespace Modules\Example;
use Core\CModule as BaseModule;

class Module extends BaseModule {
    ...
}
```

For reference, please see an example of `Module.php` in the [Reference](#) section.

**Reference** This section contains basic versions of different module elements introduced in the previous sections.

### manifest.json

```
{
    "manifest_version": 1.0,
    "id": "example_module",
    "name": "Example module",
    "version": "1.0",
    "namespace": "Example",
    "author": "John Smith",
    "url": "http://module.example.com",
    "description": "Short description of the module.",
    "actions": {
        "example.something.view": {
            "class": "SomethingView",
            "view": "module.example.something.view"
        },
        "example.something.create": {
            "class": "SomethingCreate",
            "layout": null
        },
        "example.something.delete": {
            "class": "SomethingDelete",
            "layout": null
        },
        "example.something.export.xml": {
            "class": "data_export/ExportAsXml",
            "layout": null
        },
        "example.something.export.excel": {
            "class": "data_export/ExportAsExcel",
            "layout": null
        }
    },
    "config": {
        "username": "john_smith"
    }
}
```

### Module.php

```

<?php declare(strict_types = 1);

namespace Modules\Example;

use APP;
use CController as CAction;

/**
 * Please see Core\CModule class for additional reference.
 */
class Module extends \Core\CModule {

    /**
     * Initialize module.
     */
    public function init(): void {
        // Initialize main menu (CMenu class instance).
        APP::Component()->get('menu.main')
            ->findOrAdd(_('Reports'))
                ->getSubMenu()
                    ->add((new \CMenuItem(_('Example wide report'))
                        ->setAction('example.report.wide.php')
                    ))
                    ->add((new \CMenuItem(_('Example narrow report'))
                        ->setAction('example.report.narrow.php')
                    ));
    }

    /**
     * Event handler, triggered before executing the action.
     *
     * @param CAction $action Action instance responsible for current request.
     */
    public function onBeforeAction(CAction $action): void {
    }

    /**
     * Event handler, triggered on application exit.
     *
     * @param CAction $action Action instance responsible for current request.
     */
    public function onTerminate(CAction $action): void {
    }
}

```

#### Action controller

```

<?php declare(strict_types = 1);

namespace Modules\Example\Actions;

use CControllerResponseData;
use CControllerResponseFatal;
use CController as CAction;

/**
 * Example module action.
 */
class SomethingView extends CAction {

    /**
     * Initialize action. Method called by Zabbix core.
     */
}

```

```

* @return void
*/
public function init(): void {
    /**
     * Disable SID (Session ID) validation. Session ID validation should only be used for actions which
     * modification, such as update or delete actions. In such case Session ID must be presented in the URL
     * the URL would expire as soon as the session expired.
     */
    $this->disableSIDvalidation();
}

/**
 * Check and sanitize user input parameters. Method called by Zabbix core. Execution stops if false is
 *
 * @return bool true on success, false on error.
 */
protected function checkInput(): bool {
    $fields = [
        'name' => 'required|string',
        'email' => 'required|string',
        'phone' => 'string'
    ];

    // Only validated data will further be available using $this->hasInput() and $this->getInput().
    $ret = $this->validateInput($fields);

    if (!$ret) {
        $this->setResponse(new CControllerResponseFatal());
    }

    return $ret;
}

/**
 * Check if the user has permission to execute this action. Method called by Zabbix core.
 * Execution stops if false is returned.
 *
 * @return bool
 */
protected function checkPermissions(): bool {
    $permit_user_types = [USER_TYPE_ZABBIX_ADMIN, USER_TYPE_SUPER_ADMIN];

    return in_array($this->getUserType(), $permit_user_types);
}

/**
 * Prepare the response object for the view. Method called by Zabbix core.
 *
 * @return void
 */
protected function doAction(): void {
    $contacts = $this->getInput('email');

    if ($this->hasInput('phone')) {
        $contacts .= ', ' . $this->getInput('phone');
    }

    $data = [
        'name' => $this->getInput('name'),
        'contacts' => $contacts
    ];

```

```

        $response = new CControllerResponseData($data);

        $this->setResponse($response);
    }
}

```

#### Action view

```

<?php declare(strict_types = 1);

/**
 * @var CView $this
 */

$this->includeJsFile('example.something.view.js.php');

(new CWidget())
    ->setTitle(_('Something view'))
    ->addItem(new CDiv($data['name']))
    ->addItem(new CPartial('module.example.something.reusable', [
        'contacts' => $data['contacts']
    ]))
    ->show();

```

## 21 Appendixes

Please use the sidebar to access content in the Appendixes section.

### 1 Installation and setup

Please use the sidebar to access content in this section.

#### 1 Database creation

##### Overview

A Zabbix database must be created during the installation of Zabbix server or proxy.

This section provides instructions for creating a Zabbix database. A separate set of instructions is available for each supported database.

UTF-8 is the only encoding supported by Zabbix. It is known to work without any security flaws. Users should be aware that there are known security issues if using some of the other encodings. See also [Limits of filtering with utf8mb4 collations](#).

##### Note:

If installing from [Zabbix Git repository](#), you need to run the following command prior to proceeding to the next steps:  
`<br><br> make dbschema`

##### MySQL/MariaDB

Character sets utf8 (aka utf8mb3) and utf8mb4 are supported (with utf8\_bin and utf8mb4\_bin collation respectively) for Zabbix server/proxy to work properly with MySQL database. It is recommended to use utf8mb4 for new installations.

For Zabbix 6.0.11 and newer, deterministic triggers need to be created during the import of schema. On MySQL and MariaDB, this requires `GLOBAL log_bin_trust_function_creators = 1` to be set if binary logging is enabled and there is no superuser privileges and `log_bin_trust_function_creators = 1` is not set in MySQL configuration file.

If you are installing from Zabbix **packages**, proceed to the [instructions](#) for your platform.

If you are installing Zabbix from sources:

- Create and configure a database and a user.

```
mysql -uroot -p<password>
```

```
mysql> create database zabbix character set utf8mb4 collate utf8mb4_bin;
mysql> create user 'zabbix'@'localhost' identified by '<password>';
mysql> grant all privileges on zabbix.* to 'zabbix'@'localhost';
mysql> SET GLOBAL log_bin_trust_function_creators = 1;
mysql> quit;
```

- Import the data into the database. For a Zabbix proxy database, only `schema.sql` should be imported (no `images.sql` nor `data.sql`).

```
cd database/mysql
mysql -uzabbix -p<password> zabbix < schema.sql
#### stop here if you are creating database for Zabbix proxy
mysql -uzabbix -p<password> zabbix < images.sql
mysql -uzabbix -p<password> zabbix < data.sql
```

`log_bin_trust_function_creators` can be disabled after the schema has been successfully imported:

```
mysql -uroot -p<password>

mysql> SET GLOBAL log_bin_trust_function_creators = 0;
mysql> quit;
```

## PostgreSQL

You need to have database user with permissions to create database objects.

If you are installing from Zabbix **packages**, proceed to the [instructions](#) for your platform.

If you are installing Zabbix from sources:

- Create a database user.

The following shell command will create user `zabbix`. Specify a password when prompted and repeat the password (note, you may first be asked for `sudo` password):

```
sudo -u postgres createuser --pwprompt zabbix
```

- Create a database.

The following shell command will create the database `zabbix` (last parameter) with the previously created user as the owner (`-O zabbix`).

```
sudo -u postgres createdb -O zabbix -E Unicode -T template0 zabbix
```

- Import the initial schema and data (assuming you are in the root directory of Zabbix sources).

For a Zabbix proxy database, only `schema.sql` should be imported (no `images.sql` nor `data.sql`).

```
cd database/postgresql
cat schema.sql | sudo -u zabbix psql zabbix
#### stop here if you are creating database for Zabbix proxy
cat images.sql | sudo -u zabbix psql zabbix
cat data.sql | sudo -u zabbix psql zabbix
```

### Attention:

The above commands are provided as an example that will work in most of GNU/Linux installations. You can use different commands depending on how your system/database is configured, for example: `psql -U <username>`  
If you have any trouble setting up the database, please consult your Database administrator.

## TimescaleDB

Instructions for creating and configuring TimescaleDB are provided in a separate [section](#).

## Oracle

Instructions for creating and configuring Oracle database are provided in a separate [section](#).

## SQLite

Using SQLite is supported for **Zabbix proxy** only!



The database will be automatically created if it does not exist.

Return to the [installation section](#).

## 2 Repairing Zabbix database character set and collation

MySQL/MariaDB

Historically, MySQL and derivatives used 'utf8' as an alias for utf8mb3 - MySQL's own 3-byte implementation of the standard UTF8, which is 4-byte. Starting from MySQL 8.0.28 and MariaDB 10.6.1, 'utf8mb3' character set is deprecated and at some point its support will be dropped while 'utf8' will become a reference to 'utf8mb4'. Since Zabbix 6.0, 'utf8mb4' is supported. To avoid future problems, it is highly recommended to use 'utf8mb4'. Another advantage of switching to 'utf8mb4' is support of supplementary Unicode characters.

### Warning:

As versions before Zabbix 6.0 are not aware of utf8mb4, make sure to first upgrade Zabbix server and DB schema to 6.0.x before executing utf8mb4 conversion.

#### 1. Check the database character set and collation.

For example:

```
mysql> SELECT @@character_set_database, @@collation_database;
+-----+-----+
| @@character_set_database | @@collation_database |
+-----+-----+
| latin2                   | latin2_general_ci    |
+-----+-----+
```

Or:

```
mysql> SELECT @@character_set_database, @@collation_database;
+-----+-----+
| @@character_set_database | @@collation_database |
+-----+-----+
| utf8                    | utf8_bin              |
+-----+-----+
```

As we see, the character set here is not 'utf8mb4' and collation is not 'utf8mb4\_bin', so we need to fix them.

#### 2. Stop Zabbix.

#### 3. Create a backup copy of the database!

#### 4. Fix the character set and collation on database level:

```
alter database <your DB name> character set utf8mb4 collate utf8mb4_bin;
```

Fixed values:

```
mysql> SELECT @@character_set_database, @@collation_database;
+-----+-----+
| @@character_set_database | @@collation_database |
+-----+-----+
| utf8mb4                 | utf8mb4_bin          |
+-----+-----+
```

#### 5. Load the [script](#) to fix character set and collation on table and column level:

```
mysql <your DB name> < utf8mb4_convert.sql
```

#### 6. Execute the script:

```
SET @ZABBIX_DATABASE = '<your DB name>';
If MariaDB → set innodb_strict_mode = OFF;
              CALL zbx_convert_utf8();
If MariaDB → set innodb_strict_mode = ON;
              drop procedure zbx_convert_utf8;
```

Please note that 'utf8mb4' is expected to consume slightly more disk space.

#### 7. If no errors - you may want to create a database backup copy with the fixed database.

## 8. Start Zabbix.

### 3 Database upgrade to primary keys

#### Overview

This section provides instructions for manually upgrading tables in existing installations to primary keys.

Upgrading to primary keys optimizes how data is indexed and accessed, which may speed up queries and save space. It also improves data management and synchronization in clustered setups, helping with scaling and ensuring the system remains reliable even if some servers fail.

Primary keys are used for all tables in new installations since Zabbix 6.0.

There is no automatic database upgrade to primary keys; however, existing installations may be upgraded manually **after** upgrading Zabbix server to 6.0 or newer.

Instructions are available for:

- [MySQL](#)
- [PostgreSQL](#)
- [TimescaleDB](#)
- [Oracle](#)

#### Attention:

The instructions provided on this page are designed for advanced users and may need to be adjusted for your specific configuration. Upgrading to primary keys can be time-consuming and resource-intensive. Ensure that enough free disk space is available; depending on your database size and stored data, the process may require up to 2.5 times the space currently used by history tables.

#### Important notes

To perform the database upgrade:

1. Stop Zabbix server.

Stopping Zabbix server for the time of the upgrade is strongly recommended. However, if absolutely necessary, you can perform the upgrade while the server is running (only for MySQL, MariaDB, and PostgreSQL without TimescaleDB).

2. Back up your database.
3. Run the scripts for your database.
4. Start Zabbix server.

#### Warning:

Run the scripts for the server database only. The proxy will not benefit from this upgrade.

If the database uses partitions, contact the DB administrator or Zabbix Support for help.

CSV files can be removed after a successful upgrade to primary keys.

Optionally, Zabbix frontend may be switched to [maintenance mode](#).

#### MySQL

Export and import must be performed in tmux/screen to ensure that the session isn't dropped.

See also: [Important notes](#)

#### MySQL 8.0+ with mysqlsh

This method can be used with a running Zabbix server, but it is recommended to stop the server for the time of the upgrade. The MySQL Shell (*mysqlsh*) must be [installed](#) and able to connect to the DB.

- Log in to MySQL console as root (recommended) or as any user with FILE privileges.
- Start MySQL with [local\\_infile](#) variable enabled.
- Rename old tables and create new tables by running `history_pk_prepare.sql`.

```
mysql -uzabbix -p<password> zabbix < /usr/share/zabbix-sql-scripts/mysql/history_pk_prepare.sql
```

- Export and import data.

Connect via `mysqlsh`. If using a socket connection, specifying the path might be required.

```
sudo mysqlsh -uroot -S /run/mysqld/mysqld.sock --no-password -Dzabbix
```

Run (CSVPATH can be changed as needed):

```
CSVPATH="/var/lib/mysql-files";

util.exportTable("history_old", CSVPATH + "/history.csv", { dialect: "csv" });
util.importTable(CSVPATH + "/history.csv", {"dialect": "csv", "table": "history" });

util.exportTable("history_uint_old", CSVPATH + "/history_uint.csv", { dialect: "csv" });
util.importTable(CSVPATH + "/history_uint.csv", {"dialect": "csv", "table": "history_uint" });

util.exportTable("history_str_old", CSVPATH + "/history_str.csv", { dialect: "csv" });
util.importTable(CSVPATH + "/history_str.csv", {"dialect": "csv", "table": "history_str" });

util.exportTable("history_log_old", CSVPATH + "/history_log.csv", { dialect: "csv" });
util.importTable(CSVPATH + "/history_log.csv", {"dialect": "csv", "table": "history_log" });

util.exportTable("history_text_old", CSVPATH + "/history_text.csv", { dialect: "csv" });
util.importTable(CSVPATH + "/history_text.csv", {"dialect": "csv", "table": "history_text" });
```

- Follow [post-migration instructions](#) to drop the old tables.

MariaDB/MySQL 8.0+ without `mysqlsh`

This upgrade method takes more time and should be used only if an upgrade with `mysqlsh` is not possible.

Table upgrade

- Log in to MySQL console as root (recommended) or any user with FILE privileges.
- Start MySQL with `local_infile` variable enabled.
- Rename old tables and create new tables by running `history_pk_prepare.sql`:

```
mysql -uzabbix -p<password> zabbix < /usr/share/zabbix-sql-scripts/mysql/history_pk_prepare.sql
```

Migration with stopped server

`max_execution_time` must be disabled before migrating data to avoid timeout during migration.

```
SET @@max_execution_time=0;

INSERT IGNORE INTO history SELECT * FROM history_old;
INSERT IGNORE INTO history_uint SELECT * FROM history_uint_old;
INSERT IGNORE INTO history_str SELECT * FROM history_str_old;
INSERT IGNORE INTO history_log SELECT * FROM history_log_old;
INSERT IGNORE INTO history_text SELECT * FROM history_text_old;
```

Follow [post-migration instructions](#) to drop the old tables.

Migration with running server

Check for which paths import/export is enabled:

```
mysql> SELECT @@secure_file_priv;
+-----+
| @@secure_file_priv |
+-----+
| /var/lib/mysql-files/ |
+-----+
```

If `secure_file_priv` value is a path to a directory, export/import will be performed for files in that directory. In this case, edit paths to files in queries accordingly or set the `secure_file_priv` value to an empty string for the upgrade time.

If `secure_file_priv` value is empty, export/import can be performed from any location.

If `secure_file_priv` value is NULL, set it to the path that contains exported table data ('/var/lib/mysql-files/' in the example above).

For more information, see [MySQL documentation](#).

`max_execution_time` must be disabled before exporting data to avoid timeout during export.

```
SET @@max_execution_time=0;
```

```
SELECT * INTO OUTFILE '/var/lib/mysql-files/history.csv' FIELDS TERMINATED BY ',' ESCAPED BY '"' LINES TER  
LOAD DATA INFILE '/var/lib/mysql-files/history.csv' IGNORE INTO TABLE history FIELDS TERMINATED BY ',' ESC
```

```
SELECT * INTO OUTFILE '/var/lib/mysql-files/history_uint.csv' FIELDS TERMINATED BY ',' ESCAPED BY '"' LINE  
LOAD DATA INFILE '/var/lib/mysql-files/history_uint.csv' IGNORE INTO TABLE history_uint FIELDS TERMINATED
```

```
SELECT * INTO OUTFILE '/var/lib/mysql-files/history_str.csv' FIELDS TERMINATED BY ',' ESCAPED BY '"' LINES  
LOAD DATA INFILE '/var/lib/mysql-files/history_str.csv' IGNORE INTO TABLE history_str FIELDS TERMINATED BY
```

```
SELECT * INTO OUTFILE '/var/lib/mysql-files/history_log.csv' FIELDS TERMINATED BY ',' ESCAPED BY '"' LINES  
LOAD DATA INFILE '/var/lib/mysql-files/history_log.csv' IGNORE INTO TABLE history_log FIELDS TERMINATED BY
```

```
SELECT * INTO OUTFILE '/var/lib/mysql-files/history_text.csv' FIELDS TERMINATED BY ',' ESCAPED BY '"' LINE  
LOAD DATA INFILE '/var/lib/mysql-files/history_text.csv' IGNORE INTO TABLE history_text FIELDS TERMINATED
```

Follow [post-migration instructions](#) to drop the old tables.

#### PostgreSQL

Export and import must be performed in tmux/screen to ensure that the session isn't dropped. For installations with TimescaleDB, skip this section and proceed to [PostgreSQL + TimescaleDB](#).

See also: [Important notes](#)

#### Table upgrade

- Rename tables using `history_pk_prepare.sql`:

```
sudo -u zabbix psql zabbix < /usr/share/zabbix-sql-scripts/postgresql/history_pk_prepare.sql
```

#### Migration with stopped server

- Export current history, import it to the temp table, then insert the data into new tables while ignoring duplicates:

```
INSERT INTO history SELECT * FROM history_old ON CONFLICT (itemid,clock,ns) DO NOTHING;  
INSERT INTO history_uint SELECT * FROM history_uint_old ON CONFLICT (itemid,clock,ns) DO NOTHING;  
INSERT INTO history_str SELECT * FROM history_str_old ON CONFLICT (itemid,clock,ns) DO NOTHING;  
INSERT INTO history_log SELECT * FROM history_log_old ON CONFLICT (itemid,clock,ns) DO NOTHING;  
INSERT INTO history_text SELECT * FROM history_text_old ON CONFLICT (itemid,clock,ns) DO NOTHING;
```

See tips for improving INSERT performance: [PostgreSQL: Bulk Loading Huge Amounts of Data, Checkpoint Distance and Amount of WAL](#).

- Follow [post-migration instructions](#) to drop the old tables.

#### Migration with running server

- Export current history, import it to the temp table, then insert the data into new tables while ignoring duplicates:

```
\copy history_old TO '/tmp/history.csv' DELIMITER ',' CSV  
CREATE TEMP TABLE temp_history (  
    itemid          bigint          NOT NULL,  
    clock           integer         DEFAULT '0'      NOT NULL,  
    value           DOUBLE PRECISION DEFAULT '0.0000' NOT NULL,  
    ns             integer         DEFAULT '0'      NOT NULL  
);  
\copy temp_history FROM '/tmp/history.csv' DELIMITER ',' CSV  
INSERT INTO history SELECT * FROM temp_history ON CONFLICT (itemid,clock,ns) DO NOTHING;  
  
\copy history_uint_old TO '/tmp/history_uint.csv' DELIMITER ',' CSV  
CREATE TEMP TABLE temp_history_uint (  
    itemid          bigint          NOT NULL,  
    clock           integer         DEFAULT '0'      NOT NULL,
```

```

    value                numeric(20)    DEFAULT '0'          NOT NULL,
    ns                   integer         DEFAULT '0'          NOT NULL
);
\copy temp_history_uint FROM '/tmp/history_uint.csv' DELIMITER ',' CSV
INSERT INTO history_uint SELECT * FROM temp_history_uint ON CONFLICT (itemid,clock,ns) DO NOTHING;

\copy history_str_old TO '/tmp/history_str.csv' DELIMITER ',' CSV
CREATE TEMP TABLE temp_history_str (
    itemid               bigint          NOT NULL,
    clock                integer         DEFAULT '0'          NOT NULL,
    value                varchar(255)    DEFAULT ''           NOT NULL,
    ns                   integer         DEFAULT '0'          NOT NULL
);
\copy temp_history_str FROM '/tmp/history_str.csv' DELIMITER ',' CSV
INSERT INTO history_str (itemid,clock,value,ns) SELECT * FROM temp_history_str ON CONFLICT (itemid,clock,ns) DO NOTHING;

\copy history_log_old TO '/tmp/history_log.csv' DELIMITER ',' CSV
CREATE TEMP TABLE temp_history_log (
    itemid               bigint          NOT NULL,
    clock                integer         DEFAULT '0'          NOT NULL,
    timestamp            integer         DEFAULT '0'          NOT NULL,
    source               varchar(64)     DEFAULT ''           NOT NULL,
    severity             integer         DEFAULT '0'          NOT NULL,
    value                text            DEFAULT ''           NOT NULL,
    logeventid           integer         DEFAULT '0'          NOT NULL,
    ns                   integer         DEFAULT '0'          NOT NULL
);
\copy temp_history_log FROM '/tmp/history_log.csv' DELIMITER ',' CSV
INSERT INTO history_log SELECT * FROM temp_history_log ON CONFLICT (itemid,clock,ns) DO NOTHING;

\copy history_text_old TO '/tmp/history_text.csv' DELIMITER ',' CSV
CREATE TEMP TABLE temp_history_text (
    itemid               bigint          NOT NULL,
    clock                integer         DEFAULT '0'          NOT NULL,
    value                text            DEFAULT ''           NOT NULL,
    ns                   integer         DEFAULT '0'          NOT NULL
);
\copy temp_history_text FROM '/tmp/history_text.csv' DELIMITER ',' CSV
INSERT INTO history_text SELECT * FROM temp_history_text ON CONFLICT (itemid,clock,ns) DO NOTHING;

```

- Follow [post-migration instructions](#) to drop the old tables.

#### PostgreSQL + TimescaleDB

Export and import must be performed in tmux/screen to ensure that the session isn't dropped. Zabbix server should be down during the upgrade.

See also: [Important notes](#)

- Rename tables using `history_pk_prepare.sql`.

```
sudo -u zabbix psql zabbix < /usr/share/zabbix-sql-scripts/postgresql/history_pk_prepare.sql
```

#### Attention:

The path to `history_pk_prepare.sql` has been **changed** since Zabbix 6.0.9. For versions older than 6.0.9, the following command should be used:

```
sudo -u zabbix psql zabbix < /usr/share/doc/zabbix-sql-scripts/postgresql/history_pk_prepare.sql
```

- Run TimescaleDB hypertable migration scripts (compatible with both TSDB v2.x and v1.x version) based on compression settings:
  - If compression is enabled (on default installation), run scripts from `/usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_with_compression/`

```
cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_with_compression/history_pk_upgrade_with_compression.sql
cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_with_compression/history_pk_upgrade_with_compression.sql
cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_with_compression/history_pk_upgrade_with_compression.sql
```

```

cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_with_compression/history_pk_upgrade_with_compression.sql
cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_with_compression/history_pk_upgrade_with_compression.sql
- If compression is disabled, run scripts from /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_no_compression/
cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_no_compression/history_pk_upgrade_no_compression.sql
cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_no_compression/history_pk_upgrade_no_compression.sql
cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_no_compression/history_pk_upgrade_no_compression.sql
cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_no_compression/history_pk_upgrade_no_compression.sql
cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_no_compression/history_pk_upgrade_no_compression.sql
cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_no_compression/history_pk_upgrade_no_compression.sql

```

See also: [Tips](#) for improving INSERT performance.

- Follow [post-migration instructions](#) to drop the old tables.

## Oracle

Export and import must be performed in tmux/screen to ensure that the session isn't dropped. Zabbix server should be down during the upgrade.

See also: [Important notes](#)

## Table upgrade

- Install Oracle Data Pump (available in the [Instant Client Tools package](#)).

See Oracle Data Pump [documentation](#) for performance tips.

- Rename tables using `history_pk_prepare.sql`.

```

cd /path/to/zabbix-sources/database/oracle/option-patches
sqlplus zabbix/password@oracle_host/service
sqlplus> @history_pk_prepare.sql

```

## Batch migration of history tables

- Prepare directories for Data Pump.

Data Pump must have read and write permissions to these directories.

Example:

```

mkdir -pv /export/history
chown -R oracle:oracle /export

```

- Create a directory object and grant read and write permissions to this object to the user used for Zabbix authentication ('zabbix' in the example below). Under `sysdba` role, run:

```

create directory history as '/export/history';
grant read,write on directory history to zabbix;

```

- Export tables. Replace N with the desired thread count.

```

expdp zabbix/password@oracle_host/service \
  DIRECTORY=history \
  TABLES=history_old,history_uint_old,history_str_old,history_log_old,history_text_old \
  PARALLEL=N

```

- Import tables. Replace N with the desired thread count.

```

impdp zabbix/password@oracle_host/service \
  DIRECTORY=history \
  TABLES=history_uint_old \
  REMAP_TABLE=history_old:history,history_uint_old:history_uint,history_str_old:history_str,history_log_old:history_log,history_text_old:history_text \
  data_options=SKIP_CONSTRAINT_ERRORS table_exists_action=APPEND PARALLEL=N CONTENT=data_only

```

- Follow [post-migration instructions](#) to drop the old tables.

## Individual migration of history tables

- Prepare directories for Data Pump for each history table. Data Pump must have read and write permissions to these directories.

Example:

```
mkdir -pv /export/history /export/history_uint /export/history_str /export/history_log /export/history_text
chown -R oracle:oracle /export
```

- Create a directory object and grant read and write permissions to this object to the user used for Zabbix authentication ('zabbix' in the example below). Under *sysdba* role, run:

```
create directory history as '/export/history';
grant read,write on directory history to zabbix;

create directory history_uint as '/export/history_uint';
grant read,write on directory history_uint to zabbix;

create directory history_str as '/export/history_str';
grant read,write on directory history_str to zabbix;

create directory history_log as '/export/history_log';
grant read,write on directory history_log to zabbix;

create directory history_text as '/export/history_text';
grant read,write on directory history_text to zabbix;
```

- Export and import each table. Replace N with the desired thread count.

```
expdp zabbix/password@oracle_host:1521/xe DIRECTORY=history TABLES=history_old PARALLEL=N

impdp zabbix/password@oracle_host:1521/xe DIRECTORY=history TABLES=history_old REMAP_TABLE=history_old:his

expdp zabbix/password@oracle_host:1521/xe DIRECTORY=history_uint TABLES=history_uint_old PARALLEL=N

impdp zabbix/password@oracle_host:1521/xe DIRECTORY=history_uint TABLES=history_uint_old REMAP_TABLE=histo

expdp zabbix/password@oracle_host:1521/xe DIRECTORY=history_str TABLES=history_str_old PARALLEL=N

impdp zabbix/password@oracle_host:1521/xe DIRECTORY=history_str TABLES=history_str_old REMAP_TABLE=history

expdp zabbix/password@oracle_host:1521/xe DIRECTORY=history_log TABLES=history_log_old PARALLEL=N

impdp zabbix/password@oracle_host:1521/xe DIRECTORY=history_log TABLES=history_log_old REMAP_TABLE=history

expdp zabbix/password@oracle_host:1521/xe DIRECTORY=history_text TABLES=history_text_old PARALLEL=N

impdp zabbix/password@oracle_host:1521/xe DIRECTORY=history_text TABLES=history_text_old REMAP_TABLE=histo
```

- Follow [post-migration instructions](#) to drop the old tables.

Post-migration

For all databases, once the migration is completed, do the following:

- Verify that everything works as expected.
- Drop old tables:

```
DROP TABLE history_old;
DROP TABLE history_uint_old;
DROP TABLE history_str_old;
DROP TABLE history_log_old;
DROP TABLE history_text_old;
```

## 4 Secure connection to the database

Overview

This section provides Zabbix setup steps and configuration examples for secure TLS connections between:



| Database   | Zabbix components                            |
|------------|--|
| MySQL      | Zabbix frontend, Zabbix server, Zabbix proxy |
| PostgreSQL | Zabbix frontend, Zabbix server, Zabbix proxy |

To set up connection encryption within the DBMS, see official vendor documentation for details:

- [MySQL](#): source and replica replication database servers.
- [MySQL](#): group replication, etc. database servers.
- [PostgreSQL](#) encryption options.

All examples are based on the GA releases of MySQL CE (8.0) and PgSQL (13) available through official repositories using AlmaLinux 8.

#### Requirements

The following is required to set up encryption:

- Developer-supported operating system with OpenSSL  $\geq 1.1.X$  or alternative.

#### Note:

It is recommended to avoid OS in the end-of-life status, especially in the case of new installations

- Database engine (RDBMS) installed and maintained from the official repository provided by developer. Operating systems often shipped with outdated database software versions for which encryption support is not implemented, for example RHEL 7 based systems and PostgreSQL 9.2, MariaDB 5.5 without encryption support.

#### Terminology

Setting this option enforces to use TLS connection to database from Zabbix server/proxy and frontend to database:

- `required` - connect using TLS as transport mode without identity checks
- `verify_ca` - connect using TLS and verify certificate
- `verify_full` - connect using TLS, verify certificate and verify that database identity (CN) specified by DBHost matches its certificate

#### Zabbix configuration

##### Frontend to the database

A secure connection to the database can be configured during frontend installation:

- Mark the *Database TLS encryption* checkbox in the **Configure DB connection** step to enable transport encryption.
- Mark the *Verify database certificate* checkbox that appears when *TLS encryption* field is checked to enable encryption with certificates.

#### Note:

For MySQL, the *Database TLS encryption* checkbox is disabled, if *Database host* is set to localhost, because connection that uses a socket file (on Unix) or shared memory (on Windows) cannot be encrypted.

For PostgreSQL, the *TLS encryption* checkbox is disabled, if the value of the *Database host* field begins with a slash or the field is empty.

The following parameters become available in the TLS encryption in certificates mode (if both checkboxes are marked):

| Parameter                            | Description   |
|--------------------------------------|---|
| <i>Database TLS CA file</i>          | Specify the full path to a valid TLS certificate authority (CA) file.   |
| <i>Database TLS key file</i>         | Specify the full path to a valid TLS key file.  |
| <i>Database TLS certificate file</i> | Specify the full path to a valid TLS certificate file.  |
| <i>Database host verification</i>    | Mark this checkbox to activate host verification.<br>Disabled for MYSQL, because PHP MySQL library does not allow to skip the peer certificate validation step. |
| <i>Database TLS cipher list</i>      | Specify a custom list of valid ciphers. The format of the cipher list must conform to the OpenSSL standard.<br>Available for MySQL only.                        |



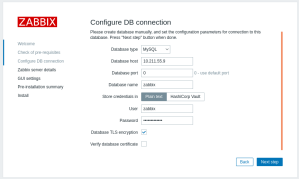

### Attention:

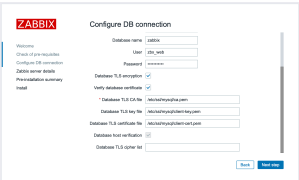

TLS parameters must point to valid files. If they point to non-existent or invalid files, it will lead to the authorization error. If certificate files are writable, the frontend generates a warning in the **System information** report that "TLS certificate files must be read-only." (displayed only if the PHP user is the owner of the certificate).

Certificates protected by passwords are not supported.

### Use cases

Zabbix frontend uses GUI interface to define possible options: `required`, `verify\_ca`, `verify\_full`. Specify required options in the installation wizard step *Configure DB connections*. These options are mapped to the configuration file (`zabbix.conf.php`) in the following manner:

| GUI settings  | Configuration file  | Description  | Result                               |
|---|---|--|--------------------------------------|
|    | <pre>... // Used for TLS connection. \$DB['ENCRYPTION'] = true; \$DB['KEY_FILE'] = ""; \$DB['CERT_FILE'] = ""; \$DB['CA_FILE'] = ""; \$DB['VERIFY_HOST'] = false; \$DB['CIPHER_LIST'] = ""; ...</pre> | <p>Check <i>Database TLS encryption</i><br/>Leave <i>Verify database certificate</i> unchecked</p>                                       | Enable required mode.                |
|  | <pre>... \$DB['ENCRYPTION'] = true; \$DB['KEY_FILE'] = ""; \$DB['CERT_FILE'] = ""; \$DB['CA_FILE'] = '/etc/ssl/mysql/ca.pem'; \$DB['VERIFY_HOST'] = false; \$DB['CIPHER_LIST'] = ""; ...</pre>        | <p>1. Check <i>Database TLS encryption</i> and <i>Verify database certificate</i><br/>2. Specify path to <i>Database TLS CA file</i></p> | Enable <code>verify\_ca</code> mode. |

| GUI settings  | Configuration file  | Description   | Result   |
|---|---|---|--|
|    | <pre>... // Used for TLS connection with strictly defined Cipher list. \$DB['ENCRYPTION'] = true; \$DB['KEY_FILE'] = '&lt;key_file_path&gt;'; \$DB['CERT_FILE'] = '&lt;key_file_path&gt;'; \$DB['CA_FILE'] = '&lt;key_file_path&gt;'; \$DB['VERIFY_HOST'] = true; \$DB['CIPHER_LIST'] = '&lt;cipher_list&gt;'; ...</pre> <p>Or:</p> <pre>... // Used for TLS connection without Cipher list defined - selected by MySQL server \$DB['ENCRYPTION'] = true; \$DB['KEY_FILE'] = '&lt;key_file_path&gt;'; \$DB['CERT_FILE'] = '&lt;key_file_path&gt;'; \$DB['CA_FILE'] = '&lt;key_file_path&gt;'; \$DB['VERIFY_HOST'] = true; \$DB['CIPHER_LIST'] = ''; ...</pre> | <ol style="list-style-type: none"> <li>1. Check <i>Database TLS encryption</i> and <i>Verify database certificate</i></li> <li>2. Specify path to <i>Database TLS key file</i></li> <li>3. Specify path to <i>Database TLS CA file</i></li> <li>4. Specify path to <i>Database TLS certificate file</i></li> <li>5. Specify <i>Database TLS cipher list</i> (optional)</li> </ol> | Enable <code>verify_full</code> mode for MySQL.      |
|  | <pre>... \$DB['ENCRYPTION'] = true; \$DB['KEY_FILE'] = '&lt;key_file_path&gt;'; \$DB['CERT_FILE'] = '&lt;key_file_path&gt;'; \$DB['CA_FILE'] = '&lt;key_file_path&gt;'; \$DB['VERIFY_HOST'] = true; \$DB['CIPHER_LIST'] = ' '; ...</pre>  | <ol style="list-style-type: none"> <li>1. Check <i>Database TLS encryption</i> and <i>Verify database certificate</i></li> <li>2. Specify path to <i>Database TLS key file</i></li> <li>3. Specify path to <i>Database TLS CA file</i></li> <li>4. Specify path to <i>Database TLS certificate file</i></li> <li>5. Check <i>Database host verification</i></li> </ol>            | Enable <code>verify_full</code> mode for PostgreSQL. |

**See also:** [Encryption configuration examples for MySQL](#), [Encryption configuration examples for PostgreSQL](#).

#### Zabbix server/proxy configuration

Secure connections to the database can be configured with the respective parameters in the Zabbix [server](#) and/or [proxy](#) configuration file.

| Configuration   | Result  |
|---|---|
| None  | Connection to the database without encryption.  |
| 1. Set DBTLSConnect=required  | Server/proxy make a TLS connection to the database. An unencrypted connection is not allowed.   |
| 1. Set DBTLSConnect=verify_ca   | Server/proxy make a TLS connection to the database after verifying the database certificate.  |
| 2. Set DBTLSCAFile - specify the TLS certificate authority file   |   |
| 1. Set DBTLSConnect=verify_full   | Server/proxy make a TLS connection to the database after verifying the database certificate and the database host identity.               |
| 2. Set DBTLSCAFile - specify TLS certificate authority file   |   |
| 1. Set DBTLSCAFile - specify TLS certificate authority file   | Server/proxy provide a client certificate while connecting to the database.   |
| 2. Set DBTLSCertFile - specify the client public key certificate file   |   |
| 3. Set DBTLSKeyFile - specify the client private key file   |   |
| 1. Set DBTLSCipher - the list of encryption ciphers that the client permits for connections using TLS protocols up to TLS 1.2 | (MySQL) TLS connection is made using a cipher from the provided list.<br>(PostgreSQL) Setting this option will be considered as an error. |
| or DBTLSCipher13 - the list of encryption ciphers that the client permits for connections using TLS 1.3 protocol              |   |

## 1 MySQL encryption configuration

### Overview

This section provides several encryption configuration examples for CentOS 8.2 and MySQL 8.0.21 and can be used as a quickstart guide for encrypting the connection to the database.

#### Attention:

If MySQL host is set to localhost, encryption options will not be available. In this case a connection between Zabbix frontend and the database uses a socket file (on Unix) or shared memory (on Windows) and cannot be encrypted.

#### Note:

List of encryption combinations is not limited to the ones listed on this page. There are a lot more combinations available.

### Pre-requisites

Install MySQL database from the [official repository](#).

See [MySQL documentation](#) for details on how to use MySQL repo.

MySQL server is ready to accept secure connections using a self-signed certificate.

To see which users are using an encrypted connection, run the following query (Performance Schema should be turned ON):

```
mysql> SELECT sbt.variable_value AS tls_version, t2.variable_value AS cipher, processlist_user AS user, pr
FROM performance_schema.status_by_thread AS sbt
JOIN performance_schema.threads AS t ON t.thread_id = sbt.thread_id
JOIN performance_schema.status_by_thread AS t2 ON t2.thread_id = t.thread_id
WHERE sbt.variable_name = 'Ssl_version' and t2.variable_name = 'Ssl_cipher'
ORDER BY tls_version;
```

### Transport-only encryption

#### MySQL configuration

Modern versions of the database are ready out-of-the-box for required **encryption mode**. A server-side certificate will be created after initial setup and launch.

Create users and roles for the main components:

```
mysql> CREATE USER
'zbx_srv'@'%' IDENTIFIED WITH mysql_native_password BY '<strong_password>',
'zbx_web'@'%' IDENTIFIED WITH mysql_native_password BY '<strong_password>'
REQUIRE SSL
PASSWORD HISTORY 5;
```

```
mysql> CREATE ROLE 'zbx_srv_role', 'zbx_web_role';

mysql> GRANT SELECT, UPDATE, DELETE, INSERT, CREATE, DROP, ALTER, INDEX, REFERENCES ON zabbix.* TO 'zbx_srv_role';
mysql> GRANT SELECT, UPDATE, DELETE, INSERT ON zabbix.* TO 'zbx_web_role';

mysql> GRANT 'zbx_srv_role' TO 'zbx_srv'@'%';
mysql> GRANT 'zbx_web_role' TO 'zbx_web'@'%';

mysql> SET DEFAULT ROLE 'zbx_srv_role' TO 'zbx_srv'@'%';
mysql> SET DEFAULT ROLE 'zbx_web_role' TO 'zbx_web'@'%';
```

Note that the X.509 protocol is not used to check identity, but the user is configured to use only encrypted connections. See [MySQL documentation](#) for more details about configuring users.

Run to check connection (socket connection cannot be used to test secure connections):

```
mysql -u zbx_srv -p -h 10.211.55.9 --ssl-mode=REQUIRED
```

Check current status and available cipher suites:

```
mysql> status
```

```
-----
mysql Ver 8.0.21 for Linux on x86_64 (MySQL Community Server - GPL)
```

```
Connection id: 62
```

```
Current database:
```

```
Current user: zbx_srv@bfdb.local
```

```
SSL: Cipher in use is TLS_AES_256_GCM_SHA384
```

```
mysql> SHOW SESSION STATUS LIKE 'Ssl_cipher_list'\G;
```

```
***** 1. row *****
```

```
Variable_name: Ssl_cipher_list
```

```
Value: TLS_AES_256_GCM_SHA384:TLS_CHACHA20_POLY1305_SHA256:TLS_AES_128_GCM_SHA256:TLS_AES_128_CCM_SHA256:TLS_AES_128_CCM_0_SHA256
```

```
1 row in set (0.00 sec)
```


ERROR:

No query specified

Frontend

To enable transport-only encryption for connections between Zabbix frontend and the database:

- Check *Database TLS encryption*
- Leave *Verify database certificate* unchecked



## Configure DB connection

Please create database manually, and set the configuration parameters for connection to this database. Press "Next step" button when done.

Welcome  
Check of pre-requisites  
Configure DB connection  
Zabbix server details  
GUI settings  
Pre-installation summary  
Install

Database type MySQL  
Database host 10.211.55.9  
Database port 0 0 - use default port  
Database name zabbix  
Store credentials in Plain text HashiCorp Vault  
User zabbix  
Password \*\*\*\*\*  
Database TLS encryption ☒  
Verify database certificate ☐

Back Next step

### Server

To enable transport-only encryption for connections between server and the database, configure `/etc/zabbix/zabbix_server.conf`:

```
...
DBHost=10.211.55.9
DBName=zabbix
DBUser=zbx_srv
DBPassword=<strong_password>
DBTLSConnect=required
...
```

### Encryption with certificate authority verification

Copy required MySQL CA to the Zabbix frontend server, assign proper permissions to allow the webserver to read this file.


#### Note:

This mode doesn't work on SLES 12 and RHEL 7 due to older MySQL libraries.

### Frontend

To enable encryption with certificate verification for connections between Zabbix frontend and the database:

- Check *Database TLS encryption* and *Verify database certificate*
- Specify path to Database TLS CA file



Welcome

Check of pre-requisites

Configure DB connection

Zabbix server details

GUI settings

Pre-installation summary

Install

## Configure DB connection

Please create database manually, and set the configuration parameters for connection to this database. Press "Next step" button when done.

Database type

MySQL

Database host

10.211.55.9

Database port

0

0 - use default port

Database name

zabbix

Store credentials in

Plain text

HashiCorp Vault

User

zabbix

Password

\*\*\*\*\*

Database TLS encryption

☒

Verify database certificate

☒

\* Database TLS CA file

/etc/ssl/mysql/ca.pem

Back

Next step

Alternatively, this can be set in `/etc/zabbix/web/zabbix.conf.php`:

```
...
$DB['ENCRYPTION'] = true;
$DB['KEY_FILE'] = '';
$DB['CERT_FILE'] = '';
$DB['CA_FILE'] = '/etc/ssl/mysql/ca.pem';
$DB['VERIFY_HOST'] = false;
$DB['CIPHER_LIST'] = '';
...
```

Troubleshoot user using command-line tool to check if connection is possible for required user:

```
mysql -u zbx_web -p -h 10.211.55.9 --ssl-mode=REQUIRED --ssl-ca=/var/lib/mysql/ca.pem
```

Server

To enable encryption with certificate verification for connections between Zabbix server and the database, configure `/etc/zabbix/zabbix_server.conf`:

```
...
DBHost=10.211.55.9
DBName=zabbix
DBUser=zbx_srv
DBPassword=<strong_password>
DBTLSConnect=verify_ca
DBTLSCAFile=/etc/ssl/mysql/ca.pem
...
```

Encryption with full verification

MySQL configuration

Set MySQL CE server configuration option (`/etc/my.cnf.d/server-tls.cnf`) to:

```
[mysqld]
...
# in this examples keys are located in the MySQL CE datadir directory
ssl_ca=ca.pem
ssl_cert=server-cert.pem
ssl_key=server-key.pem

require_secure_transport=ON
```

```
tls_version=TLSv1.3
```

```
...
```

Keys for the MySQL CE server and client (Zabbix frontend) should be created manually according to the MySQL CE documentation: [Creating SSL and RSA certificates and keys using MySQL](#) or [Creating SSL certificates and keys using openssl](#)

**Attention:**

MySQL server certificate should contain the Common Name field set to the FQDN name as Zabbix frontend will use the DNS name to communicate with the database or IP address of the database host.

Create MySQL user:

```
mysql> CREATE USER
'zbx_srv'@'%' IDENTIFIED WITH mysql_native_password BY '<strong_password>',
'zbx_web'@'%' IDENTIFIED WITH mysql_native_password BY '<strong_password>'
REQUIRE X509
PASSWORD HISTORY 5;
```

Check if it is possible to log in with that user:

```
mysql -u zbx_web -p -h 10.211.55.9 --ssl-mode=VERIFY_IDENTITY --ssl-ca=/var/lib/mysql/ca.pem --ssl-cert=/v
```

Frontend

To enable encryption with full verification for connections between Zabbix frontend and the database:

- Check *Database TLS encryption* and *Verify database certificate*
- Specify path to *Database TLS key file*
- Specify path to *Database TLS CA file*
- Specify path to *Database TLS certificate file*

Note that *Database host verification* is checked and grayed out - this step cannot be skipped for MySQL.

**Warning:**

If *Database TLS cipher list* field is left empty, the common ciphers permitted by both frontend (client) and server will be enabled. Alternatively, the ciphers can be set explicitly, in conformance with the [cipher configuration requirements](#).

**ZABBIX**

Welcome

Check of pre-requisites

Configure DB connection

Zabbix server details

Pre-installation summary

Install

### Configure DB connection

Database name

User

Password

Database TLS encryption ☒

Verify database certificate ☒

\* Database TLS CA file

Database TLS key file

Database TLS certificate file

Database host verification ☒

Database TLS cipher list

[Back](#) [Next step](#)

Alternatively, this can be set in `/etc/zabbix/web/zabbix.conf.php`:

```
...
// Used for TLS connection with strictly defined Cipher list.
$DB['ENCRYPTION'] = true;
$DB['KEY_FILE'] = '/etc/ssl/mysql/client-key.pem';
$DB['CERT_FILE'] = '/etc/ssl/mysql/client-cert.pem';
```





```
hostssl all all 0.0.0.0/0 md5

### verify CA
hostssl all all 0.0.0.0/0 md5 clientcert=verify-ca

### verify full
hostssl all all 0.0.0.0/0 md5 clientcert=verify-full
...
```

Transport-only encryption

Frontend

To enable transport-only encryption for connections between Zabbix frontend and the database:

- Check *Database TLS encryption*
- Leave *Verify database certificate* unchecked

Server

To enable transport-only encryption for connections between server and the database, configure `/etc/zabbix/zabbix_server.conf`:

```
...
DBHost=10.211.55.9
DBName=zabbix
DBUser=zbx_srv
DBPassword=<strong_password>
DBTLSConnect=required
...
```

Encryption with certificate authority verification

Frontend

To enable encryption with certificate authority verification for connections between Zabbix frontend and the database:

- Check *Database TLS encryption* and *Verify database certificate*
- Specify path to *Database TLS CA file*

- Welcome
- Check of pre-requisites
- Configure DB connection
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- Pre-installation summary
- Install

## Configure DB connection

Database name

Database schema

User

Password

Database TLS encryption ☒

Verify database certificate ☒

\* Database TLS CA file

Database TLS key file

Database TLS certificate file

Database host verification ☐

[Back](#)
[Next step](#)

Alternatively, this can be set in `/etc/zabbix/web/zabbix.conf.php`:

```
...
$DB['ENCRYPTION'] = true;
$DB['KEY_FILE'] = '';
$DB['CERT_FILE'] = '';
$DB['CA_FILE'] = '/etc/ssl/pgsql/root.crt';
$DB['VERIFY_HOST'] = false;
$DB['CIPHER_LIST'] = '';
...
```

#### Server

To enable encryption with certificate verification for connections between Zabbix server and the database, configure `/etc/zabbix/zabbix_server.conf`:

```
...
DBHost=10.211.55.9
DBName=zabbix
DBUser=zbx_srv
DBPassword=<strong_password>
DBTLSConnect=verify_ca
DBTLSCAFile=/etc/ssl/pgsql/root.crt
...
```

Encryption with full verification

#### Frontend

To enable encryption with certificate and database host identity verification for connections between Zabbix frontend and the database:

- Check *Database TLS encryption* and *Verify database certificate*
- Specify path to *Database TLS key file*
- Specify path to *Database TLS CA file*
- Specify path to *Database TLS certificate file*
- Check *Database host verification*

## Configure DB connection

- Welcome
- Check of pre-requisites
- Configure DB connection
- Zabbix server details
- Pre-installation summary
- Install

Database name

Database schema

User

Password

Database TLS encryption

☒

Verify database certificate

☒

\* Database TLS CA file

Database TLS key file

Database TLS certificate file

Database host verification

☒

Back

Next step

Alternatively, this can be set in `/etc/zabbix/web/zabbix.conf.php`:

```
$DB['ENCRYPTION'] = true;
$DB['KEY_FILE'] = '';
$DB['CERT_FILE'] = '';
$DB['CA_FILE'] = '/etc/ssl/pgsql/root.crt';
$DB['VERIFY_HOST'] = true;
$DB['CIPHER_LIST'] = '';
...
```

#### Server

To enable encryption with certificate and database host identity verification for connections between Zabbix server and the database, configure `/etc/zabbix/zabbix_server.conf`:

```
...
DBHost=10.211.55.9
DBName=zabbix
DBUser=zbx_srv
DBPassword=<strong_password>
DBTLSConnect=verify_full
DBTLSCAFile=/etc/ssl/pgsql/root.crt
DBTLSCertFile=/etc/ssl/pgsql/client.crt
DBTLSKeyFile=/etc/ssl/pgsql/client.key
...
```

## 5 TimescaleDB setup

### Overview

Zabbix supports TimescaleDB, a PostgreSQL-based database solution of automatically partitioning data into time-based chunks to support faster performance at scale.

#### Warning:

Currently TimescaleDB is not supported by Zabbix proxy.

Instructions on this page can be used for creating TimescaleDB database or migrating from existing PostgreSQL tables to TimescaleDB.

### Configuration

We assume that TimescaleDB extension has been already installed on the database server (see installation instructions in [Timescale documentation](#)).

TimescaleDB extension must also be enabled for the specific DB by executing:

```
echo "CREATE EXTENSION IF NOT EXISTS timescaledb CASCADE;" | sudo -u postgres psql zabbix
```

Running this command requires database administrator privileges.

**Note:**

If you use a database schema other than 'public' you need to add a SCHEMA clause to the command above. E.g.:

```
echo "CREATE EXTENSION IF NOT EXISTS timescaledb SCHEMA yourschema CASCADE;" | sudo -u postgres psql zabbix
```

Then run the `postgresql/timescaledb.sql` script. For new installations the script must be run after the regular PostgreSQL database has been created with initial schema/data (see [database creation](#)):

```
cat /usr/share/zabbix-sql-scripts/postgresql/timescaledb.sql | sudo -u zabbix psql zabbix
```

**Attention:**

Please ignore warning messages informing that the best practices are not followed while running `timescaledb.sql` script on TimescaleDB version 2.9.0 and higher. Regardless of this warning, the configuration will be completed successfully.

The migration of existing history and trend data may take a lot of time. Zabbix server and frontend must be down for the period of migration.

The `timescaledb.sql` script sets the following housekeeping parameters:

- Override item history period
- Override item trend period

In order to use partitioned housekeeping for history and trends, both these options must be enabled. It is also possible to enable override individually either for history only or trends only.

For PostgreSQL version 10.2 or higher and TimescaleDB version 1.5 or higher, the `timescaledb.sql` script sets two additional parameters:

- Enable compression
- Compress records older than 7 days

To successfully remove compressed data by housekeeper, both *Override item history period* and *Override item trend period* options must be enabled. If override is disabled and tables have compressed chunks, the housekeeper will not remove data from these tables, and warnings about incorrect configuration will be displayed in the administration screen for *Housekeeping* and the *System information* section.

All of these parameters can be changed in *Administration* → *General* → *Housekeeping* after the installation.

**Note:**

You may want to run the `timescaledb-tune` tool provided by TimescaleDB to optimize PostgreSQL configuration parameters in your `postgresql.conf`.

## TimescaleDB compression

Native TimescaleDB compression is supported starting from Zabbix 5.0 for PostgreSQL version 10.2 or higher and TimescaleDB version 1.5 or higher for all Zabbix tables that are managed by TimescaleDB. During the upgrade or migration to TimescaleDB, initial compression of the large tables may take a lot of time.

Note that compression is supported under the "timescale" Timescale Community license and it is not supported under "apache" Apache 2.0 license. Starting with Zabbix 6.0.7, Zabbix detects if compression is supported. If it is not supported a warning message is written into the Zabbix server log and users cannot enable compression in the frontend.

**Note:**

Users are encouraged to get familiar with compression in [Timescale documentation](#) before using compression.

Note that there are certain limitations imposed by compression, specifically:

- Compressed chunk modifications (inserts, deletes, updates) are not allowed
- Schema changes for compressed tables are not allowed.

Compression settings can be changed in the *History and trends compression* block in *Administration* → *General* → *Housekeeping* section of Zabbix frontend.

| Parameter                          | Default | Comments  |
|------------------------------------|---------|---|
| <i>Enable compression</i>          | Enabled | <p>Checking or unchecking the checkbox does not activate/deactivate compression immediately. Because compression is handled by the Housekeeper, the changes will take effect in up to 2 times HousekeepingFrequency hours (set in <code>zabbix_server.conf</code>)</p> <p>After disabling compression, new chunks that fall into the compression period will not be compressed. However, all previously compressed data will stay compressed. To uncompress previously compressed chunks, follow the instructions in <a href="#">Timescale documentation</a>.</p> <p>When upgrading from older versions of Zabbix with TimescaleDB support, compression will not be enabled by default.</p> |
| <i>Compress records older than</i> | 7d      | <p>This parameter cannot be less than 7 days.</p> <p>Due to immutability of compressed chunks all late data (e.g. data delayed by a proxy) that is older than this value will be discarded.</p>   |

## 6 Elasticsearch setup

### Attention:

Elasticsearch support is experimental!

Zabbix supports the storage of historical data by means of Elasticsearch instead of a database. Users can choose the storage place for historical data between a compatible database and Elasticsearch. The setup procedure described in this section is applicable to Elasticsearch version 7.X. In case an earlier or later version of Elasticsearch is used, some functionality may not work as intended.

### Warning:

If all history data is stored in Elasticsearch, trends are **not** calculated nor stored in the database. With no trends calculated and stored, the history storage period may need to be extended.

### Configuration

To ensure proper communication between all elements involved make sure server configuration file and frontend configuration file parameters are properly configured.

#### Zabbix server and frontend

Zabbix server configuration file draft with parameters to be updated:

```
### Option: HistoryStorageURL
# History storage HTTP[S] URL.
#
# Mandatory: no
# Default:
# HistoryStorageURL=
### Option: HistoryStorageTypes
# Comma separated list of value types to be sent to the history storage.
#
# Mandatory: no
# Default:
# HistoryStorageTypes=uint,dbl,str,log,text
```

Example parameter values to fill the Zabbix server configuration file with:

```
HistoryStorageURL=http://test.elasticsearch.lan:9200
HistoryStorageTypes=str,log,text
```

This configuration forces Zabbix Server to store history values of numeric types in the corresponding database and textual history data in Elasticsearch.

Elasticsearch supports the following item types:

uint,dbl,str,log,text

Supported item type explanation:

| Item value type    | Database table | Elasticsearch type |
|--------------------|----------------|--------------------|
| Numeric (unsigned) | history_uint   | uint               |
| Numeric (float)    | history        | dbl                |
| Character          | history_str    | str                |
| Log                | history_log    | log                |
| Text               | history_text   | text               |

Zabbix frontend configuration file (conf/zabbix.conf.php) draft with parameters to be updated:

```
// Elasticsearch url (can be string if same url is used for all types).
$HISTORY['url'] = [
    'uint' => 'http://localhost:9200',
    'text' => 'http://localhost:9200'
];
// Value types stored in Elasticsearch.
$HISTORY['types'] = ['uint', 'text'];
```

Example parameter values to fill the Zabbix frontend configuration file with:

```
$HISTORY['url'] = 'http://test.elasticsearch.lan:9200';
$HISTORY['types'] = ['str', 'text', 'log'];
```

This configuration forces to store Text, Character and Log history values in Elasticsearch.

It is also required to make \$HISTORY global in conf/zabbix.conf.php to ensure everything is working properly (see conf/zabbix.conf.php.example for how to do it):

```
// Zabbix GUI configuration file.
global $DB, $HISTORY;
```

Installing Elasticsearch and creating mapping

Final two steps of making things work are installing Elasticsearch itself and creating mapping process.

To install Elasticsearch, please refer to [Elasticsearch installation guide](#).

**Note:**

Mapping is a data structure in Elasticsearch (similar to a table in a database). Mapping for all history data types is available here: database/elasticsearch/elasticsearch.map.

**Warning:**

Creation of mapping is mandatory. Some functionality will be broken if mapping is not created according to the instruction.

To create mapping for text type, send the following request to Elasticsearch:

```
curl -X PUT \
  http://your-elasticsearch.here:9200/text \
  -H 'content-type:application/json' \
  -d '{
    "settings": {
      "index": {
        "number_of_replicas": 1,
        "number_of_shards": 5
      }
    },
    "mappings": {
      "properties": {
        "itemid": {
          "type": "long"
        },
        "clock": {
          "format": "epoch_second",
```

```

        "type": "date"
    },
    "value": {
        "fields": {
            "analyzed": {
                "index": true,
                "type": "text",
                "analyzer": "standard"
            }
        },
        "index": false,
        "type": "text"
    }
}
}'

```

Similar request is required to be executed for Character and Log history values mapping creation with corresponding type correction.

**Note:**

To work with Elasticsearch, please refer to the [Requirements](#) for additional information.

**Note:**

**Housekeeper** is not deleting any data from Elasticsearch.

### Storing history data in multiple date-based indices

This section describes additional steps required to work with pipelines and ingest nodes.

To begin with, you must create templates for indices.

The following example shows a request for creating uint template:

```

curl -X PUT \
  http://your-elasticsearch.here:9200/_template/uint_template \
  -H 'content-type:application/json' \
  -d '{
    "index_patterns": [
      "uint*"
    ],
    "settings": {
      "index": {
        "number_of_replicas": 1,
        "number_of_shards": 5
      }
    },
    "mappings": {
      "properties": {
        "itemid": {
          "type": "long"
        },
        "clock": {
          "format": "epoch_second",
          "type": "date"
        },
        "value": {
          "type": "long"
        }
      }
    }
  }'

```

To create other templates, user should change the URL (last part is the name of template), change "index\_patterns" field to

match index name and to set valid mapping, which can be taken from database/elasticsearch/elasticsearch.map.

For example, the following command can be used to create a template for text index:

```
curl -X PUT \
  http://your-elasticsearch.here:9200/_template/text_template \
  -H 'content-type:application/json' \
  -d '{
    "index_patterns": [
      "text*"
    ],
    "settings": {
      "index": {
        "number_of_replicas": 1,
        "number_of_shards": 5
      }
    },
    "mappings": {
      "properties": {
        "itemid": {
          "type": "long"
        },
        "clock": {
          "format": "epoch_second",
          "type": "date"
        },
        "value": {
          "fields": {
            "analyzed": {
              "index": true,
              "type": "text",
              "analyzer": "standard"
            }
          },
          "index": false,
          "type": "text"
        }
      }
    }
  }'
```

This is required to allow Elasticsearch to set valid mapping for indices created automatically. Then it is required to create the pipeline definition. Pipeline is some sort of preprocessing of data before putting data in indices. The following command can be used to create pipeline for uint index:

```
curl -X PUT \
  http://your-elasticsearch.here:9200/_ingest/pipeline/uint-pipeline \
  -H 'content-type:application/json' \
  -d '{
    "description": "daily uint index naming",
    "processors": [
      {
        "date_index_name": {
          "field": "clock",
          "date_formats": [
            "UNIX"
          ],
          "index_name_prefix": "uint-",
          "date_rounding": "d"
        }
      }
    ]
  }'
```

User can change the rounding parameter ("date\_rounding") to set a specific index rotation period. To create other pipelines, user



should change the URL (last part is the name of pipeline) and change "index\_name\_prefix" field to match index name.

See also [Elasticsearch documentation](#).

Additionally, storing history data in multiple date-based indices should also be enabled in the new parameter in Zabbix server configuration:

```
### Option: HistoryStorageDateIndex
# Enable preprocessing of history values in history storage to store values in different indices based on
# 0 - disable
# 1 - enable
#
# Mandatory: no
# Default:
# HistoryStorageDateIndex=0
```

#### Troubleshooting

The following steps may help you troubleshoot problems with Elasticsearch setup:

1. Check if the mapping is correct (GET request to required index URL like `http://localhost:9200/uint`).
2. Check if shards are not in failed state (restart of Elasticsearch should help).
3. Check the configuration of Elasticsearch. Configuration should allow access from the Zabbix frontend host and the Zabbix server host.
4. Check Elasticsearch logs.

If you are still experiencing problems with your installation then please create a bug report with all the information from this list (mapping, error logs, configuration, version, etc.)

## 7 Real-time export of events, item values, trends

### Overview

It is possible to configure real-time exporting of trigger events, item values and trends in a newline-delimited JSON format.

Exporting is done into files, where each line of the export file is a JSON object. Value mappings are not applied.

In case of errors (data cannot be written to the export file or the export file cannot be renamed or a new one cannot be created after renaming it), the data item is dropped and never written to the export file. It is written only in the Zabbix database. Writing data to the export file is resumed when the writing problem is resolved.

For precise details on what information is exported, see the [export protocol](#) page.

Note that host/item can have no metadata (host groups, host name, item name) if the host/item was removed after the data was received, but before server exported data.

### Configuration

Real-time export of trigger events, item values and trends is configured by specifying a directory for the export files - see the `ExportDir` parameter in server [configuration](#).

Two other parameters are available:

- `ExportFileSize` may be used to set the maximum allowed size of an individual export file. When a process needs to write to a file it checks the size of the file first. If it exceeds the configured size limit, the file is renamed by appending `.old` to its name and a new file with the original name is created.

#### Attention:

A file will be created per each process that will write data (i.e. approximately 4-30 files). As the default size per export file is 1G, keeping large export files may drain the disk space fast.

- `ExportType` allows to specify which entity types (events, history, trends) will be exported.

## 8 Distribution-specific notes on setting up Nginx for Zabbix

### RHEL

Nginx is available only in EPEL:

```
dnf -y install epel-release
```

## SLES 12

In SUSE Linux Enterprise Server 12 you need to add the Nginx repository, before installing Nginx:

```
zypper addrepo -G -t dnf -c 'http://nginx.org/packages/sles/12' nginx
```

You also need to configure php-fpm:

```
cp /etc/php5/fpm/php-fpm.conf{.default,}  
sed -i 's/user = nobody/user = wwwrun; s/group = nobody/group = www/' /etc/php5/fpm/php-fpm.conf
```

## SLES 15

In SUSE Linux Enterprise Server 15 you need to configure php-fpm:

```
cp /etc/php7/fpm/php-fpm.conf{.default,}  
cp /etc/php7/fpm/php-fpm.d/www.conf{.default,}  
sed -i 's/user = nobody/user = wwwrun; s/group = nobody/group = www/' /etc/php7/fpm/php-fpm.d/www.conf
```

## 9 Running agent as root

Since Zabbix **5.0.0**, the systemd service file for Zabbix agent in [official packages](#) explicitly includes directives for User and Group. Both are set to zabbix.

It is no longer possible to configure which user Zabbix agent runs as via `zabbix_agentd.conf` file, because the agent will bypass this configuration and run as the user specified in the systemd service file. To run Zabbix agent as root you need to make the modifications described below.

### Zabbix agent

To override the default user and group for Zabbix agent, run:

```
systemctl edit zabbix-agent
```

Then, add the following content:

```
[Service]  
User=root  
Group=root
```

Reload daemons and restart the zabbix-agent service:

```
systemctl daemon-reload  
systemctl restart zabbix-agent
```

For **Zabbix agent** this re-enables the functionality of configuring user in the `zabbix_agentd.conf` file. Now you need to set `User=root` and `AllowRoot=1` configuration parameters in the agent [configuration file](#).

### Zabbix agent 2

To override the default user and group for Zabbix agent 2, run:

```
systemctl edit zabbix-agent2
```

Then, add the following content:

```
[Service]  
User=root  
Group=root
```

Reload daemons and restart the zabbix-agent2 service:

```
systemctl daemon-reload  
systemctl restart zabbix-agent2
```

For **Zabbix agent2** this completely determines the user that it runs as. No additional modifications are required.

## 10 Zabbix agent on Microsoft Windows

### Configuring agent

Both generations of Zabbix agents run as a Windows service. For Zabbix agent 2, replace *agentd* with *agent2* in the instructions below.

You can run a single instance of Zabbix agent or multiple instances of the agent on a Microsoft Windows host. A single instance can use the default configuration file `C:\zabbix_agentd.conf` or a configuration file specified in the command line. In case of multiple instances each agent instance must have its own configuration file (one of the instances can use the default configuration file).

An example configuration file is available in Zabbix source archive as `conf/zabbix_agentd.win.conf`.

See the [configuration file](#) options for details on configuring Zabbix Windows agent.

Hostname parameter

To perform [active checks](#) on a host Zabbix agent needs to have the hostname defined. Moreover, the hostname value set on the agent side should exactly match the "[Host name](#)" configured for the host in the frontend.

The hostname value on the agent side can be defined by either the **Hostname** or **Hostnameltem** parameter in the agent [configuration file](#) - or the default values are used if any of these parameters are not specified.

The default value for **Hostnameltem** parameter is the value returned by the "system.hostname" agent key. For Windows, it returns result of the `gethostname()` function, which queries namespace providers to determine the local host name. If no namespace provider responds, the NetBIOS name is returned.

The default value for **Hostname** is the value returned by the **Hostnameltem** parameter. So, in effect, if both these parameters are unspecified, the actual hostname will be the host NetBIOS name; Zabbix agent will use NetBIOS host name to retrieve the list of active checks from Zabbix server and send results to it.

The "system.hostname" key supports two optional parameters - *type* and *transform*.

*Type* parameter determines the type of the name the item should return. Supported values:

- *netbios* (default) - returns the NetBIOS host name which is limited to 15 symbols and is in the UPPERCASE only;
- *host* - case-sensitive, returns the full, real Windows host name (without a domain);
- *shorthost* (supported since Zabbix 5.4.7) - returns part of the hostname before the first dot. It will return a full string if the name does not contain a dot.

*Transform* parameter is supported since Zabbix 5.4.7 and allows to specify additional transformation rule for the hostname. Supported values:

- *none* (default) - use the original letter case;
- *lower* - convert the text into lowercase.

So, to simplify the configuration of `zabbix_agentd.conf` file and make it unified, two different approaches could be used.

1. leave **Hostname** or **Hostnameltem** parameters undefined and Zabbix agent will use NetBIOS host name as the hostname;
2. leave **Hostname** parameter undefined and define **Hostnameltem** like this:

**Hostnameltem=system.hostname[host]** - for Zabbix agent to use the full, real (case sensitive) Windows host name as the hostname

**Hostnameltem=system.hostname[shorthost,lower]** - for Zabbix agent to use only part of the hostname before the first dot, converted into lowercase.

Host name is also used as part of Windows service name which is used for installing, starting, stopping and uninstalling the Windows service. For example, if Zabbix agent configuration file specifies `Hostname=Windows_db_server`, then the agent will be installed as a Windows service "Zabbix Agent [Windows\_db\_server]". Therefore, to have a different Windows service name for each Zabbix agent instance, each instance must use a different host name.

Installing agent as Windows service

To install a single instance of Zabbix agent with the default configuration file `c:\zabbix_agentd.conf`:

```
zabbix_agentd.exe --install
```

**Attention:**

On a 64-bit system, a 64-bit Zabbix agent version is required for all checks related to running 64-bit processes to work correctly.

If you wish to use a configuration file other than `c:\zabbix_agentd.conf`, you should use the following command for service installation:

```
zabbix_agentd.exe --config <your_configuration_file> --install
```

A full path to the configuration file should be specified.

Multiple instances of Zabbix agent can be installed as services like this:

```
zabbix_agentd.exe --config <configuration_file_for_instance_1> --install --multiple-agents
zabbix_agentd.exe --config <configuration_file_for_instance_2> --install --multiple-agents
...
zabbix_agentd.exe --config <configuration_file_for_instance_N> --install --multiple-agents
```

The installed service should now be visible in Control Panel.

#### Starting agent

To start the agent service, you can use Control Panel or do it from command line.

To start a single instance of Zabbix agent with the default configuration file:

```
zabbix_agentd.exe --start
```

To start a single instance of Zabbix agent with another configuration file:

```
zabbix_agentd.exe --config <your_configuration_file> --start
```

To start one of multiple instances of Zabbix agent:

```
zabbix_agentd.exe --config <configuration_file_for_this_instance> --start --multiple-agents
```

#### Stopping agent

To stop the agent service, you can use Control Panel or do it from command line.

To stop a single instance of Zabbix agent started with the default configuration file:

```
zabbix_agentd.exe --stop
```

To stop a single instance of Zabbix agent started with another configuration file:

```
zabbix_agentd.exe --config <your_configuration_file> --stop
```

To stop one of multiple instances of Zabbix agent:

```
zabbix_agentd.exe --config <configuration_file_for_this_instance> --stop --multiple-agents
```

#### Uninstalling agent Windows service

To uninstall a single instance of Zabbix agent using the default configuration file:

```
zabbix_agentd.exe --uninstall
```

To uninstall a single instance of Zabbix agent using a non-default configuration file:

```
zabbix_agentd.exe --config <your_configuration_file> --uninstall
```

To uninstall multiple instances of Zabbix agent from Windows services:

```
zabbix_agentd.exe --config <configuration_file_for_instance_1> --uninstall --multiple-agents
zabbix_agentd.exe --config <configuration_file_for_instance_2> --uninstall --multiple-agents
...
zabbix_agentd.exe --config <configuration_file_for_instance_N> --uninstall --multiple-agents
```

#### Limitations

Zabbix agent for Windows does not support non-standard Windows configurations where CPUs are distributed non-uniformly across NUMA nodes. If logical CPUs are distributed non-uniformly, then CPU performance metrics may not be available for some CPUs. For example, if there are 72 logical CPUs with 2 NUMA nodes, both nodes must have 36 CPUs each.

## 11 SAML setup with Okta

This section describes how to configure Okta to enable SAML 2.0 authentication for Zabbix.

#### Okta configuration

1. Go to <https://okta.com> and register or sign in to your account.

2. In the Okta web interface navigate to *Applications* → *Applications* and press "Add Application" button (  ).

3. Press "Create New App" button (  ). In a popup window select *Platform*: Web, *Sign on method*: SAML 2.0 and press "Create" button.

Create a New Application Integration

X

Platform

Web

Sign on method

☐ Secure Web Authentication (SWA)

Uses credentials to sign in. This integration works with most apps.

☒ SAML 2.0

Uses the SAML protocol to log users into the app. This is a better option than SWA, if the app supports it.

☐ OpenID Connect

Uses the OpenID Connect protocol to log users into an app you've built.

Create

Cancel

4. Fill in the fields in the *General settings* tab (the first tab that appears) according to your preferences and press "Next".

5. In the *Configure SAML* tab enter the values provided below, then press "Next".

- In the **GENERAL** section:
  - *Single sign on URL*: `https://<your-zabbix-url>/ui/index_sso.php?acs`  
The checkbox *Use this for Recipient URL and Destination URL* should be marked)
  - *Audience URI (SP Entity ID)*: `zabbix`  
Note that this value will be used within the SAML assertion as a unique service provider identifier (if not matching, the operation will be rejected). It is possible to specify a URL or any string of data in this field.
  - *Default RelayState*:  
Leave this field blank; if a custom redirect is required, it can be added in Zabbix in the *Administration* → *Users* settings.
  - Fill in other fields according to your preferences.

## GENERAL

Single sign on URL ?

https://<your-zabbix-url>/ui/index\_sso.php?acs

☒ Use this for Recipient URL and Destination URL

☐ Allow this app to request other SSO URLs

Audience URI (SP Entity ID) ?

zabbix

Default RelayState ?

If no value is set, a blank RelayState is sent

Name ID format ?

EmailAddress ▼

Application username ?

Email ▼

Update application username on

Create and update ▼

[Show Advanced Settings](#)

### Note:

If planning to use encrypted connection, generate private and public encryption certificates, then upload public certificate to Okta. Certificate upload form appears when *Assertion Encryption* is set to Encrypted (click *Show Advanced Settings* to find this parameter).

- In the **ATTRIBUTE STATEMENTS (OPTIONAL)** section add an attribute statement with:
  - *Name:* usrEmail
  - *Name format:* Unspecified
  - *Value:* user.email

## ATTRIBUTE STATEMENTS (OPTIONAL)

[LEARN MORE](#)

Name

Name format  
(optional)

Value

usrEmail

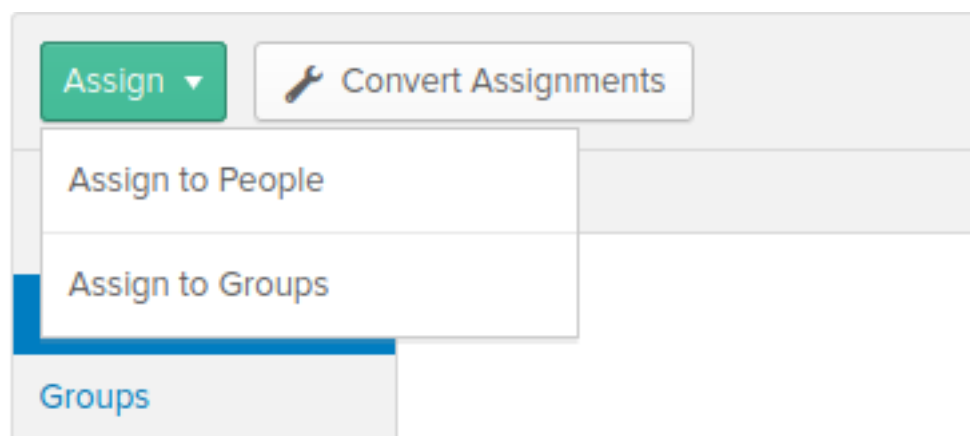
Unspecified ▼

user.email ▼

Add Another

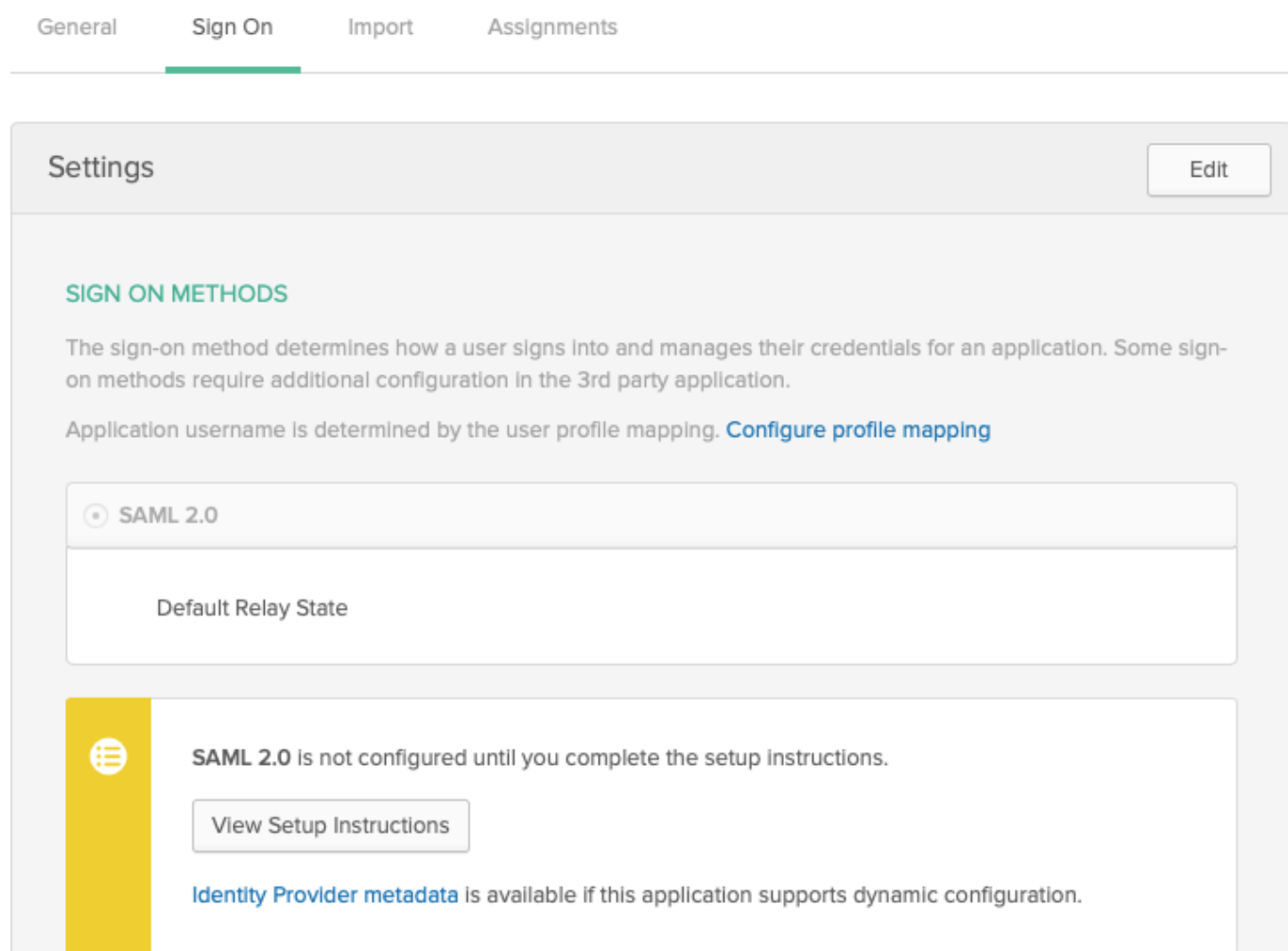
6. At the next tab, select "I'm a software vendor. I'd like to integrate my app with Okta" and press "Finish".

7. Now, navigate to *Assignments* tab and press the "Assign" button, then select *Assign to People* from the drop-down.



8. In a popup that appears, assign created app to people that will use SAML 2.0 to authenticate with Zabbix, then press "Save and go back".

9. Navigate to the *Sign On* tab and press the "View Setup Instructions" button. Setup instructions will be displayed in a new tab; keep this tab open while configuring Zabbix.



#### Zabbix configuration

1. In Zabbix, go to SAML settings in the *Administration* → *Authentication* section and copy information from Okta setup instructions into corresponding fields:

| Zabbix field              | Okta SAML setup field                |
|---------------------------|--------------------------------------|
| <i>IdP entity ID</i>      | Identity Provider Issuer             |
| <i>SSO service URL</i>    | Identity Provider Single Sign-On URL |
| <i>Username attribute</i> | Attribute name                       |

|                     |                       |
|---------------------|-----------------------|
| Zabbix field        | Okta SAML setup field |
| <i>SP entity ID</i> | Audience URI          |

2. Download the certificate provided in the Okta setup instructions page into `ui/conf/certs` folder as `idp.crt`, and set permission 644 by running:

```
chmod 644 idp.crt
```

Note that if you have upgraded to Zabbix 6.0 from an older version, you will also need to manually add these lines to `zabbix.conf.php` file (located in the `/ui/conf` directory):

```
// Used for SAML authentication.
$SSO['SP_KEY'] = 'conf/certs/sp.key'; // Path to your private key.
$SSO['SP_CERT'] = 'conf/certs/sp.crt'; // Path to your public key.
$SSO['IDP_CERT'] = 'conf/certs/idp.crt'; // Path to IdP public key.
$SSO['SETTINGS'] = []; // Additional settings
```

See generic [SAML Authentication](#) instructions for more details.

3. If *Assertion Encryption* has been set to Encrypted in Okta, a checkbox "Assertions" of the *Encrypt* parameter should be marked in Zabbix as well.

[Authentication](#)
[HTTP settings](#)
[LDAP settings](#)
[SAML settings](#)

---

Enable SAML authentication ☒

\* IdP entity ID

\* SSO service URL

SLO service URL

\* Username attribute

\* SP entity ID

SP name ID format

Sign ☒ Messages  
☒ Assertions  
☐ AuthN requests  
☐ Logout requests  
☐ Logout responses

Encrypt ☐ Name ID  
☐ Assertions

Case sensitive login ☐

4. Press the "Update" button to save these settings.

**Note:**

To sign in with SAML, the username in Zabbix should match the Okta e-mail. These settings can be changed in the *Administration* → *Users* section of Zabbix web interface.

## 12 Oracle database setup

Overview



This section contains instructions for creating Oracle database and configuring connections between the database and Zabbix server, proxy, and frontend.

#### Database creation

We assume that a *zabbix* database user with *password* password exists and has permissions to create database objects in ORCL service located on the *host* Oracle database server. Zabbix requires a Unicode database character set and a UTF8 national character set. Check current settings:

```
sqlplus> select parameter,value from v$nls_parameters where parameter='NLS_CHARACTERSET' or parameter='NLS
```

Now prepare the database:

```
cd /path/to/zabbix-sources/database/oracle
sqlplus zabbix/password@oracle_host/ORCL
sqlplus> @schema.sql
# stop here if you are creating database for Zabbix proxy
sqlplus> @images.sql
sqlplus> @data.sql
```

#### Note:

Please set the initialization parameter `CURSOR_SHARING=FORCE` for best performance.

#### Connection set up

Zabbix supports two types of connect identifiers (connection methods):

- Easy Connect
- Net Service Name

Connection configuration parameters for Zabbix server and Zabbix proxy can be set in the configuration files. Important parameters for the server and proxy are *DBHost*, *DBUser*, *DBName* and *DBPassword*. The same parameters are important for the frontend: `$DB["SERVER"]`, `$DB["PORT"]`, `$DB["DATABASE"]`, `$DB["USER"]`, `$DB["PASSWORD"]`.

Zabbix uses the following connection string syntax:

```
{DBUser/DBPassword[@<connect_identifier>]}
```

<connect\_identifier> can be specified either in the form of "Net Service Name" or "Easy Connect".

```
@[[/]]Host[:Port]/<service_name> | <net_service_name>
```

#### Easy Connect

Easy Connect uses the following parameters to connect to the database:

- *Host* - the host name or IP address of the database server computer (DBHost parameter in the configuration file).
- *Port* - the listening port on the database server (DBPort parameter in the configuration file; if not set the default 1521 port will be used).
- <service\_name> - the service name of the database you want to access (DBName parameter in the configuration file).

#### Example:

Database parameters set in the server or proxy configuration file (zabbix\_server.conf and zabbix\_proxy.conf):

```
DBHost=localhost
DBPort=1521
DBUser=myusername
DBName=ORCL
DBPassword=mypassword
```

Connection string used by Zabbix to establish connection:

```
DBUser/DBPassword@DBHost:DBPort/DBName
```

During Zabbix frontend installation, set the corresponding parameters in the *Configure DB connection* step of the setup wizard:

- Database host: localhost
- Database port: 1521
- Database name: ORCL
- User: myusername
- Password: mypassword



## Configure DB connection

Please create database manually, and set the configuration parameters for connection to this database.  
Press "Next step" button when done.

Welcome

Check of pre-requisites

Configure DB connection

Zabbix server details

GUI settings

Pre-installation summary

Install

Database type

Database host

Database port  0 - use default port

Database name

Store credentials in ☒ Plain text ☐ HashiCorp Vault

User

Password

Alternatively, these parameters can be set in the frontend configuration file (zabbix.conf.php):

```
$DB["TYPE"]           = 'ORACLE';
$DB["SERVER"]          = 'localhost';
$DB["PORT"]            = '1521';
$DB["DATABASE"]        = 'ORCL';
$DB["USER"]            = 'myusername';
$DB["PASSWORD"]        = 'mypassword';
```

Net service name

Since Zabbix 5.4.0 it is possible to connect to Oracle by using net service name.

<net\_service\_name> is a simple name for a service that resolves to a connect descriptor.

In order to use the service name for creating a connection, this service name has to be defined in the tnsnames.ora file located on both the database server and the client systems. The easiest way to make sure that the connection will succeed is to define the location of tnsnames.ora file in the TNS\_ADMIN environment variable. The default location of the tnsnames.ora file is:

\$ORACLE\_HOME/network/admin/

A simple tnsnames.ora file example:

```
ORCL =
(DESCRIPTION =
  (ADDRESS = (PROTOCOL = TCP)(HOST = localhost)(PORT = 1521))
  (CONNECT_DATA =
    (SERVER = DEDICATED)
    (SERVICE_NAME = ORCL)
  )
)
```

To set configuration parameters for the "Net Service Name" connection method, use one of the following options:

- Set an empty parameter DBHost and set DBName as usual:

```
DBHost=
DBName=ORCL
```

- Set both parameters and leave both empty:

```
DBHost=
DBName=
```

In the second case, the TWO\_TASK environment variable has to be set. It specifies the default remote Oracle service (service name). When this variable is defined, the connector connects to the specified database by using an Oracle listener that accepts connection requests. This variable is for use on Linux and UNIX only. Use the LOCAL environment variable for Microsoft Windows.

### Example:

Connect to a database using Net Service Name set as ORCL and the default port. Database parameters set in the server or proxy configuration file (zabbix\_server.conf and zabbix\_proxy.conf):

```
DBHost=  
#DBPort=  
DBUser=myusername  
DBName=ORCL  
DBPassword=mypassword
```

During Zabbix frontend installation, set the corresponding parameters in the *Configure DB connection* step of the setup wizard:

- Database host:
- Database port: 0
- Database name: ORCL
- User: myusername
- Password: mypassword

Alternatively, these parameters can be set in the frontend configuration file (zabbix.conf.php):

```
$DB["TYPE"]           = 'ORACLE';  
$DB["SERVER"]         = '';  
$DB["PORT"]           = '0';  
$DB["DATABASE"]       = 'ORCL';  
$DB["USER"]           = 'myusername';  
$DB["PASSWORD"]       = 'mypassword';
```

Connection string used by Zabbix to establish connection:

```
DBUser/DBPassword@ORCL
```

Known issues

To improve performance, you can convert the field types from *nclob* to *nvarchar2*, see [known issues](#).

## 13 Setting up scheduled reports

Overview

This section provides instructions on installing Zabbix web service and configuring Zabbix to enable generation of [scheduled reports](#).

### Attention:

Currently the support of scheduled reports is experimental.

Installation

A new [Zabbix web service](#) process and Google Chrome browser should be installed to enable generation of scheduled reports. The web service may be installed on the same machine where the Zabbix server is installed or on a different machine. Google Chrome browser should be installed on the same machine, where the web service is installed.

The official zabbix-web-service package is available in the [Zabbix repository](#). Google Chrome browser is not included into these packages and has to be installed separately.

To compile Zabbix web service from sources, see [Installing Zabbix web service](#).

After the installation, run `zabbix_web_service` on the machine, where the web service is installed:

```
zabbix_web_service
```

Configuration

To ensure proper communication between all elements involved make sure server configuration file and frontend configuration parameters are properly configured.

Zabbix server

The following parameters in Zabbix server configuration file need to be updated: *WebServiceURL* and *StartReportWriters*.

### WebServiceURL

This parameter is required to enable communication with the web service. The URL should be in the format `<host:port>/report`.

- By default, the web service listens on port 10053. A different port can be specified in the web service [configuration file](#).
- Specifying the `/report` path is mandatory (the path is hardcoded and cannot be changed).

Example:

```
WebServiceURL=http://localhost:10053/report
```

#### Attention:

It is strongly recommended to set up encryption between Zabbix server and Zabbix web service [using certificates](#). By default, data transmitted between Zabbix server and Zabbix web service is not encrypted, which can lead to unauthorized access.

### StartReportWriters

This parameter determines how many report writer processes should be started. If it is not set or equals 0, report generation is disabled. Based on the number and frequency of reports required, it is possible to enable from 1 to 100 report writer processes.

Example:

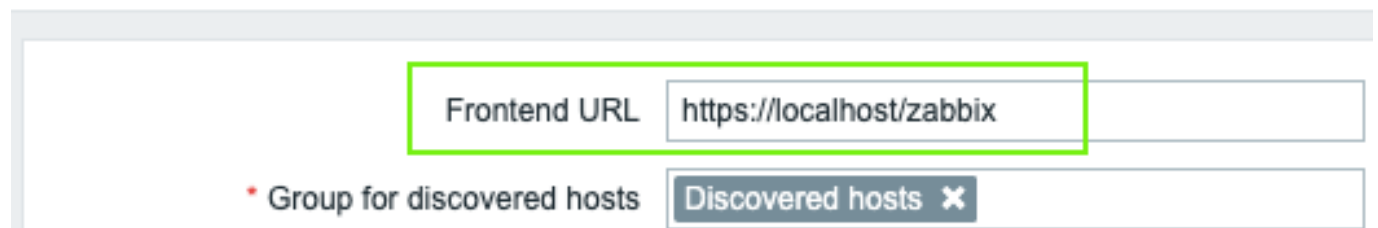
```
StartReportWriters=3
```

Zabbix frontend

A *Frontend URL* parameter should be set to enable communication between Zabbix frontend and Zabbix web service:

- Proceed to the *Administration* → *General* → *Other parameters* frontend menu section
- Specify the full URL of the Zabbix web interface in the *Frontend URL* parameter

## Other configuration parameters ▾



The screenshot shows a configuration interface with two input fields. The first field is labeled 'Frontend URL' and contains the text 'https://localhost/zabbix'. The second field is labeled 'Group for discovered hosts' and contains the text 'Discovered hosts' followed by a close button (X). The 'Frontend URL' field is highlighted with a green border.

#### Note:

Once the setup procedure is completed, you may want to configure and send a [test report](#) to make sure everything works correctly.

## 14 Additional frontend languages

Overview

In order to use any other language than English in Zabbix web interface, its locale should be installed on the web server. Additionally, the PHP gettext extension is required for the translations to work.

Installing locales

To list all installed languages, run:

```
locale -a
```

If some languages that are needed are not listed, open the `/etc/locale.gen` file and uncomment the required locales. Since Zabbix uses UTF-8 encoding, you need to select locales with UTF-8 charset.

Now, run:

```
locale-gen
```

Restart the web server.

The locales should now be installed. It may be required to reload Zabbix frontend page in browser using Ctrl + F5 for new languages to appear.

Installing Zabbix

If installing Zabbix directly from [Zabbix git repository](#), translation files should be generated manually. To generate translation files, run:

```
make gettext
locale/make_mo.sh
```

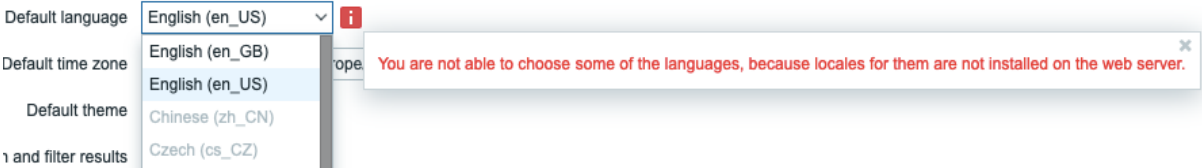
This step is not needed when installing Zabbix from packages or source tar.gz files.

Selecting a language

There are several ways to select a language in Zabbix web interface:

- When installing web interface - in the frontend **installation wizard**. Selected language will be set as system default.
- After the installation, system default language can be changed in the *Administration*→*General*→*GUI menu section*.
- Language for a particular user can be changed in the **user profile**.

If a locale for a language is not installed on the machine, this language will be greyed out in Zabbix language selector. A red icon is displayed next to the language selector if at least one locale is missing. Upon pressing on this icon the following message will be displayed: "You are not able to choose some of the languages, because locales for them are not installed on the web server."



2 Process configuration

Please use the sidebar to access content in this section.

1 Zabbix server

Overview

This section lists parameters supported in a Zabbix server configuration file (`zabbix_server.conf`).

Note that:

- The default values reflect daemon defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without **BOM**;
- Comments starting with `"#"` are only supported in the beginning of the line.

Parameters

| Parameter        | Mandatory | Range | Default                              | Description  |
|------------------|-----------|-------|--------------------------------------|--|
| AlertScriptsPath | no        |       | /usr/local/share/zabbix/alertscripts | Path to alert scripts (depends on compile-time installation variable <code>datadir</code> ). |

| Parameter                  | Mandatory  | Range      | Default   | Description  |
|----------------------------|--|------------|-----------|--|
| AllowRoot                  | no   |            | 0         | Allow the server to run as 'root'. If disabled and the server is started by 'root', the server will try to switch to the 'zabbix' user instead. Has no effect if started under a regular user.<br>0 - do not allow<br>1 - allow  |
| AllowUnsupportedDBVersions | no   |            | 0         | Allow the server to work with unsupported database versions.<br>0 - do not allow<br>1 - allow  |
| CacheSize                  | no   | 128K-64G   | 32M       | Size of configuration cache, in bytes.   |
| CacheUpdateFrequency       | no   | 1-3600     | 60        | Shared memory size for storing host, item and trigger data.<br>Determines how often Zabbix will perform update of configuration cache in seconds.<br>See also <b>runtime control</b> options.  |
| DBHost                     | no   |            | localhost | Database host name.<br>In case of MySQL localhost or empty string results in using a socket. In case of PostgreSQL only empty string results in attempt to use socket.<br>In case of <b>Oracle</b> empty string results in using the Net Service Name connection method; in this case consider using the TNS_ADMIN environment variable to specify the directory of the tnsnames.ora file.   |
| DBName                     | yes  |            |           | Database name.<br>In case of <b>Oracle</b> if the Net Service Name connection method is used, specify the service name from tnsnames.ora or set to empty string; set the TWO_TASK environment variable if DBName is set to empty string.   |
| DBPassword                 | no   |            |           | Database password.<br>Comment this line if no password is used.  |
| DBPort                     | no   | 1024-65535 |           | Database port when not using local socket.<br>In case of <b>Oracle</b> if the Net Service Name connection method is used this parameter will be ignored; the port number from the tnsnames.ora file will be used instead.  |
| DBSchema                   | no   |            |           | Schema name. Used for PostgreSQL.  |
| DBSocket                   | no   |            |           | Path to MySQL socket file.   |
| DBUser                     | no   |            |           | Database user.   |
| DBTLSConnect               | no   |            |           | Setting this option enforces the use of TLS connection to database:<br><i>required</i> - connect using TLS<br><i>verify_ca</i> - connect using TLS and verify certificate<br><i>verify_full</i> - connect using TLS, verify certificate and verify that database identity specified by DBHost matches its certificate<br><br>On MySQL starting from 5.7.11 and PostgreSQL the following values are supported: "required", "verify_ca", "verify_full".<br>On MariaDB starting from version 10.2.6 "required" and "verify_full" values are supported.<br>By default, not set to any option and the behavior depends on database configuration. |
| DBTLSCAFile                | no<br>(yes, if<br>DBTLSConnect set to<br>one of:<br>verify_ca,<br>verify_full) |            |           | This parameter is supported since Zabbix 5.0.0.<br>Full pathname of a file containing the top-level CA(s) certificates for database certificate verification.<br>This parameter is supported since Zabbix 5.0.0.   |
| DBTLSCertFile              | no   |            |           | Full pathname of file containing Zabbix server certificate for authenticating to database.<br>This parameter is supported since Zabbix 5.0.0.  |

| Parameter               | Mandatory | Range   | Default                                 | Description  |
|-------------------------|-----------|---------|---|--|
| DBTLSKeyFile            | no        |         |   | Full pathname of file containing the private key for authenticating to database.<br>This parameter is supported since Zabbix 5.0.0.  |
| DBTLSCipher             | no        |         |   | The list of encryption ciphers that Zabbix server permits for TLS protocols up through TLSv1.2.<br>Supported only for MySQL.<br>This parameter is supported since Zabbix 5.0.0.  |
| DBTLSCipher13           | no        |         |   | The list of encryption ciphersuites that Zabbix server permits for TLSv1.3 protocol.<br>Supported only for MySQL, starting from version 8.0.16.<br>This parameter is supported since Zabbix 5.0.0.   |
| DebugLevel              | no        | 0-5     | 3                                       | Specifies debug level:<br>0 - basic information about starting and stopping of Zabbix processes<br>1 - critical information<br>2 - error information<br>3 - warnings<br>4 - for debugging (produces lots of information)<br>5 - extended debugging (produces even more information)<br>See also <a href="#">runtime control</a> options.   |
| ExportDir               | no        |         |   | Directory for <a href="#">real-time export</a> of events, history and trends in newline-delimited JSON format. If set, enables real-time export.<br>This parameter is supported since Zabbix 4.0.0.  |
| ExportFileSize          | no        | 1M-1G   | 1G                                      | Maximum size per export file in bytes. Only used for rotation if ExportDir is set.<br>This parameter is supported since Zabbix 4.0.0.  |
| ExportType              | no        |         |   | List of comma-delimited entity types (events, history, trends) for <a href="#">real-time export</a> (all types by default). Valid only if ExportDir is set.<br><i>Note that if ExportType is specified, but ExportDir is not, then this is a configuration error and the server will not start.</i><br>e.g.:<br>ExportType=history,trends - export history and trends only<br>ExportType=events - export events only |
| ExternalScripts         | no        |         | /usr/local/share/zabbix/externalscripts | Location of external scripts (depends on compile-time installation variable <i>datadir</i> ).  |
| Fping6Location          | no        |         | /usr/sbin/fping6                        | Location of fping6.<br>Make sure that fping6 binary has root ownership and SUID flag set.<br>Make empty ("Fping6Location=") if your fping utility is capable to process IPv6 addresses.  |
| FpingLocation           | no        |         | /usr/sbin/fping                         | Location of fping.<br>Make sure that fping binary has root ownership and SUID flag set!  |
| HANodeName              | no        |         |   | The high availability cluster node name.<br>When empty the server is working in standalone mode and a node with empty name is created.   |
| HistoryCacheSize        | no        | 128K-2G | 16M                                     | Size of history cache, in bytes.   |
| HistoryIndexCacheSize   | no        | 128K-2G | 4M                                      | Shared memory size for storing history data.<br>Size of history index cache, in bytes.<br>Shared memory size for indexing history data stored in history cache.<br>The index cache size needs roughly 100 bytes to cache one item.<br>This parameter is supported since Zabbix 3.0.0.  |
| HistoryStorageDateIndex | no        |         | 0                                       | Enable preprocessing of history values in history storage to store values in different indices based on date:<br>0 - disable<br>1 - enable   |
| HistoryStorageURL       | no        |         |   | History storage HTTP[S] URL.<br>This parameter is used for <a href="#">Elasticsearch</a> setup.  |

| Parameter             | Mandatory | Range       | Default               | Description   |
|-----------------------|-----------|-------------|-----------------------|---|
| HistoryStorageTypes   | yes       |             | uint,dbl,str,log,text | Comma separated list of value types to be sent to the history storage.<br>This parameter is used for <a href="#">Elasticsearch</a> setup.   |
| HousekeepingFrequency |           | 0-24        | 1                     | Determines how often Zabbix will perform housekeeping procedure in hours.<br>Housekeeping is removing outdated information from the database.<br><i>Note:</i> To prevent housekeeper from being overloaded (for example, when history and trend periods are greatly reduced), no more than 4 times HousekeepingFrequency hours of outdated information are deleted in one housekeeping cycle, for each item. Thus, if HousekeepingFrequency is 1, no more than 4 hours of outdated information (starting from the oldest entry) will be deleted per cycle.<br><i>Note:</i> To lower load on server startup housekeeping is postponed for 30 minutes after server start. Thus, if HousekeepingFrequency is 1, the very first housekeeping procedure after server start will run after 30 minutes, and will repeat with one hour delay thereafter.<br>Since Zabbix 3.0.0 it is possible to disable automatic housekeeping by setting HousekeepingFrequency to 0. In this case the housekeeping procedure can only be started by <i>housekeeper_execute</i> runtime control option and the period of outdated information deleted in one housekeeping cycle is 4 times the period since the last housekeeping cycle, but not less than 4 hours and not greater than 4 days.<br>See also <a href="#">runtime control</a> options. |
| Include               | no        |             |                       | You may include individual files or all files in a directory in the configuration file.<br>To only include relevant files in the specified directory, the asterisk wildcard character is supported for pattern matching.<br>For example:<br><code>/absolute/path/to/config/files/*.conf</code> .<br>See <a href="#">special notes</a> about limitations.  |
| JavaGateway           | no        |             |                       | IP address (or hostname) of Zabbix Java gateway.<br>Only required if Java pollers are started.  |
| JavaGatewayPort       | no        | 1024-32767  | 10052                 | Port that Zabbix Java gateway listens on.   |
| ListenBacklog         | no        | 0 - INT_MAX | SOMAXCONN             | The maximum number of pending connections in the TCP queue.<br>Default value is a hard-coded constant, which depends on the system.<br>Maximum supported value depends on the system, too high values may be silently truncated to the 'implementation-specified maximum'.  |
| ListenIP              | no        |             | 0.0.0.0               | List of comma delimited IP addresses that the trapper should listen on.<br>Trapper will listen on all network interfaces if this parameter is missing.  |
| ListenPort            | no        | 1024-32767  | 10051                 | Listen port for trapper.  |
| LoadModule            | no        |             |                       | Module to load at server startup. Modules are used to extend functionality of the server.<br>Formats:<br><code>LoadModule=&lt;module.so&gt;</code><br><code>LoadModule=&lt;path/module.so&gt;</code><br><code>LoadModule=&lt;/abs_path/module.so&gt;</code><br>Either the module must be located in directory specified by LoadModulePath or the path must precede the module name.<br>If the preceding path is absolute (starts with '/') then LoadModulePath is ignored.<br>It is allowed to include multiple LoadModule parameters.  |
| LoadModulePath        | no        |             |                       | Full path to location of server modules.<br>Default depends on compilation options.   |



| Parameter                    | Mandatory  | Range     | Default                      | Description   |
|------------------------------|--|-----------|------------------------------|---|
| LogFile                      | yes, if LogType is set to <i>file</i> , otherwise no |           |                              | Name of log file.   |
| LogFileSize                  | no   | 0-1024    | 1                            | Maximum size of log file in MB.<br>0 - disable automatic log rotation.<br><i>Note:</i> If the log file size limit is reached and file rotation fails, for whatever reason, the existing log file is truncated and started anew.   |
| LogType                      | no   |           | file                         | Log output type:<br><i>file</i> - write log to file specified by LogFile parameter,<br><i>system</i> - write log to syslog,<br><i>console</i> - write log to standard output.<br>This parameter is supported since Zabbix 3.0.0.  |
| LogSlowQueries               | no   | 0-3600000 | 0                            | Determines how long a database query may take before being logged in milliseconds.<br>0 - don't log slow queries.   |
| MaxHousekeeperDelete         | no   | 0-1000000 | 5000                         | This option becomes enabled starting with DebugLevel=3.<br>No more than 'MaxHousekeeperDelete' rows (corresponding to [tablename], [field], [value]) will be deleted per one task in one housekeeping cycle.<br>If set to 0 then no limit is used at all. In this case you must know what you are doing, so as not to <b>overload the database!</b><br><b>2</b>   |
| NodeAddress                  | no   |           | 10051                        | This parameter applies only to deleting history and trends of already deleted items.<br>IP or hostname with optional port to override how the frontend should connect to the server.<br>Format: <address>[:port]<br>If IP or hostname is not set, the value of ListenIP will be used.<br>If ListenIP is not set, the value localhost will be used.<br>This option can be overridden by the address specified in the frontend configuration.<br>See also: HANodeName parameter |
| PidFile                      | no   |           | /tmp/zabbix_server.pid       | Name of PID file.   |
| ProxyConfigFrequency         | no   | 1-604800  | 3600                         | Determines how often Zabbix server sends configuration data to a Zabbix proxy in seconds. Used only for proxies in a passive mode.  |
| ProblemHousekeepingFrequency | no   | 1-3600    | 60                           | Determines how often Zabbix will delete problems for deleted triggers in seconds.   |
| ProxyDataFrequency           | no   | 1-3600    | 1                            | Determines how often Zabbix server requests history data from a Zabbix proxy in seconds. Used only for proxies in a passive mode.   |
| ServiceManagerSyncFrequency  | no   | 1-3600    | 60                           | Determines how often Zabbix will synchronize configuration of a service manager in seconds.   |
| SNMPTrapperFile              | no   |           | /tmp/zabbix_trap_receiver.pl | Temporary file used for passing data from SNMP trap daemon to the server.<br>Must be the same as in zabbix_trap_receiver.pl or SNMPTT configuration file.   |
| SocketDir                    | no   |           | /tmp                         | Directory to store IPC sockets used by internal Zabbix services.<br>This parameter is supported since Zabbix 3.4.0.   |

| Parameter               | Mandatory | Range  | Default | Description  |
|-------------------------|-----------|--------|---------|--|
| SourceIP                | no        |        |         | Source IP address for:<br>- outgoing connections to Zabbix proxy and Zabbix agent;<br>- agentless connections (VMware, SSH, JMX, SNMP, Telnet and simple checks);<br>- HTTP agent connections;<br>- script item JavaScript HTTP requests;<br>- preprocessing JavaScript HTTP requests;<br>- sending notification emails (connections to SMTP server);<br>- webhook notifications (JavaScript HTTP connections);<br>- connections to the Vault  |
| SSHKeyLocation          | no        |        |         | Location of public and private keys for SSH checks and actions   |
| SSLCertLocation         | no        |        |         | Location of SSL client certificate files for client authentication.<br>This parameter is used in web monitoring only.  |
| SSLKeyLocation          | no        |        |         | Location of SSL private key files for client authentication.<br>This parameter is used in web monitoring only.   |
| SSLCALocation           | no        |        |         | Override the location of certificate authority (CA) files for SSL server certificate verification. If not set, system-wide directory will be used.<br>Note that the value of this parameter will be set as libcurl option CURLOPT_CAPATH. For libcurl versions before 7.42.0, this only has effect if libcurl was compiled to use OpenSSL.<br>For more information see <a href="#">cURL web page</a> .<br>This parameter is used in web monitoring since Zabbix 2.4.0 and in SMTP authentication since Zabbix 3.0.0. |
| StartAlerters           | no        | 1-100  | 3       | Number of pre-forked instances of <b>alerters</b> .<br>This parameter is supported since Zabbix 3.4.0.   |
| StartDBSyncers          | no        | 1-100  | 4       | Number of pre-forked instances of <b>history syncers</b> .<br><i>Note:</i> Be careful when changing this value, increasing it may do more harm than good. Roughly, the default value should be enough to handle up to 4000 NVPS.   |
| StartDiscoverers        | no        | 0-250  | 1       | Number of pre-forked instances of <b>discoverers</b> .   |
| StartEscalators         | no        | 1-100  | 1       | Number of pre-forked instances of <b>escalators</b> .<br>This parameter is supported since Zabbix 3.0.0.   |
| StartHistoryPollers     | no        | 0-1000 | 5       | Number of pre-forked instances of <b>history pollers</b> .<br>This parameter is supported since Zabbix 5.4.0.  |
| StartHTTPPollers        | no        | 0-1000 | 1       | Number of pre-forked instances of <b>HTTP pollers</b> <sup>1</sup> .   |
| StartIPMIPollers        | no        | 0-1000 | 0       | Number of pre-forked instances of <b>IPMI pollers</b> .  |
| StartJavaPollers        | no        | 0-1000 | 0       | Number of pre-forked instances of <b>Java pollers</b> <sup>1</sup> .   |
| StartLLDProcessors      | no        | 1-100  | 2       | Number of pre-forked instances of low-level discovery (LLD) <b>workers</b> <sup>1</sup> .<br>The LLD manager process is automatically started when an LLD worker is started.<br>This parameter is supported since Zabbix 4.2.0.  |
| StartODBCPollers        | no        | 0-1000 | 1       | Number of pre-forked instances of <b>ODBC pollers</b> <sup>1</sup> .   |
| StartPingers            | no        | 0-1000 | 1       | Number of pre-forked instances of <b>ICMP pingers</b> <sup>1</sup> .   |
| StartPollersUnreachable | no        | 0-1000 | 1       | Number of pre-forked instances of <b>pollers for unreachable hosts</b> (including IPMI and Java) <sup>1</sup> .<br>At least one poller for unreachable hosts must be running if regular, IPMI or Java pollers are started.   |
| StartPollers            | no        | 0-1000 | 5       | Number of pre-forked instances of <b>pollers</b> <sup>1</sup> .  |
| StartPreprocessors      | no        | 1-1000 | 3       | Number of pre-forked instances of preprocessing <b>workers</b> <sup>1</sup> .<br>The preprocessing manager process is automatically started when a preprocessor worker is started.<br>This parameter is supported since Zabbix 3.4.0.  |
| StartProxyPollers       | no        | 0-250  | 1       | Number of pre-forked instances of <b>pollers for passive proxies</b> <sup>1</sup> .  |
| StartReportWriters      | no        | 0-100  | 0       | Number of pre-forked instances of <b>report writers</b> .<br>If set to 0, scheduled report generation is disabled.<br>The report manager process is automatically started when a report writer is started.   |
| StartSNMPTrapper        | no        | 0-1    | 0       | This parameter is supported since Zabbix 5.4.0.<br>If set to 1, <b>SNMP trapper</b> process will be started.   |

| Parameter             | Mandatory | Range  | Default | Description  |
|-----------------------|-----------|--------|---------|--|
| StartTimers           | no        | 1-1000 | 1       | Number of pre-forked instances of <b>timers</b> .<br>Timers process maintenance periods.   |
| StartTrappers         | no        | 0-1000 | 5       | Number of pre-forked instances of <b>trappers</b> <sup>1</sup> .<br>Trappers accept incoming connections from Zabbix sender, active agents and active proxies.   |
| StartVMwareCollectors | no        | 0-250  | 0       | Number of pre-forked <b>VMware collector</b> instances.  |
| StatsAllowedIP        | no        |        |         | List of comma delimited IP addresses, optionally in CIDR notation, or DNS names of external Zabbix instances. Stats request will be accepted only from the addresses listed here. If this parameter is not set no stats requests will be accepted. If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address. '0.0.0.0/0' can be used to allow any IPv4 address.<br>Example: StatsAllowedIP=127.0.0.1,192.168.1.0/24,::1,2001:db8::/32,zabbix.example.com<br>This parameter is supported since Zabbix 4.2.0. |
| Timeout               | no        | 1-30   | 3       | Specifies how long we wait for agent, SNMP device or external check in seconds.  |
| TLSCAFile             | no        |        |         | Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components.<br>This parameter is supported since Zabbix 3.0.0.   |
| TLSCertFile           | no        |        |         | Full pathname of a file containing the server certificate or certificate chain, used for encrypted communications between Zabbix components.<br>This parameter is supported since Zabbix 3.0.0.  |
| TLSCipherAll          | no        |        |         | GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for certificate- and PSK-based encryption.<br>Example:<br>TLS_AES_256_GCM_SHA384:TLS_CHACHA20_POLY1305_SHA256:TLS_AES_128_GCM_SHA256<br>This parameter is supported since Zabbix 4.4.7.   |
| TLSCipherAll13        | no        |        |         | Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for certificate- and PSK-based encryption.<br>Example for GnuTLS: NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL::+SIGN-ALL:+CTYPE-X.509<br>Example for OpenSSL:<br>EECDH+aRSA+AES128:RSA+aRSA+AES128:kECDHEPSK+AES128:kPSK+AES128:kRSA+AES128<br>This parameter is supported since Zabbix 4.4.7.  |
| TLSCipherCert         | no        |        |         | GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for certificate-based encryption.<br>Example for GnuTLS:<br>NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL:+CTYPE-X.509<br>Example for OpenSSL:<br>EECDH+aRSA+AES128:RSA+aRSA+AES128<br>This parameter is supported since Zabbix 4.4.7.  |
| TLSCipherCert13       | no        |        |         | Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for certificate-based encryption.<br>This parameter is supported since Zabbix 4.4.7.  |

| Parameter              | Mandatory | Range      | Default                | Description  |
|------------------------|-----------|------------|------------------------|--|
| TLSCipherPSK           | no        |            |                        | GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for PSK-based encryption.<br>Example for GnuTLS:<br>NONE:+VERS-TLS1.2:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL<br>Example for OpenSSL: kECDHEPSK+AES128:kPSK+AES128<br>This parameter is supported since Zabbix 4.4.7.                                 |
| TLSCipherPSK13         | no        |            |                        | Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for PSK-based encryption.<br>Example:<br>TLS_CHACHA20_POLY1305_SHA256:TLS_AES_128_GCM_SHA256<br>This parameter is supported since Zabbix 4.4.7.   |
| TLSCRLFile             | no        |            |                        | Full pathname of a file containing revoked certificates. This parameter is used for encrypted communications between Zabbix components.<br>This parameter is supported since Zabbix 3.0.0.   |
| TLSKeyFile             | no        |            |                        | Full pathname of a file containing the server private key, used for encrypted communications between Zabbix components.<br>This parameter is supported since Zabbix 3.0.0.   |
| TmpDir                 | no        |            | /tmp                   | Temporary directory.   |
| TrapperTimeout         | no        | 1-300      | 300                    | Specifies how many seconds trapper may spend processing new data.  |
| TrendCacheSize         | no        | 128K-2G    | 4M                     | Size of trend cache, in bytes.   |
| TrendFunctionCacheSize | no        | 128K-2G    | 4M                     | Shared memory size for storing trends data.<br>Size of trend function cache, in bytes.<br>Shared memory size for caching calculated trend function data.   |
| UnavailableDelay       | no        | 1-3600     | 60                     | Determines how often host is checked for availability during the <b>unavailability</b> period, in seconds.   |
| UnreachableDelay       | no        | 1-3600     | 15                     | Determines how often host is checked for availability during the <b>unreachability</b> period in seconds.  |
| UnreachablePeriod      | no        | 1-3600     | 45                     | Determines after how many seconds of <b>unreachability</b> treat a host as unavailable.  |
| User                   | no        |            | zabbix                 | Drop privileges to a specific, existing user on the system. Only has effect if run as 'root' and AllowRoot is disabled.  |
| ValueCacheSize         | no        | 0,128K-64G | 8M                     | Size of history value cache, in bytes.<br>Shared memory size for caching item history data requests. Setting to 0 disables value cache (not recommended).<br>When value cache runs out of the shared memory a warning message is written to the server log every 5 minutes.  |
| VaultDBPath            | no        |            |                        | Vault path from where credentials for database will be retrieved by keys 'password' and 'username'.<br>Example: secret/zabbix/database<br>This option can only be used if DBUser and DBPassword are not specified.   |
| VaultToken             | no        |            |                        | This parameter is supported since Zabbix 5.2.0.<br>Vault authentication token that should have been generated exclusively for Zabbix server with read-only permission to the paths specified in <b>Vault macros</b> and read-only permission to the path specified in the optional VaultDBPath configuration parameter.<br>It is an error if VaultToken and VAULT_TOKEN environment variable are defined at the same time. |
| VaultURL               | no        |            | https://127.0.0.1:8200 | This parameter is supported since Zabbix 5.2.0.<br>Zabbix server HTTP[S] URL. System-wide CA certificates directory will be used if SSLCALocation is not specified.<br>This parameter is supported since Zabbix 5.2.0.   |

| Parameter                    | Mandatory | Range    | Default | Description   |
|------------------------------|-----------|----------|---------|---|
| VMwareCacheSize <sup>2</sup> | no        | 256K-2G  | 8M      | Shared memory size for storing VMware data.<br>A VMware internal check <code>zabbix[vmware,buffer,...]</code> can be used to monitor the VMware cache usage (see <a href="#">Internal checks</a> ).<br>Note that shared memory is not allocated if there are no vmware collector instances configured to start. |
| VMwareFrequency              | no        | 10-86400 | 60      | Delay in seconds between data gathering from a single VMware service.<br>This delay should be set to the least update interval of any VMware monitoring item.   |
| VMwarePerfFrequency          | no        | 10-86400 | 60      | Delay in seconds between performance counter statistics retrieval from a single VMware service.<br>This delay should be set to the least update interval of any VMware monitoring <a href="#">item</a> that uses VMware performance counters.   |
| VMwareTimeoutno              | no        | 1-300    | 10      | The maximum number of seconds vmware collector will wait for a response from VMware service (vCenter or ESX hypervisor).  |
| WebServiceURL                | no        |          |         | HTTP[S] URL to Zabbix web service in the format <code>&lt;host:port&gt;/report</code> . For example:<br><code>http://localhost:10053/report</code><br>This parameter is supported since Zabbix 5.4.0.   |

#### Footnotes

<sup>1</sup> Note that too many data gathering processes (pollers, unreachable pollers, ODBC pollers, HTTP pollers, Java pollers, pingers, trappers, proxypollers) together with IPMI manager, SNMP trapper and preprocessing workers can **exhaust** the per-process file descriptor limit for the preprocessing manager.

#### Warning:

This will cause Zabbix server to stop (usually shortly after the start, but sometimes it can take more time). The configuration file should be revised or the limit should be raised to avoid this situation.

<sup>2</sup> When a lot of items are deleted it increases the load to the database, because the housekeeper will need to remove all the history data that these items had. For example, if we only have to remove 1 item prototype from the template, but this template is linked to 50 hosts and for every host the prototype is expanded to 100 real items, 5000 items in total have to be removed (1\*50\*100). If 500 is set for `MaxHousekeeperDelete` (`MaxHousekeeperDelete=500`), the housekeeper process will have to remove up to 2500000 values (5000\*500) for the deleted items from history and trends tables in one cycle.

## 2 Zabbix proxy

### Overview

This section lists parameters supported in a Zabbix proxy configuration file (`zabbix_proxy.conf`).

Note that:

- The default values reflect daemon defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with `"#"` are only supported in the beginning of the line.

### Parameters

| Parameter                  | Mandatory | Range | Default | Description  |
|----------------------------|-----------|-------|---------|--|
| AllowRoot                  | no        |       | 0       | Allow the proxy to run as 'root'. If disabled and the proxy is started by 'root', the proxy will try to switch to the 'zabbix' user instead. Has no effect if started under a regular user.<br>0 - do not allow<br>1 - allow |
| AllowUnsupportedDBVersions | no        |       | 0       | Allow the proxy to work with unsupported database versions.<br>0 - do not allow<br>1 - allow   |

| Parameter        | Mandatory  | Range    | Default   | Description  |
|------------------|--|----------|-----------|--|
| CacheSize        | no   | 128K-64G | 32M       | Size of configuration cache, in bytes.<br>Shared memory size, for storing host and item data.  |
| ConfigFrequency  | no   | 1-604800 | 3600      | How often proxy retrieves configuration data from Zabbix server in seconds.<br>Active proxy parameter. Ignored for passive proxies (see ProxyMode parameter).  |
| DataSetFrequency | no   | 1-3600   | 1         | Proxy will send collected data to the server every N seconds. Note that active proxy will still poll Zabbix server every second for remote command tasks.<br>Active proxy parameter. Ignored for passive proxies (see ProxyMode parameter).  |
| DBHost           | no   |          | localhost | Database host name.<br>In case of MySQL localhost or empty string results in using a socket. In case of PostgreSQL only empty string results in attempt to use socket.<br>In case of Oracle empty string results in using the Net Service Name connection method; in this case consider using the TNS_ADMIN environment variable to specify the directory of the tnsnames.ora file.  |
| DBName           | yes  |          |           | Database name or path to database file for SQLite3 (multi-process architecture of Zabbix does not allow to use <a href="#">in-memory database</a> , e.g. :memory:, file::memory:?cache=shared or file:memdb1?mode=memory&cache=shared).<br><br>Warning: Do not attempt to use the same database Zabbix server is using.<br>In case of Oracle, if the Net Service Name connection method is used, specify the service name from tnsnames.ora or set to empty string; set the TWO_TASK environment variable if DBName is set to empty string.  |
| DBPassword       | no   |          |           | Database password. Ignored for SQLite.<br>Comment this line if no password is used.  |
| DBSchema         | no   |          |           | Schema name. Used for PostgreSQL.  |
| DBSocket         | no   |          | 3306      | Path to MySQL socket.  |
| DBUser           |  |          |           | Database port when not using local socket. Ignored for SQLite.   |
| DBTLSConnect     | no   |          |           | Database user. Ignored for SQLite.<br>Setting this option enforces the use of TLS connection to database:<br><i>required</i> - connect using TLS<br><i>verify_ca</i> - connect using TLS and verify certificate<br><i>verify_full</i> - connect using TLS, verify certificate and verify that database identity specified by DBHost matches its certificate<br><br>On MySQL starting from 5.7.11 and PostgreSQL the following values are supported: "required", "verify", "verify_full". On MariaDB starting from version 10.2.6 "required" and "verify_full" values are supported.<br>By default, not set to any option and the behavior depends on database configuration. |
| DBTLSCAFile      | no<br>(yes, if<br>DBTLSConnect set to<br>one of:<br>verify_ca,<br>verify_full) |          |           | This parameter is supported since Zabbix 5.0.0.<br>Full pathname of a file containing the top-level CA(s) certificates for database certificate verification.<br>This parameter is supported since Zabbix 5.0.0.   |
| DBTLSCertFile    | no   |          |           | Full pathname of file containing Zabbix server certificate for authenticating to database.<br>This parameter is supported since Zabbix 5.0.0.  |

| Parameter             | Mandatory | Range   | Default                                 | Description   |
|-----------------------|-----------|---------|---|---|
| DBTLSKeyFile          | no        |         |   | Full pathname of file containing the private key for authenticating to database.<br>This parameter is supported since Zabbix 5.0.0.   |
| DBTLSCipher           | no        |         |   | The list of encryption ciphers that Zabbix server permits for TLS protocols up through TLSv1.2.<br>Supported only for MySQL.<br>This parameter is supported since Zabbix 5.0.0.   |
| DBTLSCipher13         | no        |         |   | The list of encryption ciphersuites that Zabbix server permits for TLSv1.3 protocol.<br>Supported only for MySQL, starting from version 8.0.16.<br>This parameter is supported since Zabbix 5.0.0.  |
| DebugLevel            | no        | 0-5     | 3                                       | Specifies debug level:<br>0 - basic information about starting and stopping of Zabbix processes<br>1 - critical information<br>2 - error information<br>3 - warnings<br>4 - for debugging (produces lots of information)<br>5 - extended debugging (produces even more information)   |
| EnableRemoteCommands  | no        |         | 0                                       | Whether remote commands from Zabbix server are allowed.<br>0 - not allowed<br>1 - allowed<br>This parameter is supported since Zabbix 3.4.0.  |
| ExternalScripts       | no        |         | /usr/local/share/zabbix/externalscripts | Location of external scripts (depends on compile-time installation variable <i>datadir</i> ).   |
| Fping6Location        | no        |         | /usr/sbin/fping6                        | Location of fping6.<br>Make sure that fping6 binary has root ownership and SUID flag set.<br>Make empty ("Fping6Location=") if your fping utility is capable to process IPv6 addresses.   |
| FpingLocation         | no        |         | /usr/sbin/fping                         | Location of fping.<br>Make sure that fping binary has root ownership and SUID flag set!   |
| HeartbeatFrequency    | no        | 0-3600  | 60                                      | Frequency of heartbeat messages in seconds.<br>Used for monitoring availability of proxy on server side.<br>0 - heartbeat messages disabled.<br>Active proxy parameter. Ignored for passive proxies (see ProxyMode parameter).  |
| HistoryCacheSize      | no        | 128K-2G | 16M                                     | Size of history cache, in bytes.  |
| HistoryIndexCacheSize | no        | 128K-2G | 4M                                      | Shared memory size for storing history data.<br>Size of history index cache, in bytes.<br>Shared memory size for indexing history data stored in history cache.<br>The index cache size needs roughly 100 bytes to cache one item.<br>This parameter is supported since Zabbix 3.0.0. |
| Hostname              | no        |         | Set by HostnameItem                     | Unique, case sensitive Proxy name. Make sure the proxy name is known to the server!<br>Allowed characters: alphanumeric, '.', '_', '-' and '-'.<br>Maximum length: 128  |
| HostnameItem          | no        |         | system.hostname                         | Item used for setting Hostname if it is undefined (this will be run on the proxy similarly as on an agent).<br>Does not support UserParameters, performance counters or aliases, but does support system.run[()].<br><br>Ignored if Hostname is set.                                  |

| Parameter             | Mandatory  | Range       | Default   | Description   |
|-----------------------|--|-------------|-----------|---|
| HousekeepingFrequency |  | 0-24        | 1         | How often Zabbix will perform housekeeping procedure (in hours).<br>Housekeeping is removing outdated information from the database.<br><i>Note:</i> To lower load on proxy startup, housekeeping is postponed for 30 minutes after proxy start. Thus, if HousekeepingFrequency is 1, the very first housekeeping procedure after proxy start will run after 30 minutes, and will repeat every hour thereafter.<br>Since Zabbix 3.0.0 it is possible to disable automatic housekeeping by setting HousekeepingFrequency to 0. In this case the housekeeping procedure can only be started by <i>housekeeper_execute</i> runtime control option. |
| Include               | no   |             |           | You may include individual files or all files in a directory in the configuration file.<br>To only include relevant files in the specified directory, the asterisk wildcard character is supported for pattern matching.<br>For example:<br><code>/absolute/path/to/config/files/*.conf</code> .<br>See <b>special notes</b> about limitations.   |
| JavaGateway           | no   |             |           | IP address (or hostname) of Zabbix Java gateway.<br>Only required if Java pollers are started.  |
| JavaGatewayPort       |  | 1024-32767  | 10052     | Port that Zabbix Java gateway listens on.   |
| ListenBacklog         | no   | 0 - INT_MAX | SOMAXCONN | The maximum number of pending connections in the TCP queue.<br>Default value is a hard-coded constant, which depends on the system.<br>Maximum supported value depends on the system, too high values may be silently truncated to the 'implementation-specified maximum'.  |
| ListenIP              | no   |             | 0.0.0.0   | List of comma delimited IP addresses that the trapper should listen on.<br>Trapper will listen on all network interfaces if this parameter is missing.  |
| ListenPort            | no   | 1024-32767  | 10051     | Listen port for trapper.  |
| LoadModule            | no   |             |           | Module to load at proxy startup. Modules are used to extend functionality of the proxy.<br>Formats:<br><code>LoadModule=&lt;module.so&gt;</code><br><code>LoadModule=&lt;path/module.so&gt;</code><br><code>LoadModule=&lt;/abs_path/module.so&gt;</code><br>Either the module must be located in directory specified by LoadModulePath or the path must precede the module name.<br>If the preceding path is absolute (starts with '/') then LoadModulePath is ignored.<br>It is allowed to include multiple LoadModule parameters.  |
| LoadModulePath        | no   |             |           | Full path to location of proxy modules.<br>Default depends on compilation options.  |
| LogFile               | yes, if LogType is set to <i>file</i> , otherwise no |             |           | Name of log file.   |
| LogFileSize           | no   | 0-1024      | 1         | Maximum size of log file in MB.<br>0 - disable automatic log rotation.<br><i>Note:</i> If the log file size limit is reached and file rotation fails, for whatever reason, the existing log file is truncated and started anew.   |
| LogRemoteCommands     | no   |             | 0         | Enable logging of executed shell commands as warnings.<br>0 - disabled<br>1 - enabled<br>This parameter is supported since Zabbix 3.4.0.  |



| Parameter          | Mandatory | Range     | Default                      | Description   |
|--------------------|-----------|-----------|------------------------------|---|
| LogType            | no        |           | file                         | Log output type:<br><i>file</i> - write log to file specified by LogFile parameter,<br><i>system</i> - write log to syslog,<br><i>console</i> - write log to standard output.<br>This parameter is supported since Zabbix 3.0.0.  |
| LogSlowQueries     | no        | 0-3600000 | 0                            | How long a database query may take before being logged (in milliseconds).<br>0 - don't log slow queries.<br>This option becomes enabled starting with DebugLevel=3.   |
| PidFile            | no        |           | /tmp/zabbix_proxy.pid        | Name of PID file.   |
| ProxyLocalBuffer   | no        | 0-720     | 0                            | Proxy will keep data locally for N hours, even if the data have already been synced with the server.<br>This parameter may be used if local data will be used by third-party applications.  |
| ProxyMode          | no        | 0-1       | 0                            | Proxy operating mode.<br>0 - proxy in the active mode<br>1 - proxy in the passive mode<br><i>Note that (sensitive) proxy configuration data may become available to parties having access to the Zabbix server trapper port when using an active proxy. This is possible because anyone may pretend to be an active proxy and request configuration data; authentication does not take place.</i>   |
| ProxyOfflineBuffer | no        | 1-720     | 1                            | Proxy will keep data for N hours in case of no connectivity with Zabbix server.<br>Older data will be lost.   |
| Server             | yes       |           |                              | If ProxyMode is set to <i>active mode</i> :<br>Zabbix server IP address or DNS name (address:port) or <b>cluster</b> (address:port;address2:port) to get configuration data from and send data to.<br>If port is not specified, the default port is used.<br>Cluster nodes must be separated by a semicolon.<br><br>If ProxyMode is set to <i>passive mode</i> :<br>List of comma delimited IP addresses, optionally in CIDR notation, or DNS names of Zabbix server. Incoming connections will be accepted only from the addresses listed here. If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally.<br>'::/0' will allow any IPv4 or IPv6 address. '0.0.0.0/0' can be used to allow any IPv4 address.<br><i>Example:</i><br>Server=127.0.0.1,192.168.1.0/24,::1,2001:db8::/32,zabbix.example.com |
| SNMPTrapperFile    | no        |           | /tmp/zabbix_trap_receiver.pl | Temporary file used for passing data from SNMP trap daemon to the proxy.<br>Must be the same as in zabbix_trap_receiver.pl or SNMPTrapper configuration file.   |
| SocketDir          | no        |           | /tmp                         | Directory to store IPC sockets used by internal Zabbix services.  |
| SourceIP           | no        |           |                              | This parameter is supported since Zabbix 3.4.0.<br>Source IP address for:<br>- outgoing connections to Zabbix server;<br>- agentless connections (VMware, SSH, JMX, SNMP, Telnet and simple checks);<br>- HTTP agent connections;<br>- script item JavaScript HTTP requests;<br>- preprocessing JavaScript HTTP requests;<br>- connections to the Vault   |
| SSHKeyLocation     | no        |           |                              | Location of public and private keys for SSH checks and actions  |
| SSLCertLocation    | no        |           |                              | Location of SSL client certificate files for client authentication.<br>This parameter is used in web monitoring only.   |

| Parameter               | Mandatory  | Range  | Default | Description  |
|-------------------------|--|--------|---------|--|
| SSLKeyLocation          | no   |        |         | Location of SSL private key files for client authentication.<br>This parameter is used in web monitoring only.   |
| SSLCALocation           | no   |        |         | Location of certificate authority (CA) files for SSL server certificate verification.<br>Note that the value of this parameter will be set as libcurl option CURLOPT_CAPATH. For libcurl versions before 7.42.0, this only has effect if libcurl was compiled to use OpenSSL. For more information see <a href="#">cURL web page</a> .<br>This parameter is used in web monitoring since Zabbix 2.4.0 and in SMTP authentication since Zabbix 3.0.0.   |
| StartDBSyncers          | no   | 1-100  | 4       | Number of pre-forked instances of <b>history syncers</b> .<br><i>Note:</i> Be careful when changing this value, increasing it may do more harm than good.  |
| StartDiscoverers        | no   | 0-250  | 1       | Number of pre-forked instances of <b>discoverers</b> .   |
| StartHistoryPollers     | no   | 0-1000 | 1       | Number of pre-forked instances of <b>history pollers</b> .<br>This parameter is supported since Zabbix 5.4.0.  |
| StartHTTTPollers        | no   | 0-1000 | 1       | Number of pre-forked instances of <b>HTTP pollers</b> .  |
| StartIPMIPollers        | no   | 0-1000 | 0       | Number of pre-forked instances of <b>IPMI pollers</b> .  |
| StartJavaPollers        | no   | 0-1000 | 0       | Number of pre-forked instances of <b>Java pollers</b> .  |
| StartODBCPollers        | no   | 0-1000 | 1       | Number of pre-forked instances of <b>ODBC pollers</b> .  |
| StartPingers            | no   | 0-1000 | 1       | Number of pre-forked instances of <b>ICMP pingers</b> .  |
| StartPollersUnreachable | no   | 0-1000 | 1       | Number of pre-forked instances of <b>pollers for unreachable hosts</b> (including IPMI and Java).<br>At least one poller for unreachable hosts must be running if regular, IPMI or Java pollers are started.   |
| StartPollers            | no   | 0-1000 | 5       | Number of pre-forked instances of <b>pollers</b> .   |
| StartPreprocessors      | no   | 1-1000 | 3       | Number of pre-forked instances of preprocessing <b>workers</b> <sup>1</sup> .<br>The preprocessing manager process is automatically started when a preprocessor worker is started.<br>This parameter is supported since Zabbix 4.2.0.  |
| StartSNMPTrappers       | no   | 0-1    | 0       | If set to 1, <b>SNMP trapper</b> process will be started.  |
| StartTrappers           | no   | 0-1000 | 5       | Number of pre-forked instances of <b>trappers</b> .<br>Trappers accept incoming connections from Zabbix sender and active agents.  |
| StartVMwareCollectors   | no   | 0-250  | 0       | Number of pre-forked <b>VMware collector</b> instances.  |
| StatsAllowedIP          | no   |        |         | List of comma delimited IP addresses, optionally in CIDR notation, or DNS names of external Zabbix instances. Stats request will be accepted only from the addresses listed here.<br>If this parameter is not set no stats requests will be accepted.<br>If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address. '0.0.0.0/0' can be used to allow any IPv4 address.<br>Example: StatsAllowedIP=127.0.0.1,192.168.1.0/24,::1,2001:db8::/32,zabbix.example.com<br>This parameter is supported since Zabbix 4.2.0. |
| Timeout                 | no   | 1-30   | 3       | Specifies how long we wait for agent, SNMP device or external check (in seconds).  |
| TLSAccept               | yes for passive proxy, if TLS certificate or PSK parameters are defined (even for <i>unencrypted</i> connection), otherwise no |        |         | What incoming connections to accept from Zabbix server.<br>Used for a passive proxy, ignored on an active proxy. Multiple values can be specified, separated by comma:<br><i>unencrypted</i> - accept connections without encryption (default)<br><i>psk</i> - accept connections with TLS and a pre-shared key (PSK)<br><i>cert</i> - accept connections with TLS and a certificate<br>This parameter is supported since Zabbix 3.0.0.  |

| Parameter       | Mandatory | Range | Default | Description   |
|-----------------|-----------|-------|---------|---|
| TLSCAFile       | no        |       |         | Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components.<br>This parameter is supported since Zabbix 3.0.0.  |
| TLSCertFile     | no        |       |         | Full pathname of a file containing the proxy certificate or certificate chain, used for encrypted communications between Zabbix components.<br>This parameter is supported since Zabbix 3.0.0.  |
| TLSCipherAll    | no        |       |         | GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for certificate- and PSK-based encryption.<br>Example:<br>TLS_AES_256_GCM_SHA384:TLS_CHACHA20_POLY1305_SHA256:TLS_AES_128_GCM_SHA256   |
| TLSCipherAll13  | no        |       |         | This parameter is supported since Zabbix 4.4.7.<br>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for certificate- and PSK-based encryption.<br>Example for GnuTLS: NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL::+SIGN-ALL:+CTYPE-X.509<br>Example for OpenSSL:<br>EECDH+aRSA+AES128:RSA+aRSA+AES128:kECDHEPSK+AES128:kPSK+AES128 |
| TLSCipherCert   | no        |       |         | This parameter is supported since Zabbix 4.4.7.<br>GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for certificate-based encryption.<br>Example for GnuTLS:<br>NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL:+CTYPE-X.509<br>Example for OpenSSL:<br>EECDH+aRSA+AES128:RSA+aRSA+AES128   |
| TLSCipherCert13 | no        |       |         | This parameter is supported since Zabbix 4.4.7.<br>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for certificate-based encryption.   |
| TLSCipherPSK    | no        |       |         | This parameter is supported since Zabbix 4.4.7.<br>GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for PSK-based encryption.<br>Example for GnuTLS:<br>NONE:+VERS-TLS1.2:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL<br>Example for OpenSSL: kECDHEPSK+AES128:kPSK+AES128  |
| TLSCipherPSK13  | no        |       |         | This parameter is supported since Zabbix 4.4.7.<br>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for PSK-based encryption.<br>Example:<br>TLS_CHACHA20_POLY1305_SHA256:TLS_AES_128_GCM_SHA256  |

| Parameter                   | Mandatory   | Range   | Default                | Description   |
|-----------------------------|---|---------|------------------------|---|
| TLSCConnect                 | yes for active proxy, if TLS certificate or PSK parameters are defined (even for <i>unencrypted</i> connection), otherwise no |         |                        | How the proxy should connect to Zabbix server. Used for an active proxy, ignored on a passive proxy. Only one value can be specified:<br><i>unencrypted</i> - connect without encryption (default)<br><i>psk</i> - connect using TLS and a pre-shared key (PSK)<br><i>cert</i> - connect using TLS and a certificate<br>This parameter is supported since Zabbix 3.0.0. |
| TLSCRLFile                  | no  |         |                        | Full pathname of a file containing revoked certificates. This parameter is used for encrypted communications between Zabbix components.<br>This parameter is supported since Zabbix 3.0.0.  |
| TLSKeyFile                  | no  |         |                        | Full pathname of a file containing the proxy private key, used for encrypted communications between Zabbix components.<br>This parameter is supported since Zabbix 3.0.0.   |
| TLSPSKFile                  | no  |         |                        | Full pathname of a file containing the proxy pre-shared key, used for encrypted communications with Zabbix server.<br>This parameter is supported since Zabbix 3.0.0.   |
| TLSPSKIdentity              | no  |         |                        | Pre-shared key identity string, used for encrypted communications with Zabbix server.<br>This parameter is supported since Zabbix 3.0.0.  |
| TLSServerCertificateIssuer  | no  |         |                        | Allowed server certificate issuer.<br>This parameter is supported since Zabbix 3.0.0.   |
| TLSServerCertificateSubject | no  |         |                        | Allowed server certificate subject.<br>This parameter is supported since Zabbix 3.0.0.  |
| TmpDir                      | no  |         | /tmp                   | Temporary directory.  |
| TrapperTimeout              | no  | 1-300   | 300                    | Specifies how many seconds trapper may spend processing new data.   |
| User                        | no  |         | zabbix                 | Drop privileges to a specific, existing user on the system. Only has effect if run as 'root' and AllowRoot is disabled.   |
| UnavailableDelay            | no  | 1-3600  | 60                     | How often host is checked for availability during the <b>unavailability</b> period, in seconds.   |
| UnreachableDelay            | no  | 1-3600  | 15                     | How often host is checked for availability during the <b>unreachability</b> period, in seconds.   |
| UnreachablePeriod           | no  | 1-3600  | 45                     | After how many seconds of <b>unreachability</b> treat a host as unavailable.  |
| VaultDBPath                 | no  |         |                        | Vault path from where credentials for database will be retrieved by keys 'password' and 'username'.<br>Example: secret/zabbix/database<br>This option can only be used if DBUser and DBPassword are not specified.<br>This parameter is supported since Zabbix 5.2.0.   |
| VaultToken                  | no  |         |                        | Vault authentication token that should have been generated exclusively for Zabbix proxy with read-only permission to the path specified in the optional VaultDBPath configuration parameter.<br>It is an error if VaultToken and VAULT_TOKEN environment variable are defined at the same time.<br>This parameter is supported since Zabbix 5.2.0.                      |
| VaultURL                    | no  |         | https://127.0.0.1:8200 | Server HTTP[S] URL. System-wide CA certificates directory will be used if SSLCALocation is not specified.<br>This parameter is supported since Zabbix 5.2.0.  |
| VMwareCacheSize             | no  | 256K-2G | 8M                     | Shared memory size for storing VMware data.<br>A VMware internal check zabbix[vmware,buffer,...] can be used to monitor the VMware cache usage (see <b>Internal checks</b> ).<br>Note that shared memory is not allocated if there are no vmware collector instances configured to start.   |

| Parameter           | Mandatory | Range    | Default | Description   |
|---------------------|-----------|----------|---------|---|
| VMwareFrequency     | no        | 10-86400 | 60      | Delay in seconds between data gathering from a single VMware service.<br>This delay should be set to the least update interval of any VMware monitoring item.   |
| VMwarePerfFrequency | no        | 10-86400 | 60      | Delay in seconds between performance counter statistics retrieval from a single VMware service.<br>This delay should be set to the least update interval of any VMware monitoring item that uses VMware performance counters. |
| VMwareTimeoutno     | no        | 1-300    | 10      | The maximum number of seconds vmware collector will wait for a response from VMware service (vCenter or ESX hypervisor).  |

### 3 Zabbix agent (UNIX)

#### Overview

This section lists parameters supported in a Zabbix agent configuration file (zabbix\_agentd.conf).

Note that:

- The default values reflect daemon defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without BOM;
- Comments starting with "#" are only supported in the beginning of the line.

#### Parameters

| Parameter | Mandatory | Range | Default | Description   |
|-----------|-----------|-------|---------|---|
| Alias     | no        |       |         | <p>Sets an alias for an item key. It can be used to substitute long and complex item key with a smaller and simpler one. Multiple <i>Alias</i> parameters may be present. Multiple parameters with the same <i>Alias</i> key are not allowed. Different <i>Alias</i> keys may reference the same item key. Aliases can be used in <i>HostMetadataItem</i> but not in <i>HostnameItem</i> parameters.</p> <p>Examples:</p> <ol style="list-style-type: none"> <li>1. Retrieving the ID of user 'zabbix'.<br/>Alias=zabbix.userid:vfs.file.regexp[/etc/passwd,"^zabbix:..([0-9]+)"",1]<br/>Now shorthand key <b>zabbix.userid</b> may be used to retrieve data.</li> <li>2. Getting CPU utilization with default and custom parameters.<br/>Alias=cpu.util:system.cpu.util<br/>Alias=cpu.util[*]:system.cpu.util[*]<br/>This allows use <b>cpu.util</b> key to get CPU utilization percentage with default parameters as well as use <b>cpu.util[all, idle, avg15]</b> to get specific data about CPU utilization.</li> <li>3. Running multiple low-level discovery rules processing the same discovery items.<br/>Alias=vfs.fs.discovery[*]:vfs.fs.discovery<br/>Now it is possible to set up several discovery rules using <b>vfs.fs.discovery</b> with different parameters for each rule, e.g., <b>vfs.fs.discovery[foo]</b>, <b>vfs.fs.discovery[bar]</b>, etc.</li> </ol> |

| Parameter            | Mandatory | Range            | Default | Description   |
|----------------------|-----------|------------------|---------|---|
| AllowKey             | no        |                  |         | <p>Allow execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters.</p> <p>Multiple key matching rules may be defined in combination with DenyKey. The parameters are processed one by one according to their appearance order.</p> <p>This parameter is supported since Zabbix 5.0.0.</p> <p>See also: <a href="#">Restricting agent checks</a>.</p>   |
| AllowRoot            | no        |                  | 0       | <p>Allow the agent to run as 'root'. If disabled and the agent is started by 'root', the agent will try to switch to user 'zabbix' instead. Has no effect if started under a regular user.</p> <p>0 - do not allow<br/>1 - allow</p>  |
| BufferSend           | no        | 1-3600           | 5       | Do not keep data longer than N seconds in buffer.   |
| BufferSize           | no        | 2-65535          | 100     | <p>Maximum number of values in a memory buffer. The agent will send</p> <p>all collected data to Zabbix server or proxy if the buffer is full.</p>  |
| DebugLevel           | no        | 0-5              | 3       | <p>Specifies debug level:</p> <p>0 - basic information about starting and stopping of Zabbix processes<br/>1 - critical information<br/>2 - error information<br/>3 - warnings<br/>4 - for debugging (produces lots of information)<br/>5 - extended debugging (produces even more information)</p>   |
| DenyKey              | no        |                  |         | <p>Deny execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters.</p> <p>Multiple key matching rules may be defined in combination with AllowKey. The parameters are processed one by one according to their appearance order.</p> <p>This parameter is supported since Zabbix 5.0.0.</p> <p>See also: <a href="#">Restricting agent checks</a>.</p>   |
| EnableRemoteCommands |           |                  | 0       | <p>Whether remote commands from Zabbix server are allowed. This parameter is <b>deprecated</b>, use AllowKey=system.run[*] or DenyKey=system.run[*] instead</p> <p>It is internal alias for AllowKey/DenyKey parameters depending on value: 0 - DenyKey=system.run[*]<br/>1 - AllowKey=system.run[*]</p>  |
| HostInterface        | no        | 0-255 characters |         | <p>Optional parameter that defines host interface.</p> <p>Host interface is used at host <a href="#">autoregistration</a> process.</p> <p>An agent will issue an error and not start if the value is over the limit of 255 characters.</p> <p>If not defined, value will be acquired from HostInterfaceItem.</p> <p>Supported since Zabbix 4.4.0.</p>   |
| HostInterfaceItem    | no        |                  |         | <p>Optional parameter that defines an item used for getting host interface.</p> <p>Host interface is used at host <a href="#">autoregistration</a> process.</p> <p>During an autoregistration request an agent will log a warning message if the value returned by specified item is over limit of 255 characters.</p> <p>The <a href="#">system.run[]</a> item is supported regardless of AllowKey/DenyKey values.</p> <p>This option is only used when HostInterface is not defined.</p> <p>Supported since Zabbix 4.4.0.</p> |
| HostMetadata         | no        | 0-255 characters |         | <p>Optional parameter that defines host metadata. Host metadata is used only at host autoregistration process (active agent).</p> <p>If not defined, the value will be acquired from HostMetadataItem.</p> <p>An agent will issue an error and not start if the specified value is over the limit or a non-UTF-8 string.</p>  |

| Parameter        | Mandatory                                    | Range       | Default             | Description   |
|------------------|--|-------------|---------------------|---|
| HostMetadataItem | no   |             |                     | Optional parameter that defines a <i>Zabbix agent</i> item used for getting host metadata. This option is only used when HostMetadata is not defined.<br>Supports UserParameters and aliases. Supports <i>system.run[]</i> regardless of AllowKey/DenyKey values.<br>HostMetadataItem value is retrieved on each autoregistration attempt and is used only at host autoregistration process (active agent).<br>During an autoregistration request an agent will log a warning message if the value returned by the specified item is over the limit of 255 characters.<br>The value returned by the item must be a UTF-8 string otherwise it will be ignored. |
| Hostname         | no   |             | Set by HostnameItem | List of comma-delimited unique, case-sensitive hostnames. Required for active checks and must match hostnames as configured on the server. Value is acquired from HostnameItem if undefined.<br>Allowed characters: alphanumeric, '.', '_', '-' and '-'.<br>Maximum length: 128 characters per hostname, 2048 characters for the entire line.   |
| HostnameItem     | no   |             | system.hostname     | Optional parameter that defines a <i>Zabbix agent</i> item used for getting host name. This option is only used when Hostname is not defined.<br>Does not support UserParameters or aliases, but does support <i>system.run[]</i> regardless of AllowKey/DenyKey values.  |
| Include          | no   |             |                     | You may include individual files or all files in a directory in the configuration file.<br>To only include relevant files in the specified directory, the asterisk wildcard character is supported for pattern matching.<br>For example:<br>/absolute/path/to/config/files/*.conf.<br>See <b>special notes</b> about limitations.   |
| ListenBacklog    | no   | 0 - INT_MAX | SOMAXCONN           | The maximum number of pending connections in the TCP queue.<br>Default value is a hard-coded constant, which depends on the system.<br>Maximum supported value depends on the system, too high values may be silently truncated to the 'implementation-specified maximum'.  |
| ListenIP         | no   |             | 0.0.0.0             | List of comma delimited IP addresses that the agent should listen on.<br>Multiple IP addresses are supported in version 1.8.3 and higher.   |
| ListenPort       | no   | 1024-32767  | 10050               | Agent will listen on this port for connections from the server.   |
| LoadModule       | no   |             |                     | Module to load at agent startup. Modules are used to extend functionality of the agent.<br>Formats:<br>LoadModule=<module.so><br>LoadModule=<path/module.so><br>LoadModule=</abs_path/module.so><br>Either the module must be located in directory specified by LoadModulePath or the path must precede the module name.<br>If the preceding path is absolute (starts with '/') then LoadModulePath is ignored.<br>It is allowed to include multiple LoadModule parameters.   |
| LoadModulePath   | no   |             |                     | Full path to location of agent modules.<br>Default depends on compilation options.  |
| LogFile          | yes, if LogType is set to file, otherwise no |             |                     | Name of log file.   |

| Parameter           | Mandatory                                      | Range   | Default                | Description   |
|---------------------|--|---------|------------------------|---|
| LogFileSize         | no   | 0-1024  | 1                      | Maximum size of log file in MB.<br>0 - disable automatic log rotation.<br><i>Note:</i> If the log file size limit is reached and file rotation fails, for whatever reason, the existing log file is truncated and started anew.   |
| LogType             | no   |         | file                   | Log output type:<br><i>file</i> - write log to file specified by LogFile parameter,<br><i>system</i> - write log to syslog,<br><i>console</i> - write log to standard output.<br>This parameter is supported since Zabbix 3.0.0.  |
| LogRemoteCommands   |  |         | 0                      | Enable logging of executed shell commands as warnings.<br>0 - disabled<br>1 - enabled<br>Commands will be logged only if executed remotely. Log entries will not be created if system.run[] is launched locally by HostMetadataItem, HostInterfaceItem or HostnameItem parameters.  |
| MaxLinesPerSecond   |  | 1-1000  | 20                     | Maximum number of new lines the agent will send per second to Zabbix server or proxy when processing 'log', 'logrt' or 'log.count' active checks.<br><i>The provided value will be overridden by the parameter 'maxlines', provided in 'log', 'logrt' or 'log.count' item key.</i><br><i>Note:</i> Zabbix will process 10 times more new lines than set in MaxLinesPerSecond to seek the required string in log items.  |
| PidFile             | no   |         | /tmp/zabbix_agentd.pid | Path of PID file.   |
| RefreshActiveChecks | no   | 60-3600 | 120                    | How often list of active checks is refreshed, in seconds.<br><i>Note</i> that after failing to refresh active checks the next refresh will be attempted after 60 seconds.   |
| Server              | yes, if StartAgents is not explicitly set to 0 |         |                        | List of comma delimited IP addresses, optionally in CIDR notation, or DNS names of Zabbix servers and Zabbix proxies. Incoming connections will be accepted only from the hosts listed here.<br>If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address.<br>'0.0.0.0/0' can be used to allow any IPv4 address.<br><i>Note</i> that "IPv4-compatible IPv6 addresses" (0000::/96 prefix) are supported but deprecated by <a href="#">RFC4291</a> .<br>Example:<br>Server=127.0.0.1,192.168.1.0/24,::1,2001:db8::/32,zabbix.example.com<br>Spaces are allowed. |



| Parameter    | Mandatory  | Range | Default | Description  |
|--------------|--|-------|---------|--|
| ServerActive | no   |       |         | <p>Zabbix server/proxy address or cluster configuration to get active checks from.</p> <p>Server/proxy address is IP address or DNS name and optional port separated by colon.</p> <p>Cluster configuration is one or more server addresses separated by semicolon.</p> <p>Multiple Zabbix servers/clusters and Zabbix proxies can be specified, separated by comma.</p> <p>More than one Zabbix proxy should not be specified from each Zabbix server/cluster.</p> <p>If Zabbix proxy is specified then Zabbix server/cluster for that proxy should not be specified.</p> <p>Multiple comma-delimited addresses can be provided to use several independent Zabbix servers in parallel. Spaces are allowed.</p> <p>If port is not specified, default port is used.</p> <p>IPv6 addresses must be enclosed in square brackets if port for that host is specified.</p> <p>If port is not specified, square brackets for IPv6 addresses are optional.</p> <p>If this parameter is not specified, active checks are disabled.</p> <p>Example for Zabbix proxy:<br/> ServerActive=127.0.0.1:10051</p> <p>Example for multiple servers:<br/> ServerActive=127.0.0.1:20051,zabbix.domain,[::1]:30051,::1,[12fc::1]</p> <p>Example for high availability:<br/> ServerActive=zabbix.cluster.node1;zabbix.cluster.node2:20051;zabbix.clus</p> <p>Example for high availability with two clusters and one server:<br/> ServerActive=zabbix.cluster.node1;zabbix.cluster.node2:20051,zabbix.clus</p> |
| SourceIP     | no   |       |         | <p>Source IP address for:</p> <ul style="list-style-type: none"> <li>- outgoing connections to Zabbix server or Zabbix proxy;</li> <li>- making connections while executing some items (web.page.get, net.tcp.port, etc.)</li> </ul>   |
| StartAgents  | no   | 0-100 | 3       | <p>Number of pre-forked instances of zabbix_agentd that process passive checks.</p> <p>If set to 0, disables passive checks and the agent will not listen on any TCP port.</p>   |
| Timeout      | no   | 1-30  | 3       | <p>Spend no more than Timeout seconds on processing.</p>   |
| TLSAccept    | yes, if TLS certificate or PSK parameters are defined (even for <i>unencrypted</i> connection), otherwise no |       |         | <p>What incoming connections to accept. Used for a passive checks. Multiple values can be specified, separated by comma:</p> <p><i>unencrypted</i> - accept connections without encryption (default)</p> <p><i>psk</i> - accept connections with TLS and a pre-shared key (PSK)</p> <p><i>cert</i> - accept connections with TLS and a certificate</p> <p>This parameter is supported since Zabbix 3.0.0.</p>  |
| TLSCAFile    | no   |       |         | <p>Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>  |
| TLSCertFile  | no   |       |         | <p>Full pathname of a file containing the agent certificate or certificate chain, used for encrypted communications with Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>   |
| TLSCipherAll | no   |       |         | <p>GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for certificate- and PSK-based encryption.</p> <p>Example:<br/> TLS_AES_256_GCM_SHA384:TLS_CHACHA20_POLY1305_SHA256:TLS_AES_1</p> <p>This parameter is supported since Zabbix 4.4.7.</p>   |

| Parameter       | Mandatory  | Range | Default | Description   |
|-----------------|--|-------|---------|---|
| TLSCipherAll13  | no   |       |         | <p>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for certificate- and PSK-based encryption.</p> <p>Example for GnuTLS: NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL:+CTYPE-X.509</p> <p>Example for OpenSSL: ECDH+aRSA+AES128:RSA+aRSA+AES128:kECDHEPSK+AES128:kPSK+AES128</p> <p>This parameter is supported since Zabbix 4.4.7.</p> |
| TLSCipherCert   | no   |       |         | <p>GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for certificate-based encryption.</p> <p>Example for GnuTLS: NONE:+VERS-TLS1.2:+ECDHE-RSA:+RSA:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL:+CTYPE-X.509</p> <p>Example for OpenSSL: ECDH+aRSA+AES128:RSA+aRSA+AES128</p> <p>This parameter is supported since Zabbix 4.4.7.</p>   |
| TLSCipherCert13 | no   |       |         | <p>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for certificate-based encryption.</p> <p>This parameter is supported since Zabbix 4.4.7.</p>  |
| TLSCipherPSK    | no   |       |         | <p>GnuTLS priority string or OpenSSL (TLS 1.2) cipher string. Override the default ciphersuite selection criteria for PSK-based encryption.</p> <p>Example for GnuTLS: NONE:+VERS-TLS1.2:+ECDHE-PSK:+PSK:+AES-128-GCM:+AES-128-CBC:+AEAD:+SHA256:+SHA1:+CURVE-ALL:+COMP-NULL:+SIGN-ALL</p> <p>Example for OpenSSL: kECDHEPSK+AES128:kPSK+AES128</p> <p>This parameter is supported since Zabbix 4.4.7.</p>  |
| TLSCipherPSK13  | no   |       |         | <p>Cipher string for OpenSSL 1.1.1 or newer in TLS 1.3. Override the default ciphersuite selection criteria for PSK-based encryption.</p> <p>Example: TLS_CHACHA20_POLY1305_SHA256:TLS_AES_128_GCM_SHA256</p> <p>This parameter is supported since Zabbix 4.4.7.</p>  |
| TLSConnect      | yes, if TLS certificate or PSK parameters are defined (even for <i>unencrypted</i> connection), otherwise no |       |         | <p>How the agent should connect to Zabbix server or proxy. Used for active checks. Only one value can be specified:</p> <p><i>unencrypted</i> - connect without encryption (default)</p> <p><i>psk</i> - connect using TLS and a pre-shared key (PSK)</p> <p><i>cert</i> - connect using TLS and a certificate</p> <p>This parameter is supported since Zabbix 3.0.0.</p>   |
| TLSCRLFile      | no   |       |         | <p>Full pathname of a file containing revoked certificates. This parameter is used for encrypted communications with Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>  |
| TLSKeyFile      | no   |       |         | <p>Full pathname of a file containing the agent private key used for encrypted communications with Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>  |
| TLSPSKFile      | no   |       |         | <p>Full pathname of a file containing the agent pre-shared key used for encrypted communications with Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>   |
| TLSPSKIdentity  | no   |       |         | <p>Pre-shared key identity string, used for encrypted communications with Zabbix server.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>   |

| Parameter                   | Mandatory | Range | Default | Description   |
|-----------------------------|-----------|-------|---------|---|
| TLSServerCertificateIssuer  |           |       |         | Allowed server (proxy) certificate issuer.<br>This parameter is supported since Zabbix 3.0.0.   |
| TLSServerCertificateSubject |           |       |         | Allowed server (proxy) certificate subject.<br>This parameter is supported since Zabbix 3.0.0.  |
| UnsafeUserParameters        |           | 0,1   | 0       | Allow all characters to be passed in arguments to user-defined parameters.<br>0 - do not allow<br>1 - allow<br>The following characters are not allowed:<br>\ ' " * ? [ ] { } ~ \$ ! & ; ( ) >   # @<br>Additionally, newline characters are not allowed.   |
| User                        | no        |       | zabbix  | Drop privileges to a specific, existing user on the system.<br>Only has effect if run as 'root' and AllowRoot is disabled.  |
| UserParameter               | no        |       |         | User-defined parameter to monitor. There can be several user-defined parameters.<br>Format: UserParameter=<key>,<shell command><br>Note that shell command must not return empty string or EOL only.<br>Shell commands may have relative paths, if UserParameterDir parameter is specified.<br>Examples:<br>UserParameter=system.test,who wc -l<br>UserParameter=check_cpu,./custom_script.sh |
| UserParameterDir            |           |       |         | Default search path for UserParameter commands. If used, the agent will change its working directory to the one specified here before executing a command. Thereby, UserParameter commands can have a relative ./ prefix instead of a full path.<br>Only one entry is allowed.<br>Example: UserParameterDir=/opt/myscripts  |

See also

1. [Differences in the Zabbix agent configuration for active and passive checks starting from version 2.0.0](#)

## 4 Zabbix agent 2 (UNIX)

### Overview

Zabbix agent 2 is a new generation of Zabbix agent and may be used in place of Zabbix agent.

This section lists parameters supported in a Zabbix agent 2 configuration file (zabbix\_agent2.conf).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without BOM;
- Comments starting with "#" are only supported in the beginning of the line.

### Parameters

| Parameter     | Mandatory | Range   | Default         | Description  |
|---------------|-----------|---------|-----------------|--|
| Alias         | no        |         |                 | <p>Sets an alias for an item key. It can be used to substitute long and complex item key with a smaller and simpler one. Multiple <i>Alias</i> parameters may be present. Multiple parameters with the same <i>Alias</i> key are not allowed. Different <i>Alias</i> keys may reference the same item key. Aliases can be used in <i>HostMetadataItem</i> but not in <i>HostnameItem</i> parameters.</p> <p>Examples:</p> <ol style="list-style-type: none"> <li>Retrieving the ID of user 'zabbix'.<br/>Alias=zabbix.userid:vfs.file.regexp[/etc/passwd,"^zabbix::([0-9]+)"",\1]<br/>Now shorthand key <b>zabbix.userid</b> may be used to retrieve data.</li> <li>Getting CPU utilization with default and custom parameters.<br/>Alias=cpu.util:system.cpu.util<br/>Alias=cpu.util[*]:system.cpu.util[*]<br/>This allows use <b>cpu.util</b> key to get CPU utilization percentage with default parameters as well as use <b>cpu.util[all, idle, avg15]</b> to get specific data about CPU utilization.</li> <li>Running multiple <b>low-level discovery</b> rules processing the same discovery items.<br/>Alias=vfs.fs.discovery[*]:vfs.fs.discovery<br/>Now it is possible to set up several discovery rules using <b>vfs.fs.discovery</b> with different parameters for each rule, e.g., <b>vfs.fs.discovery[foo]</b>, <b>vfs.fs.discovery[bar]</b>, etc. Allow execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters. Multiple key matching rules may be defined in combination with DenyKey. The parameters are processed one by one according to their appearance order.<br/>This parameter is supported since Zabbix 5.0.0.<br/>See also: <b>Restricting agent checks</b>.</li> </ol> |
| AllowKey      | no        |         |                 | <p>Allow execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters. Multiple key matching rules may be defined in combination with DenyKey. The parameters are processed one by one according to their appearance order.<br/>This parameter is supported since Zabbix 5.0.0.<br/>See also: <b>Restricting agent checks</b>.</p>  |
| BufferSend    | no        | 1-3600  | 5               | <p>The time interval in seconds which determines how often values are sent from the buffer to Zabbix server.<br/>Note that if the buffer is full, the data will be sent sooner.</p>  |
| BufferSize    | no        | 2-65535 | 100             | <p>Maximum number of values in a memory buffer. The agent will send all collected data to Zabbix server or proxy if the buffer is full.<br/>This parameter should only be used if persistent buffer is disabled (<i>EnablePersistentBuffer=0</i>).</p>   |
| ControlSocket | no        |         | /tmp/agent.sock | <p>The control socket, used to send runtime commands with '-R' option.</p>   |
| DebugLevel    | no        | 0-5     | 3               | <p>Specifies debug level:</p> <ul style="list-style-type: none"> <li>0 - basic information about starting and stopping of Zabbix processes</li> <li>1 - critical information</li> <li>2 - error information</li> <li>3 - warnings</li> <li>4 - for debugging (produces lots of information)</li> <li>5 - extended debugging (produces even more information)</li> </ul>  |

| Parameter                | Mandatory | Range            | Default | Description  |
|--------------------------|-----------|------------------|---------|--|
| DenyKey                  | no        |                  |         | Deny execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters. Multiple key matching rules may be defined in combination with AllowKey. The parameters are processed one by one according to their appearance order. This parameter is supported since Zabbix 5.0.0. See also: <a href="#">Restricting agent checks</a> .   |
| EnablePersistentBuffer   |           | 0-1              | 0       | Enable usage of local persistent storage for active items.<br>0 - disabled<br>1 - enabled<br>If persistent storage is disabled, the memory buffer will be used.  |
| ForceActiveChecksOnStart |           | 0-1              | 0       | Perform active checks immediately after restart for the first received configuration.<br>0 - disabled<br>1 - enabled<br>Also available as per plugin configuration parameter, for example:<br><code>Plugins.Uptime.System.ForceActiveChecksOnStart=1</code><br>Supported since Zabbix 6.0.2.   |
| HostInterface            | no        | 0-255 characters |         | Optional parameter that defines host interface. Host interface is used at host autoregistration process. An agent will issue an error and not start if the value is over the limit of 255 characters. If not defined, value will be acquired from HostInterfaceItem.   |
| HostInterfaceItem        | no        |                  |         | Supported since Zabbix 4.4.0. Optional parameter that defines an item used for getting host interface. Host interface is used at host autoregistration process. During an autoregistration request an agent will log a warning message if the value returned by specified item is over limit of 255 characters. The <a href="#">system.run[]</a> item is supported regardless of AllowKey/DenyKey values. This option is only used when HostInterface is not defined. Supported since Zabbix 4.4.0.  |
| HostMetadata             | no        | 0-255 characters |         | Optional parameter that defines host metadata. Host metadata is used at host autoregistration process. An agent will issue an error and not start if the specified value is over the limit or a non-UTF-8 string. If not defined, the value will be acquired from HostMetadataItem.  |
| HostMetadataItem         | no        |                  |         | Optional parameter that defines an item used for getting host metadata. Host metadata item value is retrieved on each autoregistration attempt for host autoregistration process. During an autoregistration request an agent will log a warning message if the value returned by the specified item is over the limit of 255 characters. This option is only used when HostMetadata is not defined. Supports UserParameters and aliases. Supports <a href="#">system.run[]</a> regardless of AllowKey/DenyKey values. The value returned by the item must be a UTF-8 string otherwise it will be ignored. |

| Parameter              | Mandatory  | Range      | Default                | Description   |
|------------------------|--|------------|------------------------|---|
| Hostname               | no   |            | Set by Host-nameltem   | List of comma-delimited unique, case-sensitive hostnames. Required for active checks and must match hostnames as configured on the server. Value is acquired from Hostnameltem if undefined.<br>Allowed characters: alphanumeric, '.', '/', '_' and '-'.<br>Maximum length: 128 characters per hostname, 2048 characters for the entire line.   |
| Hostnameltem           | no   |            | system.hostname        | Item used for generating Hostname if it is not defined. Ignored if Hostname is defined.<br>Does not support UserParameters or aliases, but does support <i>system.run[]</i> regardless of AllowKey/DenyKey values.  |
| Include                | no   |            |                        | You may include individual files or all files in a directory in the configuration file.<br>During the installation Zabbix will create the include directory in /usr/local/etc, unless modified during the compile time.<br>To only include relevant files in the specified directory, the asterisk wildcard character is supported for pattern matching. For example:<br>/absolute/path/to/config/files/*.conf.<br>Since Zabbix 6.0.0 a path can be relative to <i>zabbix_agent2.conf</i> file location.<br>See <i>special notes</i> about limitations. |
| ListenIP               | no   |            | 0.0.0.0                | List of comma-delimited IP addresses that the agent should listen on.<br>The first IP address is sent to Zabbix server, if connecting to it, to retrieve the list of active checks.   |
| ListenPort             | no   | 1024-32767 | 10050                  | Agent will listen on this port for connections from the server.   |
| LogFile                | yes, if LogType is set to <i>file</i> , otherwise no |            | /tmp/zabbix_agent2.log | Log file name if LogType is 'file'.   |
| LogFileSize            | no   | 0-1024     | 1                      | Maximum size of log file in MB.<br>0 - disable automatic log rotation.<br><i>Note:</i> If the log file size limit is reached and file rotation fails, for whatever reason, the existing log file is truncated and started anew.   |
| LogType                | no   |            | file                   | Specifies where log messages are written to:<br><i>system</i> - syslog,<br><i>file</i> - file specified by LogFile parameter,<br><i>console</i> - standard output.  |
| PersistentBufferFileno |  |            |                        | The file, where Zabbix Agent2 should keep SQLite database.<br>Must be a full filename.<br>This parameter is only used if persistent buffer is enabled ( <i>EnablePersistentBuffer=1</i> ).  |
| PersistentBufferPeriod | no   | 1m-365d    | 1h                     | The time period for which data should be stored, when there is no connection to the server or proxy. Older data will be lost. Log data will be preserved.<br>This parameter is only used if persistent buffer is enabled ( <i>EnablePersistentBuffer=1</i> ).   |
| PidFile                | no   |            | /tmp/zabbix_agent2.pid | Zabbix Agent2 PID file.   |
| Plugin                 | no   |            |                        | Since Zabbix 6.0.0 most of the plugins have their own <i>configuration files</i> . The agent configuration file contains plugin parameters listed below.  |

| Parameter                           | Mandatory | Range   | Default                 | Description   |
|-------------------------------------|-----------|---------|-------------------------|---|
| Plugins.Log.MaxLinesPerSecond       | no        | 1-1000  | 20                      | Maximum number of new lines the agent will send per second to Zabbix server or proxy when processing 'log' and 'logrt' or 'log.count' active checks. <i>The provided value will be overridden by the parameter 'maxlines', provided in 'log', 'logrt' or 'log.count' item key.</i><br><i>Note: Zabbix will process 10 times more new lines than set in MaxLinesPerSecond to seek the required string in log items.</i><br>This parameter is supported since 4.4.2 and replaces MaxLinesPerSecond.       |
| Plugins.SystemRun.LogRemoteCommands | no        |         | 0                       | Enable logging of executed shell commands as warnings.<br>0 - disabled<br>1 - enabled<br>Commands will be logged only if executed remotely. Log entries will not be created if system.run[] is launched locally by HostMetadataItem, HostInterfaceItem or HostnameItem parameters.<br>This parameter is supported since 4.4.2 and replaces LogRemoteCommands.   |
| PluginSocket                        | no        |         | /tmp/agent.plugins.sock | Path to Unix socket for loadable plugin communications.   |
| PluginTimeout                       | no        | 1-30    | Global timeout          | Timeout for connections with loadable plugins.  |
| RefreshActiveChecks                 | no        | 60-3600 | 120                     | How often the list of active checks is refreshed, in seconds. Note that after failing to refresh active checks the next refresh will be attempted after 60 seconds.   |
| Server                              | yes       |         |                         | List of comma-delimited IP addresses, optionally in CIDR notation, or DNS names of Zabbix servers and Zabbix proxies.<br>Incoming connections will be accepted only from the hosts listed here.<br>If IPv6 support is enabled then '127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address.<br>'0.0.0.0/0' can be used to allow any IPv4 address.<br>Example:<br>Server=127.0.0.1,192.168.1.0/24,::1,2001:db8::/32,zabbix.example.com<br>Spaces are allowed. |

| Parameter    | Mandatory  | Range      | Default | Description  |
|--------------|--|------------|---------|--|
| ServerActive | no   |            |         | <p>Zabbix server/proxy address or cluster configuration to get active checks from.</p> <p>Server/proxy address is IP address or DNS name and optional port separated by colon.</p> <p>Cluster configuration is one or more server addresses separated by semicolon.</p> <p>Multiple Zabbix servers/clusters and Zabbix proxies can be specified, separated by comma.</p> <p>More than one Zabbix proxy should not be specified from each Zabbix server/cluster.</p> <p>If Zabbix proxy is specified then Zabbix server/cluster for that proxy should not be specified.</p> <p>Multiple comma-delimited addresses can be provided to use several independent Zabbix servers in parallel. Spaces are allowed.</p> <p>If port is not specified, default port is used.</p> <p>IPv6 addresses must be enclosed in square brackets if port for that host is specified.</p> <p>If port is not specified, square brackets for IPv6 addresses are optional.</p> <p>If this parameter is not specified, active checks are disabled.</p> <p>Example for Zabbix proxy:<br/> ServerActive=127.0.0.1:10051</p> <p>Example for multiple servers:<br/> ServerActive=127.0.0.1:20051,zabbix.domain,[::1]:30051,::1,[12fc::1]</p> <p>Example for high availability:<br/> ServerActive=zabbix.cluster.node1;zabbix.cluster.node2:20051;zabbix.clu</p> <p>Example for high availability with two clusters and one server:<br/> ServerActive=zabbix.cluster.node1;zabbix.cluster.node2:20051,zabbix.clu</p> |
| SourceIP     | no   |            |         | <p>Source IP address for:</p> <ul style="list-style-type: none"> <li>- outgoing connections to Zabbix server or Zabbix proxy;</li> <li>- making connections while executing some items (web.page.get, net.tcp.port, etc.)</li> </ul>   |
| StatusPort   | no   | 1024-32767 |         | <p>If set, agent will listen on this port for HTTP status requests (http://localhost:&lt;port&gt;/status).</p>   |
| Timeout      | no   | 1-30       | 3       | <p>Spend no more than Timeout seconds on processing.</p>   |
| TLSAccept    | yes, if TLS certificate or PSK parameters are defined (even for <i>unencrypted</i> connection), otherwise no |            |         | <p>What incoming connections to accept. Used for a passive checks. Multiple values can be specified, separated by comma:</p> <ul style="list-style-type: none"> <li><i>unencrypted</i> - accept connections without encryption (default)</li> <li><i>psk</i> - accept connections with TLS and a pre-shared key (PSK)</li> <li><i>cert</i> - accept connections with TLS and a certificate</li> </ul>  |
| TLSCAFile    | no   |            |         | <p>Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components.</p>   |
| TLSCertFile  | no   |            |         | <p>Full pathname of a file containing the agent certificate or certificate chain, used for encrypted communications with Zabbix components.</p>  |



| Parameter            | Mandatory  | Range | Default | Description   |
|----------------------|--|-------|---------|---|
| TLSCConnect          | yes, if TLS certificate or PSK parameters are defined (even for <i>unencrypted</i> connection), otherwise no |       |         | How the agent should connect to Zabbix server or proxy. Used for active checks. Only one value can be specified:<br><i>unencrypted</i> - connect without encryption (default)<br><i>psk</i> - connect using TLS and a pre-shared key (PSK)<br><i>cert</i> - connect using TLS and a certificate   |
| TLSCRLFile           | no   |       |         | Full pathname of a file containing revoked certificates. This parameter is used for encrypted communications with Zabbix components.  |
| TLSKeyFile           | no   |       |         | Full pathname of a file containing the agent private key used for encrypted communications with Zabbix components.  |
| TLSPSKFile           | no   |       |         | Full pathname of a file containing the agent pre-shared key used for encrypted communications with Zabbix components.   |
| TLSPSKIdentity       | no   |       |         | Pre-shared key identity string, used for encrypted communications with Zabbix server.   |
| TLSServerCertIssuer  | no   |       |         | Allowed server (proxy) certificate issuer.  |
| TLSServerCertSubject | no   |       |         | Allowed server (proxy) certificate subject.   |
| UnsafeUserParameters | no   | 0,1   | 0       | Allow all characters to be passed in arguments to user-defined parameters.<br>The following characters are not allowed:<br>\\ ' " * ? [ ] { } ~ \$ ! & ; ( ) >   # @<br>Additionally, newline characters are not allowed.   |
| UserParameter        | no   |       |         | User-defined parameter to monitor. There can be several user-defined parameters.<br>Format: UserParameter=<key>,<shell command><br>Note that shell command must not return empty string or EOL only.<br>Shell commands may have relative paths, if UserParameterDir parameter is specified.<br>Examples:<br>UserParameter=system.test,who wc -l<br>UserParameter=check_cpu,./custom_script.sh |
| UserParameterDir     | no   |       |         | Default search path for UserParameter commands. If used, the agent will change its working directory to the one specified here before executing a command. Thereby, UserParameter commands can have a relative ./ prefix instead of a full path.<br>Only one entry is allowed.<br>Example: UserParameterDir=/opt/myscripts  |

## 5 Zabbix agent (Windows)

### Overview

This section lists parameters supported in a Zabbix agent (Windows) configuration file (zabbix\_agentd.conf).

Note that:

- The default values reflect daemon defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without BOM;
- Comments starting with "#" are only supported in the beginning of the line.

### Parameters

| Parameter  | Mandatory | Range   | Default | Description   |
|------------|-----------|---------|---------|---|
| Alias      | no        |         |         | <p>Sets an alias for an item key. It can be used to substitute long and complex item key with a smaller and simpler one. Multiple <i>Alias</i> parameters may be present. Multiple parameters with the same <i>Alias</i> key are not allowed. Different <i>Alias</i> keys may reference the same item key. Aliases can be used in <i>HostMetadataItem</i> but not in <i>HostnameItem</i> parameters.</p> <p>Examples:</p> <ol style="list-style-type: none"> <li>Retrieving the paging file usage in percentage from the server.<br/>Alias=pg_usage:perf_counter[\Paging File(_Total)% Usage]<br/>Now the shorthand key <b>pg_usage</b> may be used to retrieve data.</li> <li>Getting CPU load with default and custom parameters.<br/>Alias=cpu.load:system.cpu.load<br/>Alias=cpu.load[*]:system.cpu.load[*]<br/>This allows use <b>cpu.load</b> key to get the CPU load with default parameters as well as use <b>cpu.load[percpu,avg15]</b> to get specific data about the CPU load.</li> <li>Running multiple <b>low-level discovery</b> rules processing the same discovery items.<br/>Alias=vfs.fs.discovery[*]:vfs.fs.discovery<br/>Now it is possible to set up several discovery rules using <b>vfs.fs.discovery</b> with different parameters for each rule, e.g., <b>vfs.fs.discovery[foo]</b>, <b>vfs.fs.discovery[bar]</b>, etc.<br/>Allow execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters.<br/>Multiple key matching rules may be defined in combination with DenyKey. The parameters are processed one by one according to their appearance order.<br/>This parameter is supported since Zabbix 5.0.0.<br/>See also: <b>Restricting agent checks</b>.</li> </ol> |
| AllowKey   | no        |         |         | <p>Do not keep data longer than N seconds in buffer.</p>  |
| BufferSend | no        | 1-3600  | 5       | Maximum number of values in a memory buffer. The agent will send  |
| BufferSize | no        | 2-65535 | 100     | all collected data to Zabbix server or proxy if the buffer is full.   |
| DebugLevel | no        | 0-5     | 3       | <p>Specifies debug level:</p> <p>0 - basic information about starting and stopping of Zabbix processes</p> <p>1 - critical information</p> <p>2 - error information</p> <p>3 - warnings</p> <p>4 - for debugging (produces lots of information)</p> <p>5 - extended debugging (produces even more information)</p>  |
| DenyKey    | no        |         |         | <p>Deny execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters.</p> <p>Multiple key matching rules may be defined in combination with AllowKey. The parameters are processed one by one according to their appearance order.</p> <p>This parameter is supported since Zabbix 5.0.0.</p> <p>See also: <b>Restricting agent checks</b>.</p>  |

| Parameter            | Mandatory | Range            | Default             | Description   |
|----------------------|-----------|------------------|---------------------|---|
| EnableRemoteCommands |           |                  | 0                   | Whether remote commands from Zabbix server are allowed.<br>This parameter is <b>deprecated</b> , use AllowKey=system.run[*] or DenyKey=system.run[*] instead<br>It is internal alias for AllowKey/DenyKey parameters depending on value: 0 - DenyKey=system.run[*]<br>1 - AllowKey=system.run[*].   |
| HostInterface        | no        | 0-255 characters |                     | Optional parameter that defines host interface.<br>Host interface is used at host autoregistration process.<br>An agent will issue an error and not start if the value is over the limit of 255 characters.<br>If not defined, value will be acquired from HostInterfaceItem.   |
| HostInterfaceItem    | no        |                  |                     | Supported since Zabbix 4.4.0.<br>Optional parameter that defines an item used for getting host interface.<br>Host interface is used at host autoregistration process.<br>During an autoregistration request an agent will log a warning message if the value returned by specified item is over limit of 255 characters.<br>The <i>system.run[]</i> item is supported regardless of AllowKey/DenyKey values.<br>This option is only used when HostInterface is not defined.<br>Supported since Zabbix 4.4.0.  |
| HostMetadata         | no        | 0-255 characters |                     | Optional parameter that defines host metadata. Host metadata is used only at host autoregistration process (active agent).<br>If not defined, the value will be acquired from HostMetadataItem.   |
| HostMetadataItem     | no        |                  |                     | An agent will issue an error and not start if the specified value is over the limit or a non-UTF-8 string.<br>Optional parameter that defines a <i>Zabbix agent</i> item used for getting host metadata. This option is only used when HostMetadata is not defined.<br>Supports UserParameters, performance counters and aliases.<br>Supports <i>system.run[]</i> regardless of AllowKey/DenyKey value.<br>HostMetadataItem value is retrieved on each autoregistration attempt and is used only at host autoregistration process (active agent).<br>During an autoregistration request an agent will log a warning message if the value returned by the specified item is over the limit of 255 characters.<br>The value returned by the item must be a UTF-8 string otherwise it will be ignored. |
| Hostname             | no        |                  | Set by HostnameItem | List of comma-delimited unique, case-sensitive hostnames.<br>Required for active checks and must match hostnames as configured on the server. Value is acquired from HostnameItem if undefined.<br>Allowed characters: alphanumeric, '.', '_', '-' and '-'.<br>Maximum length: 128 characters per hostname, 2048 characters for the entire line.  |
| HostnameItem         | no        |                  | system.hostname     | Optional parameter that defines a <i>Zabbix agent</i> item used for getting host name. This option is only used when Hostname is not defined.<br>Does not support UserParameters, performance counters or aliases, but does support <i>system.run[]</i> regardless of AllowKey/DenyKey value.<br>See also a <a href="#">more detailed description</a> .   |

| Parameter         | Mandatory  | Range       | Default              | Description   |
|-------------------|--|-------------|----------------------|---|
| Include           | no   |             |                      | <p>You may include individual files or all files in a directory in the configuration file (located in C:\Program Files\Zabbix Agent by default if Zabbix agent is installed using Windows MSI installer packages; located in the folder specified during installation if Zabbix agent is installed as a zip archive). All included files must have correct syntax, otherwise agent will not start.</p> <p>To only include relevant files in the specified directory, the asterisk wildcard character is supported for pattern matching. For example: C:\Program Files\Zabbix Agent\zabbix_agentd.d\*.conf.</p> <p>See <b>special notes</b> about limitations.</p> |
| ListenBacklog     | no   | 0 - INT_MAX | SOMAXCONN            | <p>The maximum number of pending connections in the TCP queue.</p> <p>Default value is a hard-coded constant, which depends on the system.</p> <p>Maximum supported value depends on the system, too high values may be silently truncated to the 'implementation-specified maximum'.</p>   |
| ListenIP          | no   |             | 0.0.0.0              | List of comma-delimited IP addresses that the agent should listen on.   |
| ListenPort        | no   | 1024-32767  | 10050                | Agent will listen on this port for connections from the server.   |
| LogFile           | yes, if LogType is set to <i>file</i> , otherwise no |             | C:\zabbix_agentd\log | Name of the agent log file.   |
| LogFileSize       | no   | 0-1024      | 1                    | <p>Maximum size of log file in MB.</p> <p>0 - disable automatic log rotation.</p> <p><i>Note:</i> If the log file size limit is reached and file rotation fails, for whatever reason, the existing log file is truncated and started anew.</p>  |
| LogType           | no   |             | file                 | <p>Log output type:</p> <p><i>file</i> - write log to file specified by LogFile parameter,</p> <p><i>system</i> - write log Windows Event Log,</p> <p><i>console</i> - write log to standard output.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>   |
| LogRemoteCommands | no   |             | 0                    | <p>Enable logging of executed shell commands as warnings.</p> <p>0 - disabled</p> <p>1 - enabled</p>  |
| MaxLinesPerSecond | no   | 1-1000      | 20                   | <p>Maximum number of new lines the agent will send per second to Zabbix server</p> <p>or proxy processing 'log', 'logrt' and 'eventlog' active checks.</p> <p>The provided value will be overridden by the parameter 'maxlines',</p> <p>provided in 'log', 'logrt' or 'eventlog' item keys.</p> <p><i>Note:</i> Zabbix will process 10 times more new lines than set in <i>MaxLinesPerSecond</i> to seek the required string in log items.</p>  |

| Parameter           | Mandatory                                      | Range   | Default | Description  |
|---------------------|--|---------|---------|--|
| PerfCounter         | no   |         |         | <p>Defines a new parameter &lt;parameter_name&gt; which is an average value for system performance counter &lt;perf_counter_path&gt; for the specified time period &lt;period&gt; (in seconds).</p> <p>Syntax:<br/>           &lt;parameter_name&gt;,"&lt;perf_counter_path&gt;",&lt;period&gt;<br/>           For example, if you wish to receive average number of processor interrupts per second for last minute, you can define a new parameter "interrupts" as the following:<br/>           PerfCounter = interrupts,"\\Processor(0)\\Interrupts/sec",60<br/>           Please note double quotes around performance counter path. The parameter name (interrupts) is to be used as the item key when creating an item.<br/>           Samples for calculating average value will be taken every second.<br/>           You may run "typeperf -qx" to get list of all performance counters available in Windows.</p>  |
| PerfCounterEn       | no   |         |         | <p>Defines a new parameter &lt;parameter_name&gt; which is an average value for system performance counter &lt;perf_counter_path&gt; for the specified time period &lt;period&gt; (in seconds).</p> <p>Syntax:<br/>           &lt;parameter_name&gt;,"&lt;perf_counter_path&gt;",&lt;period&gt;<br/>           Compared to PerfCounter, perfcouter paths must be in English.</p> <p>Supported only on <b>Windows Server 2008/Vista</b> and above.<br/>           For example, if you wish to receive average number of processor interrupts per second for last minute, you can define a new parameter "interrupts" as the following:<br/>           PerfCounterEn = interrupts,"\\Processor(0)\\Interrupts/sec",60<br/>           Please note double quotes around performance counter path. The parameter name (interrupts) is to be used as the item key when creating an item.<br/>           Samples for calculating average value will be taken every second.<br/>           You can find the list of English strings by viewing the following registry key:<br/>           HKEY_LOCAL_MACHINE\\SOFTWARE\\Microsoft\\Windows NT\\CurrentVersion\\Perflib\\009.</p> |
| RefreshActiveChecks | yes  | 60-3600 | 120     | <p>This parameter is supported since Zabbix 4.0.13 and 4.2.7.<br/>           How often list of active checks is refreshed, in seconds.<br/>           Note that after failing to refresh active checks the next refresh will be attempted after 60 seconds.</p>  |
| Server              | yes, if StartAgents is not explicitly set to 0 |         |         | <p>List of comma delimited IP addresses, optionally in CIDR notation, or DNS names of Zabbix servers.<br/>           Incoming connections will be accepted only from the hosts listed here.<br/>           If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated equally and '::/0' will allow any IPv4 or IPv6 address.<br/>           '0.0.0.0/0' can be used to allow any IPv4 address.<br/>           Note that "IPv4-compatible IPv6 addresses" (0000::/96 prefix) are supported but deprecated by <a href="#">RFC4291</a>.<br/>           Example:<br/>           Server=127.0.0.1,192.168.1.0/24,::1,2001:db8::/32,zabbix.example.com<br/>           Spaces are allowed.</p>   |

| Parameter    | Mandatory  | Range     | Default | Description  |
|--------------|--|-----------|---------|--|
| ServerActive | no   | (*)       |         | <p>Zabbix server/proxy address or cluster configuration to get active checks from.</p> <p>Server/proxy address is IP address or DNS name and optional port separated by colon.</p> <p>Cluster configuration is one or more server addresses separated by semicolon.</p> <p>Multiple Zabbix servers/clusters and Zabbix proxies can be specified, separated by comma.</p> <p>More than one Zabbix proxy should not be specified from each Zabbix server/cluster.</p> <p>If Zabbix proxy is specified then Zabbix server/cluster for that proxy should not be specified.</p> <p>Multiple comma-delimited addresses can be provided to use several independent Zabbix servers in parallel. Spaces are allowed.</p> <p>If port is not specified, default port is used.</p> <p>IPv6 addresses must be enclosed in square brackets if port for that host is specified.</p> <p>If port is not specified, square brackets for IPv6 addresses are optional.</p> <p>If this parameter is not specified, active checks are disabled.</p> <p>Example for Zabbix proxy:<br/> ServerActive=127.0.0.1:10051</p> <p>Example for multiple servers:<br/> ServerActive=127.0.0.1:20051,zabbix.domain,[::1]:30051,::1,[12fc::1]</p> <p>Example for high availability:<br/> ServerActive=zabbix.cluster.node1;zabbix.cluster.node2:20051;zabbix.clus</p> <p>Example for high availability with two clusters and one server:<br/> ServerActive=zabbix.cluster.node1;zabbix.cluster.node2:20051,zabbix.clus</p> |
| SourceIP     | no   |           |         | <p>Source IP address for:</p> <ul style="list-style-type: none"> <li>- outgoing connections to Zabbix server or Zabbix proxy;</li> <li>- making connections while executing some items (web.page.get, net.tcp.port, etc.)</li> </ul>   |
| StartAgents  | no   | 0-100 (*) | 3       | <p>Number of pre-forked instances of zabbix_agentd that process passive checks.</p> <p>If set to 0, disables passive checks and the agent will not listen on any TCP port.</p>   |
| Timeout      | no   | 1-30      | 3       | <p>Spend no more than Timeout seconds on processing</p>  |
| TLSAccept    | yes, if TLS certificate or PSK parameters are defined (even for <i>unencrypted</i> connection), otherwise no |           |         | <p>What incoming connections to accept. Used for a passive checks. Multiple values can be specified, separated by comma:</p> <p><i>unencrypted</i> - accept connections without encryption (default)</p> <p><i>psk</i> - accept connections with TLS and a pre-shared key (PSK)</p> <p><i>cert</i> - accept connections with TLS and a certificate</p> <p>This parameter is supported since Zabbix 3.0.0.</p>  |
| TLSCAFile    | no   |           |         | <p>Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>  |
| TLSCertFile  | no   |           |         | <p>Full pathname of a file containing the agent certificate or certificate chain, used for encrypted communications with Zabbix components.</p> <p>This parameter is supported since Zabbix 3.0.0.</p>   |

| Parameter                   | Mandatory  | Range | Default | Description  |
|-----------------------------|--|-------|---------|--|
| TLSCConnect                 | yes, if TLS certificate or PSK parameters are defined (even for <i>unencrypted</i> connection), otherwise no |       |         | How the agent should connect to Zabbix server or proxy. Used for active checks. Only one value can be specified:<br><i>unencrypted</i> - connect without encryption (default)<br><i>psk</i> - connect using TLS and a pre-shared key (PSK)<br><i>cert</i> - connect using TLS and a certificate<br>This parameter is supported since Zabbix 3.0.0. |
| TLSCRLFile                  | no   |       |         | Full pathname of a file containing revoked certificates. This parameter is used for encrypted communications with Zabbix components.<br>This parameter is supported since Zabbix 3.0.0.  |
| TLSKeyFile                  | no   |       |         | Full pathname of a file containing the agent private key used for encrypted communications with Zabbix components.<br>This parameter is supported since Zabbix 3.0.0.  |
| TLSPSKFile                  | no   |       |         | Full pathname of a file containing the agent pre-shared key used for encrypted communications with Zabbix components.<br>This parameter is supported since Zabbix 3.0.0.   |
| TLSPSKIdentity              | no   |       |         | Pre-shared key identity string, used for encrypted communications with Zabbix server.<br>This parameter is supported since Zabbix 3.0.0.   |
| TLSServerCertificateIssuer  | no   |       |         | Allowed server (proxy) certificate issuer.<br>This parameter is supported since Zabbix 3.0.0.  |
| TLSServerCertificateSubject | no   |       |         | Allowed server (proxy) certificate subject.<br>This parameter is supported since Zabbix 3.0.0.   |
| UnsafeUserParameters        | no   | 0-1   | 0       | Allow all characters to be passed in arguments to user-defined parameters.<br>0 - do not allow<br>1 - allow<br>The following characters are not allowed:<br>\\ ' " * ? [ ] { } ~ \$ ! & ; ( ) >   # @<br>Additionally, newline characters are not allowed.   |
| UserParameter               | no   |       |         |  |
| UserParameterDir            | no   |       |         | Default search path for UserParameter commands. If used, the agent will change its working directory to the one specified here before executing a command. Thereby, UserParameter commands can have a relative ./ prefix instead of a full path.<br>Only one entry is allowed.<br>Example: UserParameterDir=C:\opt\myscripts                       |

#### Note:

(\*) The number of active servers listed in ServerActive plus the number of pre-forked instances for passive checks specified in StartAgents must be less than 64.

## 6 Zabbix agent 2 (Windows)

### Overview

Zabbix agent 2 is a new generation of Zabbix agent and may be used in place of Zabbix agent.

This section lists parameters supported in a Zabbix agent 2 configuration file (zabbix\_agent2.conf).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without BOM;
- Comments starting with "#" are only supported in the beginning of the line.

### Parameters

| Parameter     | Mandatory | Range   | Default             | Description  |
|---------------|-----------|---------|---------------------|--|
| Alias         | no        |         |                     | <p>Sets an alias for an item key. It can be used to substitute long and complex item key with a smaller and simpler one. Multiple <i>Alias</i> parameters may be present. Multiple parameters with the same <i>Alias</i> key are not allowed. Different <i>Alias</i> keys may reference the same item key. Aliases can be used in <i>HostMetadataItem</i> but not in <i>HostnameItem</i> parameters.</p> <p>Examples:</p> <ol style="list-style-type: none"> <li>Retrieving the paging file usage in percentage from the server.<br/>Alias=pg_usage:perf_counter[\\Paging File(_Total)% Usage]<br/>Now the shorthand key <b>pg_usage</b> may be used to retrieve data.</li> <li>Getting CPU load with default and custom parameters.<br/>Alias=cpu.load:system.cpu.load<br/>Alias=cpu.load[*]:system.cpu.load[*]<br/>This allows use <b>cpu.load</b> key to get the CPU load with default parameters as well as use <b>cpu.load[percpu,avg15]</b> to get specific data about the CPU load.</li> <li>Running multiple <b>low-level discovery</b> rules processing the same discovery items.<br/>Alias=vfs.fs.discovery[*]:vfs.fs.discovery<br/>Now it is possible to set up several discovery rules using <b>vfs.fs.discovery</b> with different parameters for each rule, e.g., <b>vfs.fs.discovery[foo]</b>, <b>vfs.fs.discovery[bar]</b>, etc. Allow execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters. Multiple key matching rules may be defined in combination with DenyKey. The parameters are processed one by one according to their appearance order.<br/>This parameter is supported since Zabbix 5.0.0.<br/>See also: <b>Restricting agent checks</b>.</li> </ol> |
| AllowKey      | no        |         |                     | <p>Allow execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters. Multiple key matching rules may be defined in combination with DenyKey. The parameters are processed one by one according to their appearance order.<br/>This parameter is supported since Zabbix 5.0.0.<br/>See also: <b>Restricting agent checks</b>.</p>  |
| BufferSend    | no        | 1-3600  | 5                   | <p>The time interval in seconds which determines how often values are sent from the buffer to Zabbix server.<br/>Note that if the buffer is full, the data will be sent sooner.</p>  |
| BufferSize    | no        | 2-65535 | 100                 | <p>Maximum number of values in a memory buffer. The agent will send all collected data to Zabbix server or proxy if the buffer is full.<br/>This parameter should only be used if persistent buffer is disabled (<i>EnablePersistentBuffer=0</i>).</p>   |
| ControlSocket | no        |         | \\.\pipe\agent.sock | <p>File control socket, used to send runtime commands with '-R' option.</p>  |
| DebugLevel    | no        | 0-5     | 3                   | <p>Specifies debug level:</p> <ul style="list-style-type: none"> <li>0 - basic information about starting and stopping of Zabbix processes</li> <li>1 - critical information</li> <li>2 - error information</li> <li>3 - warnings</li> <li>4 - for debugging (produces lots of information)</li> <li>5 - extended debugging (produces even more information)</li> </ul>  |



| Parameter                | Mandatory | Range            | Default | Description   |
|--------------------------|-----------|------------------|---------|---|
| DenyKey                  | no        |                  |         | Deny execution of those item keys that match a pattern. Key pattern is a wildcard expression that supports "*" character to match any number of any characters. Multiple key matching rules may be defined in combination with AllowKey. The parameters are processed one by one according to their appearance order. This parameter is supported since Zabbix 5.0.0. See also: <a href="#">Restricting agent checks</a> .  |
| EnablePersistentBuffer   |           | 0-1              | 0       | Enable usage of local persistent storage for active items. 0 - disabled 1 - enabled If persistent storage is disabled, the memory buffer will be used.  |
| ForceActiveChecksOnStart |           | 0-1              | 0       | Perform active checks immediately after restart for the first received configuration. 0 - disabled 1 - enabled Also available as per plugin configuration parameter, for example: <code>Plugins.Uptime.System.ForceActiveChecksOnStart=1</code> Supported since Zabbix 6.0.2.   |
| HostInterface            | no        | 0-255 characters |         | Optional parameter that defines host interface. Host interface is used at host autoregistration process. An agent will issue an error and not start if the value is over the limit of 255 characters. If not defined, value will be acquired from HostInterfaceItem. Supported since Zabbix 4.4.0.  |
| HostInterfaceItem        | no        |                  |         | Optional parameter that defines an item used for getting host interface. Host interface is used at host autoregistration process. During an autoregistration request an agent will log a warning message if the value returned by specified item is over limit of 255 characters. The <a href="#">system.run[]</a> item is supported regardless of AllowKey/DenyKey values. This option is only used when HostInterface is not defined. Supported since Zabbix 4.4.0.   |
| HostMetadata             | no        | 0-255 characters |         | Optional parameter that defines host metadata. Host metadata is used at host autoregistration process. An agent will issue an error and not start if the specified value is over the limit or a non-UTF-8 string. If not defined, the value will be acquired from HostMetadataItem.   |
| HostMetadataItem         | no        |                  |         | Optional parameter that defines an item used for getting host metadata. Host metadata item value is retrieved on each autoregistration attempt for host autoregistration process. During an autoregistration request an agent will log a warning message if the value returned by the specified item is over the limit of 255 characters. This option is only used when HostMetadata is not defined. Supports UserParameters and aliases. Supports <a href="#">system.run[]</a> regardless of AllowKey/DenyKey value. The value returned by the item must be a UTF-8 string otherwise it will be ignored. |

| Parameter              | Mandatory  | Range      | Default                  | Description  |
|------------------------|--|------------|--------------------------|--|
| Hostname               | no   |            | Set by Host-nameltem     | List of comma-delimited unique, case-sensitive hostnames. Required for active checks and must match hostnames as configured on the server. Value is acquired from Hostnameltem if undefined.<br>Allowed characters: alphanumeric, '.', ' ', '_' and '-'.<br>Maximum length: 128 characters per hostname, 2048 characters for the entire line.  |
| Hostnameltem           | no   |            | system.hostname          | Item used for generating Hostname if it is not defined. Ignored if Hostname is defined.<br>Does not support UserParameters or aliases, but does support <i>system.run[]</i> regardless of AllowKey/DenyKey value.  |
| Include                | no   |            |                          | You may include individual files or all files in a directory in the configuration file (located in C:\Program Files\Zabbix Agent 2 by default if Zabbix agent is installed using Windows MSI installer packages; located in the folder specified during installation if Zabbix agent is installed as a zip archive). All included files must have correct syntax, otherwise agent will not start.<br>The path can be relative to the <i>zabbix_agent2.conf</i> file location (e.g.,<br>Include=. \zabbix_agent2.d\plugins.d\*.conf).<br>To only include relevant files in the specified directory, the asterisk wildcard character is supported for pattern matching. For example: C:\Program Files\Zabbix Agent2\zabbix_agent2.d\*.conf.<br>See <i>special notes</i> about limitations. |
| ListenIP               | no   |            | 0.0.0.0                  | List of comma-delimited IP addresses that the agent should listen on.<br>The first IP address is sent to Zabbix server, if connecting to it, to retrieve the list of active checks.  |
| ListenPort             | no   | 1024-32767 | 10050                    | Agent will listen on this port for connections from the server.  |
| LogFile                | yes, if LogType is set to <i>file</i> , otherwise no |            | c:\zabbix_agent2\logfile | Log file name if LogType is 'file'.  |
| LogFileSize            | no   | 0-1024     | 1                        | Maximum size of log file in MB.<br>0 - disable automatic log rotation.<br><i>Note:</i> If the log file size limit is reached and file rotation fails, for whatever reason, the existing log file is truncated and started anew.  |
| LogType                | no   |            | file                     | Specifies where log messages are written to:<br><i>file</i> - file specified by LogFile parameter,<br><i>console</i> - standard output.  |
| PersistentBufferFileno |  |            |                          | The file, where Zabbix Agent2 should keep SQLite database.<br>Must be a full filename.<br>This parameter is only used if persistent buffer is enabled ( <i>EnablePersistentBuffer=1</i> ).   |
| PersistentBufferPeriod | no   | 1m-365d    | 1h                       | The time period for which data should be stored, when there is no connection to the server or proxy. Older data will be lost. Log data will be preserved.<br>This parameter is only used if persistent buffer is enabled ( <i>EnablePersistentBuffer=1</i> ).  |
| Plugins                | no   |            |                          | Since Zabbix 6.0.0 most of the plugins have their own <i>configuration files</i> . The agent configuration file contains plugin parameters listed below.   |

| Parameter                           | Mandatory | Range  | Default                    | Description  |
|-------------------------------------|-----------|--------|----------------------------|--|
| Plugins.Log.MaxLinesPerSecond       | no        | 1-1000 | 20                         | <p>Maximum number of new lines the agent will send per second to Zabbix server or proxy when processing 'log' and 'eventlog' active checks.</p> <p>The provided value will be overridden by the parameter 'maxlines', provided in 'log' or 'eventlog' item key.</p> <p><i>Note:</i> Zabbix will process 10 times more new lines than set in <i>MaxLinesPerSecond</i> to seek the required string in log items.</p> <p>This parameter is supported since 4.4.2 and replaces <i>MaxLinesPerSecond</i>.</p>   |
| Plugins.SystemRun.LogRemoteCommands | no        |        | 0                          | <p>Enable logging of executed shell commands as warnings.</p> <p>0 - disabled<br/>1 - enabled</p> <p>Commands will be logged only if executed remotely. Log entries will not be created if system.run[] is launched locally by HostMetadataItem, HostInterfaceItem or HostnameItem parameters.</p> <p>This parameter is supported since 4.4.2 and replaces <i>LogRemoteCommands</i>.</p>   |
| PluginSocket                        | no        |        | \\.\pipe\agent.zabbix.sock | Path to zabbix socket for loadable plugin communications.  |
| PluginTimeout                       | no        | 1-30   | Global timeout             | Timeout for connections with loadable plugins.   |
| PerfCounter                         | no        |        |                            | <p>Defines a new parameter &lt;parameter_name&gt; which is an average value for system performance counter &lt;perf_counter_path&gt; for the specified time period &lt;period&gt; (in seconds).</p> <p>Syntax:</p> <p>&lt;parameter_name&gt;,"&lt;perf_counter_path&gt;",&lt;period&gt;</p> <p>For example, if you wish to receive average number of processor interrupts per second for last minute, you can define a new parameter "interrupts" as the following:</p> <p>PerfCounter = interrupts,"\\Processor(0)\\Interrupts/sec",60</p> <p>Please note double quotes around performance counter path.</p> <p>The parameter name (interrupts) is to be used as the item key when creating an item.</p> <p>Samples for calculating average value will be taken every second.</p> <p>You may run "typeperf -qx" to get list of all performance counters available in Windows.</p> |

| Parameter           | Mandatory | Range   | Default | Description   |
|---------------------|-----------|---------|---------|---|
| PerfCounterEn       | no        |         |         | <p>Defines a new parameter &lt;parameter_name&gt; which is an average value for system performance counter &lt;perf_counter_path&gt; for the specified time period &lt;period&gt; (in seconds).</p> <p>Syntax:<br/>           &lt;parameter_name&gt;,"&lt;perf_counter_path&gt;",&lt;period&gt;<br/>           Compared to PerfCounter, perfcounter paths must be in English.</p> <p>Supported only on <b>Windows Server 2008/Vista</b> and above.</p> <p>For example, if you wish to receive average number of processor interrupts per second for last minute, you can define a new parameter "interrupts" as the following:<br/>           PerfCounterEn =<br/>           interrupts,"\\Processor(0)\\Interrupts/sec",60</p> <p>Please note double quotes around performance counter path.</p> <p>The parameter name (interrupts) is to be used as the item key when creating an item.</p> <p>Samples for calculating average value will be taken every second.</p> <p>You can find the list of English strings by viewing the following registry key:<br/>           HKEY_LOCAL_MACHINE\\SOFTWARE\\Microsoft\\Windows NT\\CurrentVersion\\Perflib\\009.</p> |
| RefreshActiveChecks | no        | 60-3600 | 120     | <p>How often the list of active checks is refreshed, in seconds. Note that after failing to refresh active checks the next refresh will be attempted after 60 seconds.</p>  |
| Server              | yes       |         |         | <p>List of comma-delimited IP addresses, optionally in CIDR notation, or DNS names of Zabbix servers and Zabbix proxies.</p> <p>Incoming connections will be accepted only from the hosts listed here.</p> <p>If IPv6 support is enabled then '127.0.0.1', '::ffff:127.0.0.1' are treated equally and ':::/0' will allow any IPv4 or IPv6 address.</p> <p>'0.0.0.0/0' can be used to allow any IPv4 address.</p> <p>Example:<br/>           Server=127.0.0.1,192.168.1.0/24,::1,2001:db8::/32,zabbix.example.com</p> <p>Spaces are allowed.</p>   |

| Parameter    | Mandatory   | Range      | Default | Description  |
|--------------|---|------------|---------|--|
| ServerActive | no  |            |         | <p>Zabbix server/proxy address or cluster configuration to get active checks from.</p> <p>Server/proxy address is IP address or DNS name and optional port separated by colon.</p> <p>Cluster configuration is one or more server addresses separated by semicolon.</p> <p>Multiple Zabbix servers/clusters and Zabbix proxies can be specified, separated by comma.</p> <p>More than one Zabbix proxy should not be specified from each Zabbix server/cluster.</p> <p>If Zabbix proxy is specified then Zabbix server/cluster for that proxy should not be specified.</p> <p>Multiple addresses can be provided to use several independent Zabbix servers in parallel. Spaces are allowed.</p> <p>If port is not specified, default port is used.</p> <p>IPv6 addresses must be enclosed in square brackets if port for that host is specified.</p> <p>If port is not specified, square brackets for IPv6 addresses are optional.</p> <p>If this parameter is not specified, active checks are disabled.</p> <p>Example for Zabbix proxy:<br/> ServerActive=127.0.0.1:10051</p> <p>Example for multiple servers:<br/> ServerActive=127.0.0.1:20051,zabbix.domain,[::1]:30051,::1,[12fc::1]</p> <p>Example for high availability:<br/> ServerActive=zabbix.cluster.node1;zabbix.cluster.node2:20051;zabbix.clu</p> <p>Example for high availability with two clusters and one server:<br/> ServerActive=zabbix.cluster.node1;zabbix.cluster.node2:20051,zabbix.clu</p> |
| SourceIP     | no  |            |         | <p>Source IP address for:</p> <ul style="list-style-type: none"> <li>- outgoing connections to Zabbix server or Zabbix proxy;</li> <li>- making connections while executing some items (web.page.get, net.tcp.port, etc.)</li> </ul>   |
| StatusPort   | no  | 1024-32767 |         | If set, agent will listen on this port for HTTP status requests (http://localhost:<port>/status).  |
| Timeout      | no  | 1-30       | 3       | Spend no more than Timeout seconds on processing.  |
| TLSAccept    | yes, if TLS certificate or PSK parameters are defined (even for <i>unen-crypted</i> connection), otherwise no |            |         | <p>What incoming connections to accept. Used for a passive checks. Multiple values can be specified, separated by comma:</p> <p><i>unencrypted</i> - accept connections without encryption (default)</p> <p><i>psk</i> - accept connections with TLS and a pre-shared key (PSK)</p> <p><i>cert</i> - accept connections with TLS and a certificate</p>   |
| TLSCAFile    | no  |            |         | Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components.  |
| TLSCertFile  | no  |            |         | Full pathname of a file containing the agent certificate or certificate chain, used for encrypted communications with Zabbix components.   |

| Parameter            | Mandatory  | Range | Default | Description  |
|----------------------|--|-------|---------|--|
| TLSCConnect          | yes, if TLS certificate or PSK parameters are defined (even for <i>unencrypted</i> connection), otherwise no |       |         | How the agent should connect to Zabbix server or proxy. Used for active checks. Only one value can be specified:<br><i>unencrypted</i> - connect without encryption (default)<br><i>psk</i> - connect using TLS and a pre-shared key (PSK)<br><i>cert</i> - connect using TLS and a certificate  |
| TLSCRLFile           | no   |       |         | Full pathname of a file containing revoked certificates. This parameter is used for encrypted communications with Zabbix components.   |
| TLSKeyFile           | no   |       |         | Full pathname of a file containing the agent private key used for encrypted communications with Zabbix components.   |
| TLSPSKFile           | no   |       |         | Full pathname of a file containing the agent pre-shared key used for encrypted communications with Zabbix components.  |
| TLSPSKIdentity       | no   |       |         | Pre-shared key identity string, used for encrypted communications with Zabbix server.  |
| TLSServerCertIssuer  | no   |       |         | Allowed server (proxy) certificate issuer.   |
| TLSServerCertSubject | no   |       |         | Allowed server (proxy) certificate subject.  |
| UnsafeUserParameters | no   | 0,1   | 0       | Allow all characters to be passed in arguments to user-defined parameters.<br>The following characters are not allowed:<br>` ' " * ? [ ] { } ~ \$ ! & ; ( ) >   # @<br>Additionally, newline characters are not allowed.   |
| UserParameter        | no   |       |         | User-defined parameter to monitor. There can be several user-defined parameters.<br>Format: UserParameter=<key>,<shell command><br>Note that shell command must not return empty string or EOL only.<br>Shell commands may have relative paths, if UserParameterDir parameter is specified.<br>Examples:<br>UserParameter=system.test,dir /b   find /c /v ""<br>UserParameter=check_cpu,.\\custom_script.bat |
| UserParameterDir     | no   |       |         | Default search path for UserParameter commands. If used, the agent will change its working directory to the one specified here before executing a command. Thereby, UserParameter commands can have a relative ./ prefix instead of a full path.<br>Only one entry is allowed.<br>Example: UserParameterDir=C:\opt\myscripts   |

## 7 Zabbix agent 2 plugins

### Overview

This section contains descriptions of configuration file parameters for Zabbix agent 2 plugins. Please use the sidebar to access information about the specific plugin.

### 1 Ceph plugin

#### Overview

This section lists parameters supported in the Ceph Zabbix agent 2 plugin configuration file (ceph.conf).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with “#” are only supported at the beginning of the line.

#### Parameters

| Parameter                                  | Mandatory | Range        | Default                | Description   |
|--|-----------|--------------|------------------------|---|
| Plugins.Ceph.Default.ApiKey                |           |              |                        | Default API key for connecting to Ceph; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18  |
| Plugins.Ceph.Default.User                  |           |              |                        | Default username for connecting to Ceph; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18   |
| Plugins.Ceph.Default.Uri                   |           |              | https://localhost:8003 | Default URI for connecting to Ceph; used if no value is specified in an item key or named session.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Only https scheme is supported; a scheme can be omitted.<br>A port can be omitted (default=8003).<br>Examples: https://127.0.0.1:8003<br>localhost<br>Supported since version 6.0.18 |
| Plugins.Ceph.InsecureSkipVerify            |           | false / true | false                  | Determines whether an http client should verify the server's certificate chain and host name.<br>If true, TLS accepts any certificate presented by the server and any host name in that certificate. In this mode, TLS is susceptible to man-in-the-middle attacks (should be used only for testing).   |
| Plugins.Ceph.KeepAlive                     |           | 60-900       | 300                    | The maximum time of waiting (in seconds) before unused plugin connections are closed.   |
| Plugins.Ceph.Sessions.<SessionName>.ApiKey |           |              |                        | Named session API key.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.Ceph.Sessions.<SessionName>.User   |           |              |                        | Named session username.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.  |
| Plugins.Ceph.Sessions.<SessionName>.Uri    |           |              |                        | Connection string of a named session.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Only https scheme is supported; a scheme can be omitted.<br>A port can be omitted (default=8003).<br>Examples: https://127.0.0.1:8003<br>localhost               |
| Plugins.Ceph.Timeout                       |           | 1-30         | global timeout         | Request execution timeout (the duration, in seconds, to wait for a request to complete before shutting it down).  |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\)](#) / [Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)

## 2 Docker plugin

Overview

This section lists parameters supported in the Docker Zabbix agent 2 plugin configuration file (docker.conf).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with "#" are only supported at the beginning of the line.

Parameters

| Parameter               | Mandatory | Range | Default                     | Description  |
|-------------------------|-----------|-------|-----------------------------|--|
| Plugins.Docker.Endpoint |           |       | unix:///var/run/docker.sock | Docker daemon unix-socket location.<br>Must contain a scheme (only <code>unix://</code> is supported).           |
| Plugins.Docker.Timeout  |           | 1-30  | global<br>timeout           | Request execution timeout (the duration, in seconds, to wait for a request to complete before shutting it down). |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\)](#) / [Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)

### 3 Ember+ plugin

Overview

This section lists parameters supported in the Ember+ Zabbix agent 2 plugin configuration file (ember.conf).

The Ember+ plugin is a loadable plugin and is available and fully described in the [Ember+ plugin repository](#).

This plugin is supported since Zabbix 6.0.30 and currently only available to be built from the source (for both Unix and Windows).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with "#" are only supported at the beginning of the line.

Parameters

| Parameter                                    | Mandatory | Range  | Default              | Description   |
|--|-----------|--------|----------------------|---|
| Plugins.EmberPlus.Default.Uri                |           |        | tcp://localhost:9999 | Default URI to connect. The only supported schema is <code>tcp://</code> . A schema can be omitted. Embedded credentials will be ignored.   |
| Plugins.EmberPlus.KeepAlive                  |           | 60-900 | 300                  | The maximum time of waiting (in seconds) before unused plugin connections are closed.   |
| Plugins.EmberPlus.Sessions.<SessionName>.Uri |           |        | tcp://localhost:9999 | URI to connect, for the named session. The only supported schema is <code>tcp://</code> . A schema can be omitted. Embedded credentials will be ignored.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys. |
| Plugins.EmberPlus.System.Path                |           |        |                      | Path to the Ember+ plugin executable.<br>Example usage:<br><code>Plugins.EmberPlus.System.Path=/usr/sbin/zabbix-agent2-pl</code>  |
| Plugins.EmberPlus.Timeout                    |           | 1-30   | global<br>timeout    | The duration, in seconds, to wait for a server to respond when first connecting and on follow-up operations in the session.   |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\)](#) / [Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)



## 4 Memcached plugin

### Overview

This section lists parameters supported in the Memcached Zabbix agent 2 plugin configuration file (memcached.conf).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with “#” are only supported at the beginning of the line.

### Parameters

| Parameter   | Mandatory | Range  | Default               | Description  |
|---|-----------|--------|-----------------------|--|
| Plugins.Memcached.Default.Password                |           |        |                       | Default password for connecting to Memcached; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18   |
| Plugins.Memcached.Default.Uri                     |           |        | tcp://localhost:11211 | Default URI for connecting to Memcached; used if no value is specified in an item key or named session.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Supported schemes: tcp, unix; a scheme can be omitted.<br>A port can be omitted (default=11211).<br>Examples: tcp://localhost:11211<br>localhost<br>unix:/var/run/memcached.sock<br>Supported since version 6.0.18 |
| Plugins.Memcached.Default.User                    |           |        |                       | Default username for connecting to Memcached; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18   |
| Plugins.Memcached.KeepAlive                       |           | 60-900 | 300                   | The maximum time of waiting (in seconds) before unused plugin connections are closed.  |
| Plugins.Memcached.Sessions.<SessionName>.Password |           |        |                       | Named session password.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.Memcached.Sessions.<SessionName>.Uri      |           |        |                       | Connection string of a named session.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Supported schemes: tcp, unix; a scheme can be omitted.<br>A port can be omitted (default=11211).<br>Examples: tcp://localhost:11211<br>localhost<br>unix:/var/run/memcached.sock                    |
| Plugins.Memcached.Sessions.<SessionName>.User     |           |        |                       | Named session username.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.Memcached.Timeout                         |           | 1-30   | global timeout        | Request execution timeout (the duration, in seconds, to wait for a request to complete before shutting it down).   |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\) / Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)

## 5 Modbus plugin

## Overview

This section lists parameters supported in the Modbus Zabbix agent 2 plugin configuration file (modbus.conf).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with “#” are only supported at the beginning of the line.

## Parameters

| Parameter                                      | Mandatory | Range | Default        | Description   |
|--|-----------|-------|----------------|---|
| Plugins.Modbus.Sessions.<SessionName>.Endpoint |           |       |                | Endpoint is a connection string consisting of a protocol scheme, a host address and a port or serial port name and attributes.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.Modbus.Sessions.<SessionName>.SlaveID  |           |       |                | Slave ID of a named session.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br>Example: <code>Plugins.Modbus.Sessions.MB1.SlaveID=20</code><br>Note that this named session parameter is checked only if the value provided in the <b>item key</b> slave ID parameter is empty. |
| Plugins.Modbus.Sessions.<SessionName>.Timeout  |           |       |                | Timeout of a named session in seconds.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br>Example: <code>Plugins.Modbus.Sessions.MB1.Timeout=2</code>  |
| Plugins.Modbus.Timeout                         |           | 1-30  | global timeout | Request execution timeout (the duration, in seconds, to wait for a request to complete before shutting it down).  |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\) / Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)

## 6 MongoDB plugin

### Overview

This section lists parameters supported in the MongoDB Zabbix agent 2 plugin configuration file (mongo.conf).

Since Zabbix 6.0.6, the MongoDB plugin is a loadable plugin and is available and fully described in the [MongoDB plugin repository](#).

Pre-compiled plugin binaries for Windows are available since [Zabbix 6.0.19](#) and are compatible with previous 6.0 versions.

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with “#” are only supported at the beginning of the line.

### Options

| Parameter    | Description                                       |
|--------------|---|
| -V --version | Print the plugin version and license information. |
| -h --help    | Print help information (shorthand).               |

## Parameters

### Note:

In Zabbix versions before 6.0.6, parameter names start with `Plugins.Mongo.<Parameter>` instead of `Plugins.MongoDB.<Parameter>`. For example, `Plugins.Mongo.KeepAlive`

| Parameter  | Mandatory | Range  | Default | Description   |
|--|-----------|--------|---------|---|
| Plugins.MongoDB.Default.Password   |           |        |         | Default password for connecting to MongoDB; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18  |
| Plugins.MongoDB.Default.Uri  |           |        |         | Default URI for connecting to MongoDB; used if no value is specified in an item key or named session.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Only tcp scheme is supported; a scheme can be omitted.<br>A port can be omitted (default=27017).<br>Examples: tcp://127.0.0.1:27017, tcp:localhost, localhost<br>Supported since version 6.0.18               |
| Plugins.MongoDB.Default.User   |           |        |         | Default username for connecting to MongoDB; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18  |
| Plugins.MongoDB.KeepAlive  |           | 60-900 | 300     | The maximum time of waiting (in seconds) before unused plugin connections are closed.   |
| Plugins.MongoDB.Sessions.<SessionName>.Password  |           |        |         | Named session password.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.  |
| Plugins.MongoDB.Sessions.<SessionName>.TLSCAFile<br>(yes, if Plugins.MongoDB.Sessions.<SessionName>.TLSConnect is set to one of:<br>verify_ca,<br>verify_full)   |           |        |         | Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix agent 2 and monitored databases.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Supported in plugin versions 1.2.0, 6.0.13 and newer <sup>1</sup> .  |
| Plugins.MongoDB.Sessions.<SessionName>.TLSCertFile<br>(yes, if Plugins.MongoDB.Sessions.<SessionName>.TLSConnect is specified<br><br>Before version 6.0.24 always mandatory if Plugins.MongoDB.Sessions.<SessionName>.TLSConnect is set to one of:<br>verify_ca,<br>verify_full) |           |        |         | Full pathname of a file containing the agent certificate or certificate chain, used for encrypted communications between Zabbix agent 2 and monitored databases.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Supported in plugin versions 1.2.0, 6.0.13 and newer <sup>1</sup> .  |
| Plugins.MongoDB.Sessions.<SessionName>.TLSConnect  |           |        |         | Encryption type for communications between Zabbix agent 2 and monitored databases.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Supported values:<br><i>required</i> - require TLS connection;<br><i>verify_ca</i> - verify certificates;<br><i>verify_full</i> - verify certificates and IP address.<br><br>Supported in plugin versions 1.2.0, 6.0.13 and newer <sup>1</sup> . |

| Parameter   | Mandatory   | Range | Default        | Description  |
|---|---|-------|----------------|--|
| Plugins.MongoDB.Sessions.<SessionName>.TLSKeyFile | Before version 6.0.24 always mandatory if Plug-ins.MongoDB.Sessions.<SessionName>.TLSConnect is set to one of: verify_ca, verify_full |       |                | Full pathname of a file containing the database private key used for encrypted communications between Zabbix agent 2 and monitored databases.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br>Supported in plugin versions 1.2.0, 6.0.13 and newer <sup>1</sup> .  |
| Plugins.MongoDB.Sessions.<SessionName>.Uri        |   |       |                | Connection string of a named session.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Only tcp scheme is supported; a scheme can be omitted.<br>A port can be omitted (default=27017).<br>Examples: tcp://127.0.0.1:27017, tcp:localhost, localhost |
| Plugins.MongoDB.Sessions.<SessionName>.User       |   |       |                | Named session username.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.MongoDB.System.Path                       |   |       |                | Path to external plugin executable. Supported since Zabbix 6.0.6   |
| Plugins.MongoDB.Timeout                           |   | 1-30  | global timeout | Request execution timeout (the duration, in seconds, to wait for a request to complete before shutting it down).   |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\) / Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)

Footnotes

<sup>1</sup> - Since Zabbix 6.0.13, loadable plugins started using the same versioning system as Zabbix itself. As a result, MongoDB plugin version has changed from 1.2.0 to 6.0.13.

## 7 MQTT plugin

Overview

This section lists parameters supported in the MQTT Zabbix agent 2 plugin configuration file (mqtt.conf).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with "#" are only supported at the beginning of the line.

Parameters

| Parameter                     | Mandatory | Range | Default | Description   |
|-------------------------------|-----------|-------|---------|---|
| Plugins.MQTT.Default.Password |           |       |         | Default password for connecting to MQTT; used if no value is specified in an item key or named session.<br>Supported since version 6.0.19 |

| Parameter                                       | Mandatory | Range | Default              | Description   |
|---|-----------|-------|----------------------|---|
| Plugins.MQTT.Default.TLSCAFile                  |           |       |                      | Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification for encrypted communications between Zabbix agent 2 and MQTT broker; used if no value is specified in a named session.<br>Supported since version 6.0.19  |
| Plugins.MQTT.Default.TLSCertFile                |           |       |                      | Full pathname of a file containing the agent certificate or certificate chain for encrypted communications between Zabbix agent 2 and MQTT broker; used if no value is specified in a named session.<br>Supported since version 6.0.19  |
| Plugins.MQTT.Default.TLSKeyFile                 |           |       |                      | Full pathname of a file containing the MQTT private key for encrypted communications between Zabbix agent 2 and MQTT broker; used if no value is specified in a named session.<br>Supported since version 6.0.19  |
| Plugins.MQTT.Default.Topic                      |           |       |                      | Default topic for MQTT subscription; used if no value is specified in an item key or named session.<br><br>The topic may contain wildcards ("+", "#")<br>Examples: path/to/file<br>path/to/#<br>path/+/topic<br>Supported since version 6.0.19  |
| Plugins.MQTT.Default.Url                        |           |       | tcp://localhost:1883 | Default MQTT broker connection string; used if no value is specified in an item key or named session.<br><br>Should not include query parameters.<br>Must match the URL format.<br>Supported schemes: tcp (default), ws, tls; a scheme can be omitted.<br>A port can be omitted (default=1883).<br>Examples: tcp://host:1883<br>localhost<br>ws://host:8080<br>Supported since version 6.0.19 |
| Plugins.MQTT.Default.User                       |           |       |                      | Default username for connecting to MQTT; used if no value is specified in an item key or named session.<br>Supported since version 6.0.19   |
| Plugins.MQTT.Sessions.<SessionName>.Password    |           |       |                      | Named session password.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br>Supported since version 6.0.19  |
| Plugins.MQTT.Sessions.<SessionName>.TLSCAFile   |           |       |                      | Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix agent 2 and MQTT broker.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br>Supported since version 6.0.19   |
| Plugins.MQTT.Sessions.<SessionName>.TLSCertFile |           |       |                      | Full pathname of a file containing the agent certificate or certificate chain, used for encrypted communications between Zabbix agent 2 and MQTT broker.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br>Supported since version 6.0.19   |
| Plugins.MQTT.Sessions.<SessionName>.TLSKeyFile  |           |       |                      | Full pathname of a file containing the MQTT private key used for encrypted communications between Zabbix agent 2 and MQTT broker.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br>Supported since version 6.0.19  |

| Parameter                                 | Mandatory | Range | Default        | Description  |
|---|-----------|-------|----------------|--|
| Plugins.MQTT.Sessions.<SessionName>.Topic |           |       |                | Named session topic for MQTT subscription.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>The topic may contain wildcards ("+", "#")<br>Examples: path/to/file<br>path/to/#<br>path/+/topic<br>Supported since version 6.0.19   |
| Plugins.MQTT.Sessions.<SessionName>.Url   |           |       |                | Connection string of a named session.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Should not include query parameters.<br>Must match the URL format.<br>Supported schemes: tcp (default), ws, tls; a scheme can be omitted.<br>A port can be omitted (default=1883).<br>Examples: tcp://host:1883<br>localhost<br>ws://host:8080<br>Supported since version 6.0.19 |
| Plugins.MQTT.Sessions.<SessionName>.User  |           |       |                | Named session username.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br>Supported since version 6.0.19   |
| Plugins.MQTT.Timeout                      |           | 1-30  | global timeout | Request execution timeout (the duration, in seconds, to wait for a request to complete before shutting it down).   |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\) / Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)

## 8 MSSQL plugin

### Overview

This section lists parameters supported in the MSSQL Zabbix agent 2 plugin configuration file (mssql.conf).

The MSSQL plugin is a loadable plugin and is available and fully described in the [MSSQL plugin repository](#).

This plugin is supported since Zabbix 6.0.27. Pre-compiled plugin binaries for Windows are available since [Zabbix 6.0.28](#) and are compatible with 6.0.27 version.

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with "#" are only supported at the beginning of the line.

### Parameters

| Parameter                        | Mandatory | Range | Default | Description   |
|----------------------------------|-----------|-------|---------|---|
| Plugins.MSSQL.CustomQueriesDir   |           |       | empty   | Specifies the file path to a directory containing user-defined .sql files with custom queries that the plugin can execute. The plugin loads all available .sql files in the configured directory at startup. This means that any changes to the custom query files will not be reflected until the plugin is restarted. The plugin is started and stopped together with Zabbix agent 2. |
| Plugins.MSSQL.Default.CACertPath |           |       |         | The default file path to the public key certificate of the certificate authority (CA) that issued the certificate of the MSSQL server. The certificate must be in PEM format.   |

| Parameter   | Mandatory | Range  | Default                    | Description   |
|---|-----------|--------|----------------------------|---|
| Plugins.MSSQL.Default.Database                              |           |        |                            | The default database name to connect to.  |
| Plugins.MSSQL.Default.Encrypt                               |           |        |                            | Specifies the default connection encryption type. Possible values are:<br><i>true</i> - data sending between plugin and server is encrypted;<br><i>false</i> - data sending between plugin and server is not encrypted beyond the login packet;<br><i>strict</i> - data sending between plugin and server is encrypted E2E using <a href="#">TDS8</a> ;<br><i>disable</i> - data sending between plugin and server is not encrypted.  |
| Plugins.MSSQL.Default.HostNameInCertificate                 |           |        |                            | The common name (CN) of the certificate of the MSSQL server by default.   |
| Plugins.MSSQL.Default.Password                              |           |        |                            | The password to be sent to a protected MSSQL server by default.   |
| Plugins.MSSQL.Default.TLSMinVersion                         |           |        |                            | The minimum TLS version to use by default. Possible values are: 1.0, 1.1, 1.2, 1.3.   |
| Plugins.MSSQL.Default.TrustServerCertificate                |           |        |                            | Whether the plugin should trust the server certificate without validating it by default. Possible values: <i>true</i> , <i>false</i> .  |
| Plugins.MSSQL.Default.Uri                                   |           |        | sqlserver://localhost:1433 | The default URI to connect. The only supported schema is <i>sqlserver://</i> . A schema can be omitted. Embedded credentials will be ignored.   |
| Plugins.MSSQL.Default.User                                  |           |        |                            | The default username to be sent to a protected MSSQL server.  |
| Plugins.MSSQL.KeepAlive                                     |           | 60-900 | 300                        | The maximum time of waiting (in seconds) before unused plugin connections are closed.   |
| Plugins.MSSQL.Sessions.<SessionName>.CACertPath             |           |        |                            | The file path to the public key certificate of the certificate authority (CA) that issued the certificate of the MSSQL server for the named session. The certificate must be in PEM format.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.  |
| Plugins.MSSQL.Sessions.<SessionName>.Database               |           |        |                            | The database name to connect to for the named session.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.MSSQL.Sessions.<SessionName>.Encrypt                |           |        |                            | Specifies the connection encryption type for the named session. Possible values are:<br><i>true</i> - data sending between plugin and server is encrypted;<br><i>false</i> - data sending between plugin and server is not encrypted beyond the login packet;<br><i>strict</i> - data sending between plugin and server is encrypted E2E using <a href="#">TDS8</a> ;<br><i>disable</i> - data sending between plugin and server is not encrypted.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys. |
| Plugins.MSSQL.Sessions.<SessionName>.HostNameInCertificate  |           |        |                            | The common name (CN) of the certificate of the MSSQL server for the named session.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.MSSQL.Sessions.<SessionName>.Password               |           |        |                            | The password to be sent to a protected MSSQL server for the named session.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.MSSQL.Sessions.<SessionName>.TLSMinVersion          |           |        |                            | The minimum TLS version to use for the named session. Possible values are: 1.0, 1.1, 1.2, 1.3.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.MSSQL.Sessions.<SessionName>.TrustServerCertificate |           |        |                            | Whether the plugin should trust the server certificate without validating it for the named session. Possible values: <i>true</i> , <i>false</i> .<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.  |

| Parameter                                 | Mandatory | Range | Default               | Description   |
|---|-----------|-------|-----------------------|---|
| Plugins.MSSQL.Sessions.<SessionName>.Uri  | yes       |       | sqlserver://localhost | URI to connect, for the named session. The only supported schema is sqlserver://. A schema can be omitted. Embedded credentials will be ignored.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys. |
| Plugins.MSSQL.Sessions.<SessionName>.User | yes       |       |                       | The username to be sent to a protected MSSQL server for the named session.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.MSSQL.System.Path                 | yes       |       |                       | Path to the MSSQL plugin executable.<br>Global setting for the MSSQL plugin. Applied to all connections.<br>Example usage:<br>Plugins.MSSQL.System.Path=/usr/sbin/zabbix-agent2-plugin.   |
| Plugins.MSSQL.Timeout                     | no        | 1-30  | global timeout        | The duration, in seconds, to wait for a server to respond when first connecting and on follow-up operations in the session.   |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\) / Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)

## 9 MySQL plugin

### Overview

This section lists parameters supported in the MySQL Zabbix agent 2 plugin configuration file (mysql.conf).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with “#” are only supported at the beginning of the line.

### Parameters

| Parameter   | Mandatory | Range | Default        | Description  |
|---|-----------|-------|----------------|--|
| Plugins.MySQL.Timeout   | no        | 1-30  | global timeout | The maximum amount of time in seconds to wait for a request to be done.  |
| Plugins.MySQL.CustomQueriesPath   | no        |       | empty          | Full path to the directory used for storing custom queries. Supported since version 6.0.21.  |
| Plugins.MySQL.Default.Password  | no        |       |                | Default password for connecting to MySQL; used if no value is specified in an item key or named session. Supported since version 6.0.18.   |
| Plugins.MySQL.Default.TLSCAFile<br>(yes, if Plugins.MySQL.Default.TLSConnect is set to <i>verify_ca</i> or <i>verify_full</i> )   | no        |       |                | Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification for encrypted communications between Zabbix agent 2 and monitored databases; used if no value is specified in a named session. Supported since version 6.0.18. |
| Plugins.MySQL.Default.TLSCertFile<br>(yes, if Plugins.MySQL.Default.TLSConnect is set to <i>verify_ca</i> or <i>verify_full</i> ) | no        |       |                | Full pathname of a file containing the agent certificate or certificate chain for encrypted communications between Zabbix agent 2 and monitored databases; used if no value is specified in a named session. Supported since version 6.0.18.                         |



| Parameter  | Mandatory  | Range  | Default              | Description  |
|--|--|--------|----------------------|--|
| Plugins.Mysql.Default.TLSConnect                 |  |        |                      | Encryption type for communications between Zabbix agent 2 and monitored databases; used if no value is specified in a named session.<br><br>Supported values:<br><i>required</i> - require TLS connection;<br><i>verify_ca</i> - verify certificates;<br><i>verify_full</i> - verify certificates and IP address.<br>Supported since version 6.0.18.   |
| Plugins.Mysql.Default.TLSKeyFile                 |  |        |                      | Full pathname of a file containing the database private key for encrypted communications between Zabbix agent 2 and monitored databases; used if no value is specified in a named session.<br>Supported since version 6.0.18.  |
| Plugins.Mysql.Default.TLSConnect                 | (yes, if Plugins.Mysql.Default.TLSKeyFile is set to <i>verify_ca</i> or <i>verify_full</i> )   |        |                      |  |
| Plugins.Mysql.Default.Uri                        |  |        | tcp://localhost:3306 | Default URI for connecting to MySQL; used if no value is specified in an item key or named session.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Supported schemes: <i>tcp</i> , <i>unix</i> ; a scheme can be omitted.<br>A port can be omitted (default=3306).<br>Examples: <i>tcp://localhost:3306</i><br><i>localhost</i><br><i>unix:/var/run/mysql.sock</i><br>Supported since version 6.0.18. |
| Plugins.Mysql.Default.User                       |  |        |                      | Default username for connecting to MySQL; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18.  |
| Plugins.Mysql.KeyTimeAlive                       |  | 60-900 | 300                  | The maximum time of waiting (in seconds) before unused plugin connections are closed.  |
| Plugins.Mysql.Sessions.<SessionName>.Password    |  |        |                      | Named session password.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.Mysql.Sessions.<SessionName>.TLSCAFile   |  |        |                      | Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix agent 2 and monitored databases.   |
| Plugins.Mysql.Sessions.<SessionName>.TLSConnect  | (yes, if Plugins.Mysql.Sessions.<SessionName>.TLSCAFile is set to <i>verify_ca</i> or <i>verify_full</i> )                                 |        |                      | <b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.  |
| Plugins.Mysql.Sessions.<SessionName>.TLSCertFile |  |        |                      | Full pathname of a file containing the agent certificate or certificate chain, used for encrypted communications between Zabbix agent 2 and monitored databases.   |
| Plugins.Mysql.Sessions.<SessionName>.TLSKeyFile  |  |        |                      | <b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.  |
| Plugins.Mysql.Sessions.<SessionName>.TLSKeyFile  | Before version 6.0.23 always mandatory if Plugins.Mysql.Sessions.<SessionName>.TLSConnect is set to <i>verify_ca</i> or <i>verify_full</i> |        |                      |  |

| Parameter  | Mandatory   | Range | Default        | Description  |
|--|---|-------|----------------|--|
| Plugins.Mysql.Sessions.<SessionName>.TLSConnect  | yes   |       |                | Encryption type for communications between Zabbix agent 2 and monitored databases.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Supported values:<br><i>required</i> - require TLS connection;<br><i>verify_ca</i> - verify certificates;<br><i>verify_full</i> - verify certificates and IP address.   |
| Plugins.Mysql.Sessions.<SessionName>.TLSKeyFile  | yes   |       |                | Full pathname of a file containing the database private key used for encrypted communications between Zabbix agent 2 and monitored databases.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.Mysql.Sessions.<SessionName>.TLSCertFile | yes if PKCS#1 is specified  |       |                |  |
|  | Before version 6.0.23 always mandatory if Plug-ins.Mysql.Sessions.<SessionName>.TLSConnect is set to <i>verify_ca</i> or <i>verify_full</i> |       |                |  |
| Plugins.Mysql.Sessions.<SessionName>.Uri         | yes   |       |                | Connection string of a named session.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Supported schemes: <i>tcp</i> , <i>unix</i> ; a scheme can be omitted.<br>A port can be omitted (default=3306).<br>Examples: <i>tcp://localhost:3306</i><br><i>localhost</i><br><i>unix:/var/run/mysql.sock</i> |
| Plugins.Mysql.Sessions.<SessionName>.User        | yes   |       |                | Named session username.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.Mysql.Timeout                            |   | 1-30  | global timeout | The maximum time in seconds for waiting when a connection has to be established.   |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\) / Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)

## 10 Oracle plugin

### Overview

This section lists parameters supported in the Oracle Zabbix agent 2 plugin configuration file (*oracle.conf*).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with *"#"* are only supported at the beginning of the line.

### Parameters

| Parameter   | Mandatory | Range  | Default              | Description   |
|---|-----------|--------|----------------------|---|
| Plugins.Oracle.<Item>.ConnectTimeout                  | Yes       | 1-30   | global timeout       | The maximum wait time in seconds for a request to be completed.   |
| Plugins.Oracle.<Item>.ConnectTimeout                  | Yes       | 1-30   | global timeout       | The maximum wait time in seconds for a connection to be established.  |
| Plugins.Oracle.<Item>.CustomQueriesPath               | Yes       |        |                      | Full pathname of a directory containing .sql files with custom queries.<br>Disabled by default.<br>Example: /etc/zabbix/oracle/sql  |
| Plugins.Oracle.<Item>.Default.Password                | Yes       |        |                      | Default password for connecting to Oracle; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18   |
| Plugins.Oracle.<Item>.Default.Service                 | Yes       |        |                      | Default service name for connecting to Oracle (SID is not supported); used if no value is specified in an item key or named session.<br>Supported since version 6.0.18  |
| Plugins.Oracle.<Item>.Default.Uri                     | Yes       |        | tcp://localhost:1521 | Default URI for connecting to Oracle; used if no value is specified in an item key or named session.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Only tcp scheme is supported; a scheme can be omitted.<br>A port can be omitted (default=1521).<br>Examples: tcp://127.0.0.1:1521<br>localhost<br>Supported since version 6.0.18 |
| Plugins.Oracle.<Item>.Default.User                    | Yes       |        |                      | Default username for connecting to Oracle; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18   |
| Plugins.Oracle.<Item>.KeepAlive                       | Yes       | 60-900 | 300                  | The maximum time of waiting (in seconds) before unused plugin connections are closed.   |
| Plugins.Oracle.<Item>.Sessions.<SessionName>.Password | Yes       |        |                      | Named session password.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.  |
| Plugins.Oracle.<Item>.Sessions.<SessionName>.Service  | Yes       |        |                      | Named session service name to be used for connection (SID is not supported).<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.Oracle.<Item>.Sessions.<SessionName>.Uri      | Yes       |        |                      | Named session connection string for Oracle.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Only tcp scheme is supported; a scheme can be omitted.<br>A port can be omitted (default=1521).<br>Examples: tcp://127.0.0.1:1521<br>localhost           |
| Plugins.Oracle.<Item>.Sessions.<SessionName>.User     | Yes       |        |                      | Named session username.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.  |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\)](#) / [Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)

## 11 PostgreSQL plugin

Overview

This section lists parameters supported in the PostgreSQL Zabbix agent 2 plugin configuration file (postgresql.conf).

Since Zabbix 6.0.10, the PostgreSQL plugin is a loadable plugin and is available and fully described in the [PostgreSQL plugin repository](#).

Pre-compiled plugin binaries for Windows are available since [Zabbix 6.0.19](#) and are compatible with previous 6.0 versions.

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without BOM;
- Comments starting with “#” are only supported at the beginning of the line.

Options

| Parameter    | Description                                       |
|--------------|---|
| -V --version | Print the plugin version and license information. |
| -h --help    | Print help information (shorthand).               |

Parameters

**Note:**

In Zabbix versions before 6.0.10, parameter names start with *Plugins.Postgres.<Parameter>* instead of *Plugins.PostgreSQL.<Parameter>*. For example, *Plugins.Postgres.KeepAlive*.

| Parameter                              | Mandatory   | Range | Default        | Description   |
|--|---|-------|----------------|---|
| Plugins.PostgreSQL.Default.CacheMode   |   |       | prepare        | Cache mode for the PostgreSQL connection.<br>Supported values:<br><i>prepare</i> (default) - will create prepared statements on the PostgreSQL server;<br><i>describe</i> - will use the anonymous prepared statement to describe a statement without creating a statement on the server.<br>Note that “describe” is primarily useful when the environment does not allow prepared statements such as when running a connection pooler like PgBouncer.<br>Supported since version 6.0.25. |
| Plugins.PostgreSQL.CallTimeout         |   | 1-30  | global timeout | Maximum wait time (in seconds) for a request to be completed.   |
| Plugins.PostgreSQL.CustomQueriesPath   |   |       | disabled       | Full pathname of the directory containing .sql files with custom queries.   |
| Plugins.PostgreSQL.Default.Database    |   |       |                | Default database for connecting to PostgreSQL; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18.  |
| Plugins.PostgreSQL.Default.Password    |   |       |                | Default password for connecting to PostgreSQL; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18.  |
| Plugins.PostgreSQL.Default.TLSCAFile   | (yes, if Plugins.PostgreSQL.Default.TLSConnect is set to <i>verify_ca</i> or <i>verify_full</i> ) |       |                | Full pathname of a file containing the top-level CA(s) certificate for peer certificate verification for encrypted communications between Zabbix agent 2 and monitored databases; used if no value is specified in a named session.<br>Supported since version 6.0.18.  |
| Plugins.PostgreSQL.Default.TLSCertFile | (yes, if Plugins.PostgreSQL.Default.TLSConnect is set to <i>verify_ca</i> or <i>verify_full</i> ) |       |                | Full pathname of a file containing the PostgreSQL certificate or certificate chain for encrypted communications between Zabbix agent 2 and monitored databases; used if no value is specified in a named session.<br>Supported since version 6.0.18.  |

| Parameter   | Mandatory  | Range  | Default | Description  |
|---|--|--------|---------|--|
| Plugins.PostgreSQL.Default.TLSConnect               |  |        |         | Encryption type for communications between Zabbix agent 2 and monitored databases; used if no value is specified in a named session.<br>Supported values:<br><i>required</i> - connect using TLS as transport mode without identity checks;<br><i>verify_ca</i> - connect using TLS and verify certificate;<br><i>verify_full</i> - connect using TLS, verify certificate and verify that database identity (CN) specified by DBHost matches its certificate.<br>Undefined encryption type means unencrypted connection.<br>Supported since version 6.0.18.                |
| Plugins.PostgreSQL.Default.TLSKeyFile               | (yes, if Plugins.PostgreSQL.Default.TLSConnect is set to <i>verify_ca</i> or <i>verify_full</i> )                |        |         | Full pathname of a file containing the PostgreSQL private key for encrypted communications between Zabbix agent 2 and monitored databases; used if no value is specified in a named session.<br>Supported since version 6.0.18.  |
| Plugins.PostgreSQL.Default.Uri                      |  |        |         | Default URI for connecting to PostgreSQL; used if no value is specified in an item key or named session.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Supported schemes: <i>tcp</i> , <i>unix</i> .<br>Examples: <i>tcp://127.0.0.1:5432</i><br><i>tcp://localhost</i><br><i>unix:/var/run/postgresql/.s.PGSQL.5432</i><br>Supported since version 6.0.18.  |
| Plugins.PostgreSQL.Default.User                     |  |        |         | Default username for connecting to PostgreSQL; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18.   |
| Plugins.PostgreSQL.KeepAlive                        |  | 60-900 | 300     | Maximum time of waiting (in seconds) before unused plugin connections are closed.  |
| Plugins.PostgreSQL.Sessions.<SessionName>.CacheMode |  |        |         | Cache mode for the PostgreSQL connection.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br>Supported values:<br><i>prepare</i> (default) - will create prepared statements on the PostgreSQL server;<br><i>describe</i> - will use the anonymous prepared statement to describe a statement without creating a statement on the server.<br>Note that "describe" is primarily useful when the environment does not allow prepared statements such as when running a connection pooler like PgBouncer.<br>Supported since version 6.0.25. |
| Plugins.PostgreSQL.Sessions.<SessionName>.Database  |  |        |         | Database for session connection.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.  |
| Plugins.PostgreSQL.Sessions.<SessionName>.Password  |  |        |         | Password for session connection.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.  |
| Plugins.PostgreSQL.Sessions.<SessionName>.TLSCAFile | (yes, if Plugins.PostgreSQL.Sessions.<SessionName>.TLSConnect is set to <i>verify_ca</i> or <i>verify_full</i> ) |        |         | Full pathname of a file containing the top-level CA(s) certificate peer certificate verification.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |

| Parameter   | Mandatory   | Range | Default        | Description   |
|---|---|-------|----------------|---|
| Plugins.PostgreSQL.Sessions.<SessionName>.TLSCertFile | ins.PostgreSQL.Sessions.<SessionName>.TLSCertFile is specified                                    |       |                | Full pathname of a file containing the PostgreSQL certificate and certificate chain.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.PostgreSQL.Sessions.<SessionName>.TLSKeyFile  | ins.PostgreSQL.Sessions.<SessionName>.TLSKeyFile is specified                                     |       |                | Full pathname of a file containing the PostgreSQL private key.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.PostgreSQL.Sessions.<SessionName>.TLSConnect  | ins.PostgreSQL.Sessions.<SessionName>.TLSConnect is set to <i>verify_ca</i> or <i>verify_full</i> |       |                | Encryption type for PostgreSQL connection.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Supported values:<br><i>required</i> - connect using TLS as transport mode without identity checks;<br><i>verify_ca</i> - connect using TLS and verify certificate;<br><i>verify_full</i> - connect using TLS, verify certificate and verify that database identity (CN) specified by DBHost matches its certificate.<br>Undefined encryption type means unencrypted connection. |
| Plugins.PostgreSQL.Sessions.<SessionName>.Uri         | ins.PostgreSQL.Sessions.<SessionName>.Uri is specified  |       |                | Connection string of a named session.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Supported schemes: <i>tcp</i> , <i>unix</i> .<br>Examples: <i>tcp://127.0.0.1:5432</i><br><i>tcp://localhost</i><br><i>unix:/var/run/postgresql/.s.PGSQL.5432</i>  |
| Plugins.PostgreSQL.Sessions.<SessionName>.User        | ins.PostgreSQL.Sessions.<SessionName>.User is specified   |       |                | Named session username.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.  |
| Plugins.PostgreSQL.System.Path                        | ins.PostgreSQL.System.Path is specified   |       |                | Path to external plugin executable. Supported since Zabbix 6.0.10.  |
| Plugins.PostgreSQL.Timeout                            | ins.PostgreSQL.Timeout is specified   | 1-30  | global timeout | Request execution timeout (the duration, in seconds, to wait for a request to complete before shutting it down).  |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\) / Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)

## 12 Redis plugin

### Overview

This section lists parameters supported in the Redis Zabbix agent 2 plugin configuration file (redis.conf).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with “#” are only supported at the beginning of the line.

### Parameters

| Parameter                                     | Mandatory | Range  | Default              | Description  |
|---|-----------|--------|----------------------|--|
| Plugins.Redis.Default.Password                |           |        |                      | Default password for connecting to Redis; used if no value is specified in an item key or named session.<br>Supported since version 6.0.18   |
| Plugins.Redis.Default.Uri                     |           |        | tcp://localhost:6379 | Default URI for connecting to Redis; used if no value is specified in an item key or named session.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Supported schemes: tcp, unix; a scheme can be omitted (since version 5.2.3).<br>A port can be omitted (default=6379).<br>Examples: tcp://localhost:6379<br>localhost<br>unix:/var/run/redis.sock<br>Supported since version 6.0.18 |
| Plugins.Redis.KeepAlive                       |           | 60-900 | 300                  | The maximum time of waiting (in seconds) before unused plugin connections are closed.  |
| Plugins.Redis.Sessions.<SessionName>.Password |           |        |                      | Named session password.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.   |
| Plugins.Redis.Sessions.<SessionName>.Uri      |           |        |                      | Connection string of a named session.<br><b>&lt;SessionName&gt;</b> - define name of a session for using in item keys.<br><br>Should not include embedded credentials (they will be ignored).<br>Must match the URI format.<br>Supported schemes: tcp, unix; a scheme can be omitted.<br>A port can be omitted (default=6379).<br>Examples: tcp://localhost:6379<br>localhost<br>unix:/var/run/redis.sock                                      |
| Plugins.Redis.Timeout                         |           | 1-30   | global timeout       | Request execution timeout (the duration, in seconds, to wait for a request to complete before shutting it down).   |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\) / Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)

## 13 SMART plugin

### Overview

This section lists parameters supported in the SMART Zabbix agent 2 plugin configuration file (smart.conf).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- The path to the `smartctl` executable must be set either by adding its directory to the system's `PATH` environment variable or by configuring `Plugins.Smart.Path`; this applies to both Linux and Windows;
- Zabbix supports configuration files only in UTF-8 encoding without [BOM](#);
- Comments starting with `"#"` are only supported at the beginning of the line.

Parameters

| Parameter                          | Mandatory | Range | Default               | Description  |
|------------------------------------|-----------|-------|-----------------------|--|
| <code>Plugins.Smart.Path</code>    |           |       | <code>smartctl</code> | Path to the <code>smartctl</code> executable.  |
| <code>Plugins.Smart.Timeout</code> |           | 1-30  | global<br>timeout     | Request execution timeout (the duration, in seconds, to wait for a request to complete before shutting it down). |

See also:

- Description of general Zabbix agent 2 configuration parameters: [Zabbix agent 2 \(UNIX\)](#) / [Zabbix agent 2 \(Windows\)](#)
- Instructions for configuring [plugins](#)

8 Zabbix Java gateway

If you use `startup.sh` and `shutdown.sh` scripts for starting [Zabbix Java gateway](#), then you can specify the necessary configuration parameters in the `settings.sh` file. The startup and shutdown scripts source the settings file and take care of converting shell variables (listed in the first column) to Java properties (listed in the second column).

If you start Zabbix Java gateway manually by running `java` directly, then you specify the corresponding Java properties on the command line.

| Variable                     | Property                           | Mandatory | Range      | Default                           | Description  |
|------------------------------|------------------------------------|-----------|------------|-----------------------------------|--|
| <code>LISTEN_IP</code>       | <code>zabbix.listenIP</code>       | no        |            | 0.0.0.0                           | IP address to listen on.   |
| <code>LISTEN_PORT</code>     | <code>zabbix.listenPort</code>     | no        | 1024-32767 | 10052                             | Port to listen on.   |
| <code>PID_FILE</code>        | <code>zabbix.pidFile</code>        | no        |            | <code>/tmp/zabbix_java.pid</code> | Name of PID file. If omitted, Zabbix Java Gateway is started as a console application.   |
| <code>PROPERTIES_FILE</code> | <code>zabbix.propertiesFile</code> | no        |            |                                   | Name of properties file. Can be used to set additional properties using a key-value format in such a way that they are not visible on a command line or to overwrite existing ones. For example:<br><code>"javax.net.ssl.trustStorePassword=&lt;password&gt;"</code> |
| <code>START_POLLERS</code>   | <code>zabbix.startPollers</code>   | no        | 1-1000     | 5                                 | Number of worker threads to start.   |
| <code>TIMEOUT</code>         | <code>zabbix.timeout</code>        | no        | 1-30       | 3                                 | How long to wait for network operations.   |

**Warning:**  
Port 10052 is not [IANA registered](#).

9 Zabbix web service

Overview

Zabbix web service is a process that is used for communication with external web services.



This section lists parameters supported in Zabbix web service configuration file (zabbix\_web\_service.conf).

Note that:

- The default values reflect process defaults, not the values in the shipped configuration files;
- Zabbix supports configuration files only in UTF-8 encoding without BOM;
- Comments starting with “#” are only supported at the beginning of the line.

#### Parameters

| Parameter   | Mandatory  | Range                   | Default     | Description   |
|-------------|--|-------------------------|-------------|---|
| AllowedIP   | yes  |                         |             | List of comma delimited IP addresses, optionally in CIDR notation, or DNS names of Zabbix servers and Zabbix proxies. Incoming connections will be accepted only from the hosts listed here.<br>If IPv6 support is enabled then 127.0.0.1, ::127.0.0.1, ::ffff:127.0.0.1 are treated equally and ::/0 will allow any IPv4 or IPv6 address.<br>0.0.0.0/0 can be used to allow any IPv4 address.<br>Example:<br>127.0.0.1,192.168.1.0/24,::1,2001:db8::/32,zabbix.example.com |
| DebugLevel  | no   | 0-5                     | 3           | Specifies debug level:<br>0 - basic information about starting and stopping of Zabbix processes<br>1 - critical information<br>2 - error information<br>3 - warnings<br>4 - for debugging (produces lots of information)<br>5 - extended debugging (produces even more information)   |
| ListenPort  | no   | 1024-32767              | 10053       | The port service listens on for connections from the server.  |
| LogFile     | yes, if LogType is set to <i>file</i> , otherwise no |                         |             | Log file name for LogType 'file' parameter.<br>Example: /tmp/zabbix_web_service.log   |
| LogFileSize | no   | 0-1024                  | 1           | Maximum size of log file in MB.<br>0 - disable automatic log rotation.  |
| LogType     | no   | system / file / console | file        | Specifies where log messages are written to:<br><i>system</i> - syslog<br><i>file</i> - file specified with LogFile parameter<br><i>console</i> - standard output   |
| Timeout     | no   | 1-30                    | 3           | Spend no more than Timeout seconds on processing.   |
| TLSAccept   | no   | unencrypted / cert      | unencrypted | Specifies what type of connection to use:<br><i>unencrypted</i> - accept connections without encryption (default)<br><i>cert</i> - accept connections with TLS and a certificate  |
| TLSCAFile   | no   |                         |             | Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification, used for encrypted communications between Zabbix components.   |
| TLSCertFile | no   |                         |             | Full pathname of a file containing the service certificate or certificate chain, used for encrypted communications with Zabbix components.  |
| TLSKeyFile  | no   |                         |             | Full pathname of a file containing the service private key used for encrypted communications with Zabbix components.  |

## 10 Inclusion

### Overview

Additional files or directories can be included into server/proxy/agent configuration using the Include parameter.

#### Notes on inclusion

If the Include parameter is used for including a file, the file must be readable.

If the Include parameter is used for including a directory:

- All files in the directory must be readable.
- No particular order of inclusion should be assumed (e.g. files are not included in alphabetical order). Therefore do not define one parameter in several "Include" files (e.g. to override a general setting with a specific one).
- All files in the directory are included into configuration.
- Beware of file backup copies automatically created by some text editors. For example, if editing the "include/my\_specific.conf" file produces a backup copy "include/my\_specific\_conf.BAK" then both files will be included. Move "include/my\_specific\_conf.BAK" out of the "Include" directory. On Linux, contents of the "Include" directory can be checked with a "ls -al" command for unnecessary files.

If the Include parameter is used for including files using a pattern:

- All files matching the pattern must be readable.
- No particular order of inclusion should be assumed (e.g. files are not included in alphabetical order). Therefore do not define one parameter in several "Include" files (e.g. to override a general setting with a specific one).

### 3 Protocols

Please use the sidebar to access content in this section.

#### 1 Server-proxy data exchange protocol

Overview

Server - proxy data exchange is based on JSON format.

Request and response messages must begin with **header and data length**.

Passive proxy

Proxy config request

The proxy config request is sent by server to provide proxy configuration data. This request is sent every ProxyConfigFrequency (server configuration parameter) seconds.

| name                 | value type           | description   |
|----------------------|----------------------|---|
| server→proxy:        |                      |   |
| <b>request</b>       | <i>string</i>        | 'proxy config'  |
| <b>&lt;table&gt;</b> | <i>object</i>        | One or more objects with <table> data.                                  |
| <b>fields</b>        | <i>array</i>         | Array of field names.   |
| -                    | <i>string</i>        | Field name.   |
| <b>data</b>          | <i>array</i>         | Array of rows.  |
| -                    | <i>array</i>         | Array of columns.   |
| -                    | <i>string,number</i> | Column value with type depending on the column type in database schema. |
| proxy→server:        |                      |   |
| <b>response</b>      | <i>string</i>        | Request success information ('success' or 'failed').                    |
| <b>version</b>       | <i>string</i>        | Proxy version (<major>.<minor>.<build>).                                |

Example:

server→proxy:

```

{
  "request": "proxy config",
  "globalmacro":{
    "fields": [
      "globalmacroid",
      "macro",
      "value"
    ],
    "data": [
      [
        2,

```

```

        "${SNMP_COMMUNITY}",
        "public"
    ]
}
},
"hosts":{
    "fields":[
        "hostid",
        "host",
        "status",
        "ipmi_authtype",
        "ipmi_privilege",
        "ipmi_username",
        "ipmi_password",
        "name",
        "tls_connect",
        "tls_accept",
        "tls_issuer",
        "tls_subject",
        "tls_psk_identity",
        "tls_psk"
    ],
    "data":[
        [
            10001,
            "Linux",
            3,
            -1,
            2,
            "",
            "",
            "Linux",
            1,
            1,
            "",
            "",
            "",
            ""
        ],
        [
            10050,
            "Zabbix Agent",
            3,
            -1,
            2,
            "",
            "",
            "Zabbix Agent",
            1,
            1,
            "",
            "",
            "",
            ""
        ],
        [
            10105,
            "Logger",
            0,
            -1,
            2,
            "",

```

```

        "",
        "Logger",
        1,
        1,
        "",
        "",
        "",
        ""
    ]
}
},
"interface":{
    "fields":[
        "interfaceid",
        "hostid",
        "main",
        "type",
        "useip",
        "ip",
        "dns",
        "port",
        "bulk"
    ],
    "data":[
        [
            2,
            10105,
            1,
            1,
            1,
            "127.0.0.1",
            "",
            "10050",
            1
        ]
    ]
},
...
}

```

proxy→server:

```

{
    "response": "success",
    "version": "6.0.0"
}

```

#### Proxy request

The proxy data request is used to obtain host interface availability, historical, discovery and autoregistration data from proxy. This request is sent every ProxyDataFrequency (server configuration parameter) seconds.

| name                            | value type    | description   |
|---------------------------------|---------------|---|
| server→proxy:<br><b>request</b> | <i>string</i> | 'proxy data'  |
| proxy→server:<br><b>session</b> | <i>string</i> | Data session token.   |
| <b>interface</b>                | <i>array</i>  | ( <i>optional</i> ) Array of interface availability data objects. |
| <b>avail-<br/>abil-<br/>ity</b> |               |   |
| <b>interfaceid</b>              | <i>number</i> | Interface identifier.   |

| name                     | value type    | description   |
|--------------------------|---------------|---|
| <b>available</b>         | <i>number</i> | Interface availability:<br><br><b>0</b> , <i>INTERFACE_AVAILABLE_UNKNOWN</i> - unknown<br><b>1</b> , <i>INTERFACE_AVAILABLE_TRUE</i> - available<br><b>2</b> , <i>INTERFACE_AVAILABLE_FALSE</i> - unavailable   |
| <b>error</b>             | <i>string</i> | Interface error message or empty string.  |
| <b>history data</b>      | <i>array</i>  | ( <i>optional</i> ) Array of history data objects.  |
| <b>itemid</b>            | <i>number</i> | Item identifier.  |
| <b>clock</b>             | <i>number</i> | Item value timestamp (seconds).   |
| <b>ns</b>                | <i>number</i> | Item value timestamp (nanoseconds).   |
| <b>value</b>             | <i>string</i> | ( <i>optional</i> ) Item value.   |
| <b>id</b>                | <i>number</i> | Value identifier (ascending counter, unique within one data session).   |
| <b>timestamp</b>         | <i>number</i> | ( <i>optional</i> ) Timestamp of log type items.  |
| <b>source</b>            | <i>string</i> | ( <i>optional</i> ) Eventlog item source value.   |
| <b>severity</b>          | <i>number</i> | ( <i>optional</i> ) Eventlog item severity value.   |
| <b>eventid</b>           | <i>number</i> | ( <i>optional</i> ) Eventlog item eventid value.  |
| <b>state</b>             | <i>string</i> | ( <i>optional</i> ) Item state:<br><b>0</b> , <i>ITEM_STATE_NORMAL</i><br><b>1</b> , <i>ITEM_STATE_NOTSUPPORTED</i>   |
| <b>lastlogsize</b>       | <i>number</i> | ( <i>optional</i> ) Last log size of log type items.  |
| <b>mtime</b>             | <i>number</i> | ( <i>optional</i> ) Modification time of log type items.  |
| <b>discovery data</b>    | <i>array</i>  | ( <i>optional</i> ) Array of discovery data objects.  |
| <b>clock</b>             | <i>number</i> | Discovery data timestamp.   |
| <b>druleid</b>           | <i>number</i> | Discovery rule identifier.  |
| <b>dcheckid</b>          | <i>number</i> | Discovery check identifier or null for discovery rule data.   |
| <b>type</b>              | <i>number</i> | Discovery check type:<br><br><b>-1</b> discovery rule data<br><b>0</b> , <i>SVC_SSH</i> - SSH service check<br><b>1</b> , <i>SVC_LDAP</i> - LDAP service check<br><b>2</b> , <i>SVC_SMTP</i> - SMTP service check<br><b>3</b> , <i>SVC_FTP</i> - FTP service check<br><b>4</b> , <i>SVC_HTTP</i> - HTTP service check<br><b>5</b> , <i>SVC_POP</i> - POP service check<br><b>6</b> , <i>SVC_NNTP</i> - NNTP service check<br><b>7</b> , <i>SVC_IMAP</i> - IMAP service check<br><b>8</b> , <i>SVC_TCP</i> - TCP port availability check<br><b>9</b> , <i>SVC_AGENT</i> - Zabbix agent<br><b>10</b> , <i>SVC_SNMPv1</i> - SNMPv1 agent<br><b>11</b> , <i>SVC_SNMPv2</i> - SNMPv2 agent<br><b>12</b> , <i>SVC_ICMPPING</i> - ICMP ping<br><b>13</b> , <i>SVC_SNMPv3</i> - SNMPv3 agent<br><b>14</b> , <i>SVC_HTTPS</i> - HTTPS service check<br><b>15</b> , <i>SVC_TELNET</i> - Telnet availability check |
| <b>ip</b>                | <i>string</i> | Host IP address.  |
| <b>dns</b>               | <i>string</i> | Host DNS name.  |
| <b>port</b>              | <i>number</i> | ( <i>optional</i> ) Service port number.  |
| <b>key_value</b>         | <i>string</i> | ( <i>optional</i> ) Item key for discovery check of type <b>9</b> <i>SVC_AGENT</i>  |
| <b>status</b>            | <i>string</i> | ( <i>optional</i> ) Value received from the service, can be empty for most services.  |
| <b>status</b>            | <i>number</i> | ( <i>optional</i> ) Service status:<br><br><b>0</b> , <i>DOBJECT_STATUS_UP</i> - Service UP<br><b>1</b> , <i>DOBJECT_STATUS_DOWN</i> - Service DOWN   |
| <b>auto registration</b> | <i>array</i>  | ( <i>optional</i> ) Array of autoregistration data objects.   |
| <b>clock</b>             | <i>number</i> | Autoregistration data timestamp.  |

| name                             | value type | description   |
|----------------------------------|------------|---|
| <b>host</b>                      | string     | Host name.  |
| <b>ip</b>                        | string     | (optional) Host IP address.   |
| <b>dns</b>                       | string     | (optional) Resolved DNS name from IP address.   |
| <b>port</b>                      | string     | (optional) Host port.   |
| <b>host_metadata</b>             | string     | (optional) Host metadata sent by the agent (based on HostMetadata or HostMetadataItem agent configuration parameter).   |
| <b>tasks</b>                     | array      | (optional) Array of tasks.  |
| <b>type</b>                      | number     | Task type:<br><br><b>0</b> , ZBX_TM_TASK_PROCESS_REMOTE_COMMAND_RESULT - remote command result  |
| <b>status</b>                    | number     | Remote-command execution status:<br><br><b>0</b> , ZBX_TM_REMOTE_COMMAND_COMPLETED - remote command completed successfully<br><b>1</b> , ZBX_TM_REMOTE_COMMAND_FAILED - remote command failed (optional) Error message.   |
| <b>error</b>                     | string     | Parent task ID.   |
| <b>parent_taskid</b>             | number     | (optional) 1 - there are more history data to send.   |
| <b>more</b>                      | number     | (optional) Data transfer timestamp (seconds).   |
| <b>clock</b>                     | number     | (optional) Data transfer timestamp (nanoseconds).   |
| <b>ns</b>                        | number     | Proxy version (<major>.<minor>.<build>).  |
| <b>version</b>                   | string     | Request success information ('success' or 'failed').  |
| server→proxy:<br><b>response</b> | string     | (optional) Array of tasks.  |
| <b>tasks</b>                     | array      | Task type:  |
| <b>type</b>                      | number     | <b>1</b> , ZBX_TM_TASK_PROCESS_REMOTE_COMMAND - remote command Task creation time.  |
| <b>clock</b>                     | number     | Time in seconds after which the task expires.   |
| <b>ttl</b>                       | number     | Remote-command type:  |
| <b>commandtype</b>               | number     | <b>0</b> , ZBX_SCRIPT_TYPE_CUSTOM_SCRIPT - use custom script<br><b>1</b> , ZBX_SCRIPT_TYPE_IPMI - use IPMI<br><b>2</b> , ZBX_SCRIPT_TYPE_SSH - use SSH<br><b>3</b> , ZBX_SCRIPT_TYPE_TELNET - use Telnet<br><b>4</b> , ZBX_SCRIPT_TYPE_GLOBAL_SCRIPT - use global script (currently functionally equivalent to custom script) |
| <b>command</b>                   | string     | Remote command to execute.  |
| <b>execute_on</b>                | number     | Execution target for custom scripts:<br><br><b>0</b> , ZBX_SCRIPT_EXECUTE_ON_AGENT - execute script on agent<br><b>1</b> , ZBX_SCRIPT_EXECUTE_ON_SERVER - execute script on server<br><b>2</b> , ZBX_SCRIPT_EXECUTE_ON_PROXY - execute script on proxy (optional) Port for Telnet and SSH commands.                           |
| <b>port</b>                      | number     | (optional) Authentication type for SSH commands.  |
| <b>authtype</b>                  | number     | (optional) User name for Telnet and SSH commands.   |
| <b>username</b>                  | string     | (optional) Password for Telnet and SSH commands.  |
| <b>password</b>                  | string     | (optional) Public key for SSH commands.   |
| <b>publickey</b>                 | string     | (optional) Private key for SSH commands.  |
| <b>privatekey</b>                | string     | Parent task ID.   |
| <b>parent_taskid</b>             | number     | Target host ID.   |
| <b>hostid</b>                    | number     |   |

Example:

server→proxy:

```
{
  "request": "proxy data"
}
```

proxy→server:

```

{
  "session": "12345678901234567890123456789012"
  "interface availability": [
    {
      "interfaceid": 1,
      "available": 1,
      "error": ""
    },
    {
      "interfaceid": 2,
      "available": 2,
      "error": "Get value from agent failed: cannot connect to [[127.0.0.1]:10049]: [111] Connection
    },
    {
      "interfaceid": 3,
      "available": 1,
      "error": ""
    },
    {
      "interfaceid": 4,
      "available": 1,
      "error": ""
    }
  ],
  "history data":[
    {
      "itemid":"12345",
      "clock":1478609647,
      "ns":332510044,
      "value":"52956612",
      "id": 1
    },
    {
      "itemid":"12346",
      "clock":1478609647,
      "ns":330690279,
      "state":1,
      "value":"Cannot find information for this network interface in /proc/net/dev.",
      "id": 2
    }
  ],
  "discovery data":[
    {
      "clock":1478608764,
      "drule":2,
      "dcheck":3,
      "type":12,
      "ip":"10.3.0.10",
      "dns":"vdebian",
      "status":1
    },
    {
      "clock":1478608764,
      "drule":2,
      "dcheck":null,
      "type":-1,
      "ip":"10.3.0.10",
      "dns":"vdebian",
      "status":1
    }
  ],
  "auto registration":[

```

```

    {
      "clock":1478608371,
      "host":"Logger1",
      "ip":"10.3.0.1",
      "dns":"localhost",
      "port":"10050"
    },
    {
      "clock":1478608381,
      "host":"Logger2",
      "ip":"10.3.0.2",
      "dns":"localhost",
      "port":"10050"
    }
  ],
  "tasks":[
    {
      "type": 0,
      "status": 0,
      "parent_taskid": 10
    },
    {
      "type": 0,
      "status": 1,
      "error": "No permissions to execute task.",
      "parent_taskid": 20
    }
  ],
  "version":"5.4.0"
}

```

server→proxy:

```

{
  "response": "success",
  "tasks":[
    {
      "type": 1,
      "clock": 1478608371,
      "ttl": 600,
      "commandtype": 2,
      "command": "restart_service1.sh",
      "execute_on": 2,
      "port": 80,
      "authtype": 0,
      "username": "userA",
      "password": "password1",
      "publickey": "MIGfMAOGCSqGS Ib3DQEBAQUAA4GNADCBiQKBgQCqGKuk01De7zhZj6+H0qtjTkVxwTCpvKe",
      "privatekey": "lsuusFncCzWBQ7RKNUSesmQRMSGkVb1/3j+skZ6UtW+5u091HNsj6tQ5QCqGKuk01De7zhd",
      "parent_taskid": 10,
      "hostid": 10070
    },
    {
      "type": 1,
      "clock": 1478608381,
      "ttl": 600,
      "commandtype": 1,
      "command": "restart_service2.sh",
      "execute_on": 0,
      "authtype": 0,
      "username": "",
      "password": "",
      "publickey": "",

```



```

        "privatekey": "",
        "parent_taskid": 20,
        "hostid": 10084
    }
]
}

```

## Active proxy

### Proxy heartbeat request

The proxy heartbeat request is sent by proxy to report that proxy is running. This request is sent every HeartbeatFrequency (proxy configuration parameter) seconds.

| name            | value type    | description  |
|-----------------|---------------|--|
| proxy→server:   |               |  |
| <b>request</b>  | <i>string</i> | 'proxy heartbeat'                                    |
| <b>host</b>     | <i>string</i> | Proxy name.  |
| <b>version</b>  | <i>string</i> | Proxy version (<major>.<minor>.<build>).             |
| server→proxy:   |               |  |
| <b>response</b> | <i>string</i> | Request success information ('success' or 'failed'). |

proxy→server:

```

{
  "request": "proxy heartbeat",
  "host": "Proxy #12",
  "version": "5.4.0"
}

```

server→proxy:

```

{
  "response": "success"
}

```

### Proxy config request

The proxy config request is sent by proxy to obtain proxy configuration data. This request is sent every ConfigFrequency (proxy configuration parameter) seconds.

| name                 | value type           | description   |
|----------------------|----------------------|---|
| proxy→server:        |                      |   |
| <b>request</b>       | <i>string</i>        | 'proxy config'  |
| <b>host</b>          | <i>string</i>        | Proxy name.   |
| <b>version</b>       | <i>string</i>        | Proxy version (<major>.<minor>.<build>).                                |
| server→proxy:        |                      |   |
| <b>request</b>       | <i>string</i>        | 'proxy config'  |
| <b>&lt;table&gt;</b> | <i>object</i>        | One or more objects with <table> data.                                  |
| <b>fields</b>        | <i>array</i>         | Array of field names.   |
| -                    | <i>string</i>        | Field name.   |
| <b>data</b>          | <i>array</i>         | Array of rows.  |
| -                    | <i>array</i>         | Array of columns.   |
| -                    | <i>string,number</i> | Column value with type depending on the column type in database schema. |
| proxy→server:        |                      |   |
| <b>response</b>      | <i>string</i>        | Request success information ('success' or 'failed').                    |

### Example:

proxy→server:

```

{
  "request": "proxy config",

```

```

"host": "Proxy #12",
"version": "5.4.0"
}

```

server→proxy:

```

{
  "globalmacro":{
    "fields":[
      "globalmacroid",
      "macro",
      "value"
    ],
    "data":[
      [
        2,
        "{$SNMP_COMMUNITY}",
        "public"
      ]
    ]
  },
  "hosts":{
    "fields":[
      "hostid",
      "host",
      "status",
      "ipmi_authtype",
      "ipmi_privilege",
      "ipmi_username",
      "ipmi_password",
      "name",
      "tls_connect",
      "tls_accept",
      "tls_issuer",
      "tls_subject",
      "tls_psk_identity",
      "tls_psk"
    ],
    "data":[
      [
        10001,
        "Linux",
        3,
        -1,
        2,
        "",
        "",
        "Linux",
        1,
        1,
        "",
        "",
        "",
        ""
      ],
      [
        10050,
        "Zabbix Agent",
        3,
        -1,
        2,
        "",
        "",
        ""
      ]
    ]
  }
}

```

```

        "Zabbix Agent",
        1,
        1,
        "",
        "",
        "",
        ""
    ],
    [
        10105,
        "Logger",
        0,
        -1,
        2,
        "",
        "",
        "Logger",
        1,
        1,
        "",
        "",
        "",
        ""
    ]
]
},
"interface":{
    "fields":[
        "interfaceid",
        "hostid",
        "main",
        "type",
        "useip",
        "ip",
        "dns",
        "port",
        "bulk"
    ],
    "data":[
        [
            2,
            10105,
            1,
            1,
            1,
            "127.0.0.1",
            "",
            "10050",
            1
        ]
    ]
},
...
}

```

proxy→server:

```

{
    "response": "success"
}

```

#### Proxy data request

The proxy data request is sent by proxy to provide host interface availability, history, discovery and autoregistration data. This

request is sent every DataSenderFrequency (proxy configuration parameter) seconds. Note that active proxy will still poll Zabbix server every second for remote command tasks (with an empty proxy data request).

| name                            | value type    | description   |
|---------------------------------|---------------|---|
| proxy→server:                   |               |   |
| <b>request</b>                  | <i>string</i> | 'proxy data'  |
| <b>host</b>                     | <i>string</i> | Proxy name.   |
| <b>session</b>                  | <i>string</i> | Data session token.   |
| <b>interface</b>                | <i>array</i>  | (optional) Array of interface availability data objects.  |
| <b>avail-<br/>abil-<br/>ity</b> |               |   |
| <b>interfaceid</b>              | <i>number</i> | Interface identifier.   |
| <b>available</b>                | <i>number</i> | Interface availability:<br><br><b>0</b> , <i>INTERFACE_AVAILABLE_UNKNOWN</i> - unknown<br><b>1</b> , <i>INTERFACE_AVAILABLE_TRUE</i> - available<br><b>2</b> , <i>INTERFACE_AVAILABLE_FALSE</i> - unavailable   |
| <b>error</b>                    | <i>string</i> | Interface error message or empty string.  |
| <b>history</b>                  | <i>array</i>  | (optional) Array of history data objects.   |
| <b>data</b>                     |               |   |
| <b>itemid</b>                   | <i>number</i> | Item identifier.  |
| <b>clock</b>                    | <i>number</i> | Item value timestamp (seconds).   |
| <b>ns</b>                       | <i>number</i> | Item value timestamp (nanoseconds).   |
| <b>value</b>                    | <i>string</i> | (optional) Item value.  |
| <b>id</b>                       | <i>number</i> | Value identifier (ascending counter, unique within one data session).   |
| <b>timestamp</b>                | <i>number</i> | (optional) Timestamp of log type items.   |
| <b>source</b>                   | <i>string</i> | (optional) Eventlog item source value.  |
| <b>severity</b>                 | <i>number</i> | (optional) Eventlog item severity value.  |
| <b>eventid</b>                  | <i>number</i> | (optional) Eventlog item eventid value.   |
| <b>state</b>                    | <i>string</i> | (optional) Item state:<br><b>0</b> , <i>ITEM_STATE_NORMAL</i><br><b>1</b> , <i>ITEM_STATE_NOTSUPPORTED</i>  |
| <b>lastlogsize</b>              | <i>number</i> | (optional) Last log size of log type items.   |
| <b>mtime</b>                    | <i>number</i> | (optional) Modification time of log type items.   |
| <b>discovery</b>                | <i>array</i>  | (optional) Array of discovery data objects.   |
| <b>data</b>                     |               |   |
| <b>clock</b>                    | <i>number</i> | Discovery data timestamp.   |
| <b>druleid</b>                  | <i>number</i> | Discovery rule identifier.  |
| <b>dcheckid</b>                 | <i>number</i> | Discovery check identifier or null for discovery rule data.   |
| <b>type</b>                     | <i>number</i> | Discovery check type:<br><br><b>-1</b> discovery rule data<br><b>0</b> , <i>SVC_SSH</i> - SSH service check<br><b>1</b> , <i>SVC_LDAP</i> - LDAP service check<br><b>2</b> , <i>SVC_SMTP</i> - SMTP service check<br><b>3</b> , <i>SVC_FTP</i> - FTP service check<br><b>4</b> , <i>SVC_HTTP</i> - HTTP service check<br><b>5</b> , <i>SVC_POP</i> - POP service check<br><b>6</b> , <i>SVC_NNTP</i> - NNTP service check<br><b>7</b> , <i>SVC_IMAP</i> - IMAP service check<br><b>8</b> , <i>SVC_TCP</i> - TCP port availability check<br><b>9</b> , <i>SVC_AGENT</i> - Zabbix agent<br><b>10</b> , <i>SVC_SNMPv1</i> - SNMPv1 agent<br><b>11</b> , <i>SVC_SNMPv2</i> - SNMPv2 agent<br><b>12</b> , <i>SVC_ICMPPING</i> - ICMP ping<br><b>13</b> , <i>SVC_SNMPv3</i> - SNMPv3 agent<br><b>14</b> , <i>SVC_HTTPS</i> - HTTPS service check<br><b>15</b> , <i>SVC_TELNET</i> - Telnet availability check |
| <b>ip</b>                       | <i>string</i> | Host IP address.  |
| <b>dns</b>                      | <i>string</i> | Host DNS name.  |
| <b>port</b>                     | <i>number</i> | (optional) Service port number.   |

| name                    | value type | description  |
|-------------------------|------------|--|
| <b>key_</b>             | string     | (optional) Item key for discovery check of type <b>9 SVC_AGENT</b>   |
| <b>value</b>            | string     | (optional) Value received from the service, can be empty for most services.  |
| <b>status</b>           | number     | (optional) Service status:<br><br><b>0</b> , <i>DOBJECT_STATUS_UP</i> - Service UP<br><b>1</b> , <i>DOBJECT_STATUS_DOWN</i> - Service DOWN   |
| <b>autoregistration</b> | array      | (optional) Array of autoregistration data objects.   |
| <b>clock</b>            | number     | Autoregistration data timestamp.   |
| <b>host</b>             | string     | Host name.   |
| <b>ip</b>               | string     | (optional) Host IP address.  |
| <b>dns</b>              | string     | (optional) Resolved DNS name from IP address.  |
| <b>port</b>             | string     | (optional) Host port.  |
| <b>host_metadata</b>    | string     | (optional) Host metadata sent by the agent (based on HostMetadata or HostMetadataItem agent configuration parameter).  |
| <b>tasks</b>            | array      | (optional) Array of tasks.   |
| <b>type</b>             | number     | Task type:<br><br><b>0</b> , <i>ZBX_TM_TASK_PROCESS_REMOTE_COMMAND_RESULT</i> - remote command result  |
| <b>status</b>           | number     | Remote-command execution status:<br><br><b>0</b> , <i>ZBX_TM_REMOTE_COMMAND_COMPLETED</i> - remote command completed successfully<br><b>1</b> , <i>ZBX_TM_REMOTE_COMMAND_FAILED</i> - remote command failed  |
| <b>error</b>            | string     | (optional) Error message.  |
| <b>parent_taskid</b>    | number     | Parent task ID.  |
| <b>more</b>             | number     | (optional) 1 - there are more history data to send.  |
| <b>clock</b>            | number     | (optional) Data transfer timestamp (seconds).  |
| <b>ns</b>               | number     | (optional) Data transfer timestamp (nanoseconds).  |
| <b>version</b>          | string     | Proxy version (<major>.<minor>.<build>).   |
| server→proxy:           |            |  |
| <b>response</b>         | string     | Request success information ('success' or 'failed').   |
| <b>upload</b>           | string     | Upload control for historical data (history, autoregistration, host availability, network discovery).<br><br>Possible values:<br><b>enabled</b> - normal operation<br><b>disabled</b> - server is not accepting data (possibly due to internal cache over limit)   |
| <b>tasks</b>            | array      | (optional) Array of tasks.   |
| <b>type</b>             | number     | Task type:<br><br><b>1</b> , <i>ZBX_TM_TASK_PROCESS_REMOTE_COMMAND</i> - remote command  |
| <b>clock</b>            | number     | Task creation time.  |
| <b>ttd</b>              | number     | Time in seconds after which the task expires.  |
| <b>commandtype</b>      | number     | Remote-command type:<br><br><b>0</b> , <i>ZBX_SCRIPT_TYPE_CUSTOM_SCRIPT</i> - use custom script<br><b>1</b> , <i>ZBX_SCRIPT_TYPE_IPMI</i> - use IPMI<br><b>2</b> , <i>ZBX_SCRIPT_TYPE_SSH</i> - use SSH<br><b>3</b> , <i>ZBX_SCRIPT_TYPE_TELNET</i> - use Telnet<br><b>4</b> , <i>ZBX_SCRIPT_TYPE_GLOBAL_SCRIPT</i> - use global script (currently functionally equivalent to custom script) |
| <b>command</b>          | string     | Remote command to execute.   |
| <b>execute_on</b>       | number     | Execution target for custom scripts:<br><br><b>0</b> , <i>ZBX_SCRIPT_EXECUTE_ON_AGENT</i> - execute script on agent<br><b>1</b> , <i>ZBX_SCRIPT_EXECUTE_ON_SERVER</i> - execute script on server<br><b>2</b> , <i>ZBX_SCRIPT_EXECUTE_ON_PROXY</i> - execute script on proxy  |
| <b>port</b>             | number     | (optional) Port for Telnet and SSH commands.   |
| <b>authtype</b>         | number     | (optional) Authentication type for SSH commands.   |

| name                 | value type    | description                                       |
|----------------------|---------------|---|
| <b>username</b>      | <i>string</i> | (optional) User name for Telnet and SSH commands. |
| <b>password</b>      | <i>string</i> | (optional) Password for Telnet and SSH commands.  |
| <b>publickey</b>     | <i>string</i> | (optional) Public key for SSH commands.           |
| <b>privatekey</b>    | <i>string</i> | (optional) Private key for SSH commands.          |
| <b>parent_taskid</b> | <i>number</i> | Parent task ID.                                   |
| <b>hostid</b>        | <i>number</i> | Target host ID.                                   |

Example:

proxy→server:

```
{
  "request": "proxy data",
  "host": "Proxy #12",
  "session": "12345678901234567890123456789012",
  "interface availability": [
    {
      "interfaceid": 1,
      "available": 1,
      "error": ""
    },
    {
      "interfaceid": 2,
      "available": 2,
      "error": "Get value from agent failed: cannot connect to [[127.0.0.1]:10049]: [111] Connection
    },
    {
      "interfaceid": 3,
      "available": 1,
      "error": ""
    },
    {
      "interfaceid": 4,
      "available": 1,
      "error": ""
    }
  ],
  "history data": [
    {
      "itemid": "12345",
      "clock": 1478609647,
      "ns": 332510044,
      "value": "52956612",
      "id": 1
    },
    {
      "itemid": "12346",
      "clock": 1478609647,
      "ns": 330690279,
      "state": 1,
      "value": "Cannot find information for this network interface in /proc/net/dev.",
      "id": 2
    }
  ],
  "discovery data": [
    {
      "clock": 1478608764,
      "drule": 2,
      "dcheck": 3,
      "type": 12,
      "ip": "10.3.0.10",
      "dns": "vdebian",

```

```

        "status":1
    },
    {
        "clock":1478608764,
        "drule":2,
        "dcheck":null,
        "type":-1,
        "ip":"10.3.0.10",
        "dns":"vdebian",
        "status":1
    }
],
"auto_registration":[
    {
        "clock":1478608371,
        "host":"Logger1",
        "ip":"10.3.0.1",
        "dns":"localhost",
        "port":"10050"
    },
    {
        "clock":1478608381,
        "host":"Logger2",
        "ip":"10.3.0.2",
        "dns":"localhost",
        "port":"10050"
    }
],
"tasks":[
    {
        "type": 2,
        "clock":1478608371,
        "ttl": 600,
        "commandtype": 2,
        "command": "restart_service1.sh",
        "execute_on": 2,
        "port": 80,
        "authtype": 0,
        "username": "userA",
        "password": "password1",
        "publickey": "MIGfMA0GCSqGSIb3DQEBAQUAA4GNADCBiQKBgQCqGKuk01De7zhZj6+H0qtjTkVxwTCpvKe",
        "privatekey": "lsuusFncCzWBQ7RKNUSesmQRMSGkVb1/3j+skZ6UtW+5u09lHNsj6tQ5QCqGKuk01De7zhd",
        "parent_taskid": 10,
        "hostid": 10070
    },
    {
        "type": 2,
        "clock":1478608381,
        "ttl": 600,
        "commandtype": 1,
        "command": "restart_service2.sh",
        "execute_on": 0,
        "authtype": 0,
        "username": "",
        "password": "",
        "publickey": "",
        "privatekey": "",
        "parent_taskid": 20,
        "hostid": 10084
    }
],
"tasks": [

```

```

    {
      "type": 0,
      "status": 0,
      "parent_taskid": 10
    },
    {
      "type": 0,
      "status": 1,
      "error": "No permissions to execute task.",
      "parent_taskid": 20
    }
  ],
  "version": "5.4.0"
}

```

server→proxy:

```

{
  "response": "success",
  "upload": "enabled",
  "tasks": [
    {
      "type": 1,
      "clock": 1478608371,
      "ttl": 600,
      "commandtype": 2,
      "command": "restart_service1.sh",
      "execute_on": 2,
      "port": 80,
      "authtype": 0,
      "username": "userA",
      "password": "password1",
      "publickey": "MIGfMAOGCSqGSIb3DQEBAQUAA4GNADCBiQKBgQCqGKuk01De7zhZj6+H0qtjTkVxwTCpvKe",
      "privatekey": "lsuusFncCzWBQ7RKNUSesmQRMSGkVb1/3j+skZ6UtW+5u09lHNSj6tQ5QCqGKuk01De7zhd",
      "parent_taskid": 10,
      "hostid": 10070
    },
    {
      "type": 1,
      "clock": 1478608381,
      "ttl": 600,
      "commandtype": 1,
      "command": "restart_service2.sh",
      "execute_on": 0,
      "authtype": 0,
      "username": "",
      "password": "",
      "publickey": "",
      "privatekey": "",
      "parent_taskid": 20,
      "hostid": 10084
    }
  ]
}

```

## 2 Zabbix agent protocol

Please refer to [Passive and active agent checks](#) page for more information.

## 3 Zabbix agent 2 protocol

Overview



This section provides information on:

- Agent2 -> Server : active checks request
- Server -> Agent2 : active checks response
- Agent2 -> Server : agent data request
- Server -> Agent2 : agent data response

#### Active checks request

The active checks request is used to obtain the active checks to be processed by agent. This request is sent by the agent upon start and then with *RefreshActiveChecks* intervals.

| Field         | Type   | Mandatory | Value   |
|---------------|--------|-----------|---|
| request       | string | yes       | active checks   |
| host          | string | yes       | Host name.  |
| version       | string | yes       | The agent version: <major>.<minor>.   |
| host_metadata | string | no        | The configuration parameter HostMetadata or HostMetadataItem metric value.                |
| interface     | string | no        | The configuration parameter HostInterface or HostInterfaceItem metric value.              |
| ip            | string | no        | The configuration parameter ListenIP first IP if set.                                     |
| port          | number | no        | The configuration parameter ListenPort value if set and not default agent listening port. |

Example:

```
{
  "request": "active checks",
  "host": "Zabbix server",
  "version": "6.0",
  "host_metadata": "mysql,nginx",
  "hostinterface": "zabbix.server.lan",
  "ip": "159.168.1.1",
  "port": 12050
}
```

#### Active checks response

The active checks response is sent by the server back to agent after processing active checks request.

| Field           | Type                     | Mandatory | Value   |
|-----------------|--------------------------|-----------|---|
| response        | string                   | yes       | success   failed                                    |
| info            | string                   | no        | Error information in the case of failure.           |
| data            | array<br>of ob-<br>jects | no        | Active check items.                                 |
| key             | string                   | no        | Item key with expanded macros.                      |
| itemid          | number                   | no        | Item identifier.                                    |
| delay           | string                   | no        | Item update interval.                               |
| lastlogsize     | number                   | no        | Item lastlogsize.                                   |
| mtime           | number                   | no        | Item mtime.   |
| regexp          | array<br>of ob-<br>jects | no        | Global regular expressions.                         |
| name            | string                   | no        | Global regular expression name.                     |
| expression      | string                   | no        | Global regular expression.                          |
| expression_type | number                   | no        | Global regular expression type.                     |
| exp_delimiter   | string                   | no        | Global regular expression delimiter.                |
| case_sensitive  | number                   | no        | Global regular expression case sensitivity setting. |

Example:

```
{
  "response": "success",
  "data": [
    {
      "key": "log[/home/zabbix/logs/zabbix_agentd.log]",
      "itemid": 1234,
      "delay": "30s",
      "lastlogsize": 0,
      "mtime": 0
    },
    {
      "key": "agent.version",
      "itemid": 5678,
      "delay": "10m",
      "lastlogsize": 0,
      "mtime": 0
    }
  ]
}
```

#### Agent data request

The agent data request contains the gathered item values.

| Field       | Type             | Mandatory | Value   |
|-------------|------------------|-----------|---|
| request     | string           | yes       | agent data  |
| host        | string           | yes       | Host name.  |
| version     | string           | yes       | The agent version: <major>.<minor>.   |
| session     | string           | yes       | Unique session identifier generated each time when agent is started.  |
| data        | array of objects | yes       | Item values.  |
| id          | number           | yes       | The value identifier (incremental counter used for checking duplicated values in the case of network problems). |
| itemid      | number           | yes       | Item identifier.  |
| value       | string           | no        | The item value.   |
| lastlogsize | number           | no        | The item lastlogsize.   |
| mtime       | number           | no        | The item mtime.   |
| state       | number           | no        | The item state.   |
| source      | string           | no        | The value event log source.   |
| eventid     | number           | no        | The value event log eventid.  |
| severity    | number           | no        | The value event log severity.   |
| timestamp   | number           | no        | The value event log timestamp.  |
| clock       | number           | yes       | The value timestamp (seconds since Epoch).  |
| ns          | number           | yes       | The value timestamp nanoseconds.  |

Example:

```
{
  "request": "agent data",
  "data": [
    {
      "id": 1,
      "itemid": 5678,
      "value": "2.4.0",
      "clock": 1400675595,
      "ns": 76808644
    },
    {
      "id": 2,
      "itemid": 1234,
      "lastlogsize": 112,
      "value": " 19845:20140621:141708.521 Starting Zabbix Agent [hostname>]. Zabbix 2.4.0 (revision 5000"
    }
  ]
}
```

```

    "clock": 1400675595,
    "ns": 77053975
  }
],
"host": "Zabbix server",
"version": "6.0",
"session": "1234456akdsjhfoi"
}

```

Agent data response

The agent data response is sent by the server back to agent after processing the agent data request.

| Field    | Type          | Mandatory | Value                    |
|----------|---------------|-----------|--------------------------|
| response | <i>string</i> | yes       | success   failed         |
| info     | <i>string</i> | yes       | Item processing results. |

Example:

```

{
  "response": "success",
  "info": "processed: 2; failed: 0; total: 2; seconds spent: 0.003534"
}

```

#### 4 Zabbix agent 2 plugin protocol

Zabbix agent 2 protocol is based on code, size and data model.

Code

| Type | Size | Comments  |
|------|------|---|
| Byte | 4    | Payload type, currently only JSON is supported. |

Size

| Type | Size | Comments                              |
|------|------|---------------------------------------|
| Byte | 4    | Size of the current payload in bytes. |

Payload data

| Type | Size                             | Comments             |
|------|----------------------------------|----------------------|
| Byte | Defined by the <i>Size</i> field | JSON formatted data. |

Payload data definition

Common data

These parameters are present in all requests/responses:

| Name | Type   | Comments  |
|------|--------|---|
| id   | uint32 | For requests - the incrementing identifier used to link requests with responses. Unique within a request direction (i.e. from agent to plugin or from plugin to agent). |
| type | uint32 | For responses - ID of the corresponding request. The request type.  |

Log request

A request sent by a plugin to write a log message into the agent log file.

|           |                |
|-----------|----------------|
| direction | plugin → agent |
| response  | no             |

Parameters specific to log requests:

| Name     | Type   | Comments                          |
|----------|--------|-----------------------------------|
| severity | uint32 | The message severity (log level). |
| message  | string | The message to log.               |

*Example:*

```
{"id":0,"type":1,"severity":3,"message":"message"}
```

Register request

A request sent by the agent during the agent startup phase to obtain provided metrics to register a plugin.

|           |                |
|-----------|----------------|
| direction | agent → plugin |
| response  | yes            |

Parameters specific to register requests:

| Name    | Type   | Comments                             |
|---------|--------|--------------------------------------|
| version | string | The protocol version <major>.<minor> |

*Example:*

```
{"id":1,"type":2,"version":"1.0"}
```

Register response

Plugin's response to the register request.

|           |                |
|-----------|----------------|
| direction | plugin → agent |
| response  | n/a            |

Parameters specific to register responses:

| Name       | Type                        | Comments   |
|------------|-----------------------------|--|
| name       | string                      | The plugin name.   |
| metrics    | array of strings (optional) | The metrics with descriptions as used in the plugin. Returns RegisterMetrics(). Absent if error is returned. |
| interfaces | uint32 (optional)           | The bit mask of plugin's supported interfaces. Absent if error is returned.                                  |
| error      | string (optional)           | An error message returned if a plugin cannot be started. Absent, if metrics are returned.                    |

*Examples:*

```
{"id":2,"type":3,"metrics":["external.test", "External exporter Test."], "interfaces": 4}
```

or

```
{"id":2,"type":3,"error":"error message"}
```

## Start request

A request to execute the Start function of the Runner interface.

|           |                |
|-----------|----------------|
| direction | agent → plugin |
| response  | no             |

The request doesn't have specific parameters, it only contains **common data** parameters.

*Example:*

```
{"id":3,"type":4}
```

## Terminate request

A request sent by the agent to shutdown a plugin.

|           |                |
|-----------|----------------|
| direction | agent → plugin |
| response  | no             |

The request doesn't have specific parameters, it only contains **common data** parameters.

*Example:*

```
{"id":3,"type":5}
```

## Export request

A request to execute the Export function of the Exporter interface.

|           |                |
|-----------|----------------|
| direction | agent → plugin |
| response  | no             |

Parameters specific to export requests:

| Name       | Type                        | Comments                            |
|------------|-----------------------------|-------------------------------------|
| key        | string                      | The plugin key.                     |
| parameters | array of strings (optional) | The parameters for Export function. |

*Example:*

```
{"id":4,"type":6,"key":"test.key","parameters":["foo","bar"]}
```

## Export response

Response from the Export function of the Exporter interface.

|           |                |
|-----------|----------------|
| direction | plugin → agent |
| response  | n/a            |

Parameters specific to export responses:

| Name  | Type              | Comments   |
|-------|-------------------|--|
| value | string (optional) | Response value from the Export function. Absent, if error is returned.                                 |
| error | string (optional) | Error message if the Export function has not been executed successfully. Absent, if value is returned. |

*Examples:*

```
{"id":5,"type":7,"value":"response"}
```

or

```
{"id":5,"type":7,"error":"error message"}
```

Configure request

A request to execute the *Configure* function of the *Configurator* interface.

|           |                |
|-----------|----------------|
| direction | agent → plugin |
| response  | n/a            |

Parameters specific to *Configure* requests:

| Name            | Type                   | Comments  |
|-----------------|------------------------|---|
| global_options  | JSON object            | JSON object containing global agent configuration options.                |
| private_options | JSON object (optional) | JSON object containing private plugin configuration options, if provided. |

Example:

```
{"id":6,"type":8,"global_options":{"..."},"private_options":{"..."}}
```

Validate request

A request to execute *Validate* function of the *Configurator* interface.

|           |                |
|-----------|----------------|
| direction | agent → plugin |
| response  | yes            |

Parameters specific to *Validate* requests:

| Name            | Type                   | Comments  |
|-----------------|------------------------|---|
| private_options | JSON object (optional) | JSON object containing private plugin configuration options, if provided. |

Example:

```
{"id":7,"type":9,"private_options":{"..."}}
```

Validate response

Response from *Validate* function of *Configurator* interface.

|           |                |
|-----------|----------------|
| direction | plugin → agent |
| response  | n/a            |

Parameters specific to *Validate* responses:

| Name  | Type              | Comments  |
|-------|-------------------|---|
| error | string (optional) | An error message returned if the <i>Validate</i> function is not executed successfully.<br>Absent if executed successfully. |

Example:

```
{"id":8,"type":10}
```

or

```
{"id":8,"type":10,"error":"error message"}
```

5 Zabbix sender protocol

Please refer to the [trapper item](#) page for more information.

6 Header

Overview

The header is present in all request and response messages between Zabbix components. It is required to determine the message length, if it is compressed or not, if it is a large packet or not.

Zabbix communications protocol has 1GB packet size limit per connection. The limit of 1GB is applied to both the received packet data length and the uncompressed data length.

When sending configuration to Zabbix proxy, the packet size limit is increased to 4GB to allow syncing large configurations. When data length before compression exceeds 4GB, Zabbix server automatically starts using the large packet format (0x04 flag) which increases the packet size limit to 16GB.

Note that while a large packet format can be used for sending any data, currently only the Zabbix proxy configuration syncer can handle packets that are larger than 1GB.

Structure

The header consists of four fields. All numbers in the header are formatted as little-endian.

| Field      | Size | Size<br>(large<br>packet) | Description  |
|------------|------|---------------------------|--|
| <PROTOCOL> | 4    | 4                         | "ZBXD" or 5A 42 58 44  |
| <FLAGS>    | 1    | 1                         | Protocol flags:<br>0x01 - Zabbix communications protocol<br>0x02 - compression<br>0x04 - large packet                |
| <DATALEN>  | 4    | 8                         | Data length.   |
| <RESERVED> | 4    | 8                         | When compression is used (0x02 flag) - the length of uncompressed data<br>When compression is not used - 00 00 00 00 |

Examples

Here are some code snippets showing how to add Zabbix protocol header to the data you want to send in order to obtain the packet you should send to Zabbix so that it is interpreted correctly. These code snippets assume that the data is not larger than 1GB, thus the large packet format is not used.

Python

```
packet = b"ZBXD\1" + struct.pack("<II", len(data), 0) + data
```

or

```
def zbx_create_header(plain_data_size, compressed_data_size=None):
    protocol = b"ZBXD"
    flags = 0x01
    if compressed_data_size is None:
        datalen = plain_data_size
        reserved = 0
    else:
        flags |= 0x02
        datalen = compressed_data_size
        reserved = plain_data_size
    return protocol + struct.pack("<BII", flags, datalen, reserved)

packet = zbx_create_header(len(data)) + data
```

Perl

```
my $packet = "ZBXD\1" . pack("(II)<", length($data), 0) . $data;
```

or

```
sub zbx_create_header($;$)
{
    my $plain_data_size = shift;
    my $compressed_data_size = shift;

    my $protocol = "ZBXD";
    my $flags = 0x01;
    my $datalen;
    my $reserved;

    if (!defined($compressed_data_size))
    {
        $datalen = $plain_data_size;
        $reserved = 0;
    }
    else
    {
        $flags |= 0x02;
        $datalen = $compressed_data_size;
        $reserved = $plain_data_size;
    }

    return $protocol . chr($flags) . pack("(II)<", $datalen, $reserved);
}

my $packet = zbx_create_header(length($data)) . $data;
```

PHP

```
$packet = "ZBXD\1" . pack("VV", strlen($data), 0) . $data;
```

or

```
function zbx_create_header($plain_data_size, $compressed_data_size = null)
{
    $protocol = "ZBXD";
    $flags = 0x01;
    if (is_null($compressed_data_size))
    {
        $datalen = $plain_data_size;
        $reserved = 0;
    }
    else
    {
        $flags |= 0x02;
        $datalen = $compressed_data_size;
        $reserved = $plain_data_size;
    }
    return $protocol . chr($flags) . pack("VV", $datalen, $reserved);
}

$packet = zbx_create_header(strlen($data)) . $data;
```

Bash

```
datalen=$(printf "%08x" ${#data})
datalen="\x${datalen:6:2}\x${datalen:4:2}\x${datalen:2:2}\x${datalen:0:2}"
printf "ZBXD\1${datalen}\0\0\0\0%s" "$data"
```

## 7 Real-time export protocol



This section presents details of the **real-time export** protocol in a newline-delimited JSON format for:

- **trigger events**
- **item values**
- **trends**

All files have a .ndjson extension. Each line of the export file is a JSON object.

Trigger events

The following information is exported for a problem event:

| Field           | Type   | Description   |
|-----------------|--------|---|
| <i>clock</i>    | number | Number of seconds since Epoch to the moment when problem was detected (integer part).                               |
| <i>ns</i>       | number | Number of nanoseconds to be added to <i>clock</i> to get a precise problem detection time.                          |
| <i>value</i>    | number | 1 (always).   |
| <i>eventid</i>  | number | Problem event ID.   |
| <i>name</i>     | string | Problem event name.   |
| <i>severity</i> | number | Problem event severity (0 - Not classified, 1 - Information, 2 - Warning, 3 - Average, 4 - High, 5 - Disaster).     |
| <i>hosts</i>    | array  | List of hosts involved in the trigger expression; there should be at least one element in array.                    |
| -               | object |   |
| <i>host</i>     | string | Host name.  |
| <i>name</i>     | string | Visible host name.  |
| <i>groups</i>   | array  | List of host groups of all hosts involved in the trigger expression; there should be at least one element in array. |
| -               | string | Host group name.  |
| <i>tags</i>     | array  | List of problem tags (can be empty).  |
| -               | object |   |
| <i>tag</i>      | string | Tag name.   |
| <i>value</i>    | string | Tag value (can be empty).   |

The following information is exported for a recovery event:

| Field            | Type   | Description   |
|------------------|--------|---|
| <i>clock</i>     | number | Number of seconds since Epoch to the moment when problem was resolved (integer part).       |
| <i>ns</i>        | number | Number of nanoseconds to be added to <i>clock</i> to get a precise problem resolution time. |
| <i>value</i>     | number | 0 (always).   |
| <i>eventid</i>   | number | Recovery event ID.  |
| <i>p_eventid</i> | number | Problem event ID.   |

Examples

Problem:

```
{"clock":1519304285,"ns":123456789,"value":1,"name":"Either Zabbix agent is unreachable on Host B or polle
```

Recovery:

```
{"clock":1519304345,"ns":987654321,"value":0,"eventid":43,"p_eventid":42}
```

Problem (multiple problem event generation):

```
{"clock":1519304286,"ns":123456789,"value":1,"eventid":43,"name":"Either Zabbix agent is unreachable on Ho
```

```
{"clock":1519304286,"ns":123456789,"value":1,"eventid":43,"name":"Either Zabbix agent is unreachable on Ho
```

Recovery:

```
{"clock":1519304346,"ns":987654321,"value":0,"eventid":44,"p_eventid":43}
```

```
{"clock":1519304346,"ns":987654321,"value":0,"eventid":44,"p_eventid":42}
```

## Item values

The following information is exported for a collected item value:

| Field            | Type  | Description  |
|------------------|---|--|
| <i>host</i>      | object  | Host name of the item host.  |
| <i>host</i>      | string  | Host name.   |
| <i>name</i>      | string  | Visible host name.   |
| <i>groups</i>    | array   | List of host groups of the item host; there should be at least one element in array.               |
| -                | string  | Host group name.   |
| <i>itemid</i>    | number  | Item ID.   |
| <i>name</i>      | string  | Visible item name.   |
| <i>clock</i>     | number  | Number of seconds since Epoch to the moment when value was collected (integer part).               |
| <i>ns</i>        | number  | Number of nanoseconds to be added to <i>clock</i> to get a precise value collection time.          |
| <i>timestamp</i> | number  | 0 if not available.  |
| (Log only)       |   |  |
| <i>source</i>    | string  | Empty string if not available.   |
| (Log only)       |   |  |
| <i>severity</i>  | number  | 0 if not available.  |
| (Log only)       |   |  |
| <i>eventid</i>   | number  | 0 if not available.  |
| (Log only)       |   |  |
| <i>value</i>     | number (for numeric items) or string (for text items) | Collected item value.  |
| <i>type</i>      | number  | Collected value type:<br>0 - numeric float, 1 - character, 2 - log, 3 - numeric unsigned, 4 - text |

## Examples

Numeric (unsigned) value:

```
{"host":{"host":"Host B","name":"Host B visible"},"groups":["Group X","Group Y","Group Z"],"itemid":3,"name":"Host B visible"}
```

Numeric (float) value:

```
{"host":{"host":"Host B","name":"Host B visible"},"groups":["Group X","Group Y","Group Z"],"itemid":4,"name":"Host B visible"}
```

Character, text value:

```
{"host":{"host":"Host B","name":"Host B visible"},"groups":["Group X","Group Y","Group Z"],"itemid":2,"name":"Host B visible"}
```

Log value:

```
{"host":{"host":"Host A","name":"Host A visible"},"groups":["Group X","Group Y","Group Z"],"itemid":1,"name":"Host A visible"}
```

## Trends

The following information is exported for a calculated trend value:

| Field         | Type   | Description  |
|---------------|--------|--|
| <i>host</i>   | object | Host name of the item host.  |
| <i>host</i>   | string | Host name.   |
| <i>name</i>   | string | Visible host name.   |
| <i>groups</i> | array  | List of host groups of the item host; there should be at least one element in array. |
| -             | string | Host group name.   |
| <i>itemid</i> | number | Item ID.   |

| Field        | Type   | Description  |
|--------------|--------|--|
| <i>name</i>  | string | Visible item name.   |
| <i>clock</i> | number | Number of seconds since Epoch to the moment when value was collected (integer part). |
| <i>count</i> | number | Number of values collected for a given hour.   |
| <i>min</i>   | number | Minimum item value for a given hour.   |
| <i>avg</i>   | number | Average item value for a given hour.   |
| <i>max</i>   | number | Maximum item value for a given hour.   |
| <i>type</i>  | number | Value type:<br>0 - numeric float, 3 - numeric unsigned                               |

## Examples

Numeric (unsigned) value:

```
{"host":{"host":"Host B","name":"Host B visible"},"groups":["Group X","Group Y","Group Z"],"itemid":3,"name":"Host B visible"}
```

Numeric (float) value:

```
{"host":{"host":"Host B","name":"Host B visible"},"groups":["Group X","Group Y","Group Z"],"itemid":4,"name":"Host B visible"}
```

## 4 Items

Please use the sidebar to access content in this section.

## 1 Items supported by platform

The table displays support for Zabbix **agent items** on various platforms:

- Items marked with "X" are supported, the ones marked with "-" are not supported.
- If an item is marked with "?", it is not known whether it is supported or not.
- If an item is marked with "r", it means that it requires root privileges.
- Parameters that are included in angle brackets <like\_this> are optional.

### Note:

Windows-only Zabbix agent items are not included in this table.

|                    |    |    |    |    |   |    |    |    |    |    |    |    |
|--------------------|----|----|----|----|---|----|----|----|----|----|----|----|
| NetBSD             |    |    |    |    |   |    |    |    |    |    |    | ▼▼ |
| OpenBSD            |    |    |    |    |   |    |    |    |    |    | ▼▼ |    |
| Mac                |    |    |    |    |   |    |    |    | ▼▼ |    |    |    |
| OS X               |    |    |    |    |   |    |    |    |    |    |    |    |
| Tru64              |    |    |    |    |   |    |    | ▼▼ |    |    |    |    |
| AIX                |    |    |    |    |   |    | ▼▼ |    |    |    |    |    |
| HP-UX              |    |    |    |    |   | ▼▼ |    |    |    |    |    |    |
| Solaris            |    |    |    | ▼▼ |   |    |    |    |    |    |    |    |
| FreeBSD            |    |    | ▼▼ |    |   |    |    |    |    |    |    |    |
| Linux              |    | ▼▼ |    |    |   |    |    |    |    |    |    |    |
| 2.6                |    |    |    |    |   |    |    |    |    |    |    |    |
| (and later)        |    |    |    |    |   |    |    |    |    |    |    |    |
| Linux              |    | ▼▼ |    |    |   |    |    |    |    |    |    |    |
| 2.4                |    |    |    |    |   |    |    |    |    |    |    |    |
| Windows            | ▼▼ |    |    |    |   |    |    |    |    |    |    |    |
| ▼                  | 1  | 2  | 3  | 4  | 5 | 6  | 7  | 8  | 9  | 10 | 11 |    |
| Item               |    |    |    |    |   |    |    |    |    |    |    |    |
| ▼                  |    |    |    |    |   |    |    |    |    |    |    |    |
| agent.hostmetadata |    | X  | X  | X  | X | X  | X  | X  | X  | X  | X  | X  |
| agent.hostname     | X  | X  | X  | X  | X | X  | X  | X  | X  | X  | X  | X  |
| agent.ping         | X  | X  | X  | X  | X | X  | X  | X  | X  | X  | X  | X  |
| agent.variant      | X  | X  | X  | X  | X | X  | X  | X  | X  | X  | X  | X  |

|  |            |   |   |   |                |                |   |   |   |   |   |
|--|------------|---|---|---|----------------|----------------|---|---|---|---|---|
| <b>agent.version</b>   | X          | X | X | X | X              | X              | X | X | X | X | X |
| <b>kernel.maxfiles</b>   | -          | X | X | X | -              | -              | - | ? | X | X | X |
| <b>kernel.maxproc</b>  | -          | - | X | X | X              | -              | - | ? | X | X | X |
| <b>kernel.openfiles</b>  | -          | X | X | ? | ?              | ?              | ? | ? | ? | ? | ? |
| <b>log[file,&lt;regexp&gt;,&lt;encoding&gt;,&lt;maxlines&gt;,&lt;mode&gt;,&lt;output&gt;,&lt;maxdelay&gt;,&lt;options&gt;,&lt;persistent_dir&gt;]</b>          |            |   |   |   |                |                |   |   |   |   |   |
| <i>persistent_dir</i>  | -          | X | X | X | X              | X              | X | X | X | X | X |
| ▲  |            |   |   |   |                |                |   |   |   |   |   |
| <b>log.count[file,&lt;regexp&gt;,&lt;encoding&gt;,&lt;maxproclines&gt;,&lt;mode&gt;,&lt;maxdelay&gt;,&lt;options&gt;,&lt;persistent_dir&gt;]</b>               |            |   |   |   |                |                |   |   |   |   |   |
| <i>persistent_dir</i>  | -          | X | X | X | X              | X              | X | X | X | X | X |
| ▲  |            |   |   |   |                |                |   |   |   |   |   |
| <b>logrt[file_regexp,&lt;regexp&gt;,&lt;encoding&gt;,&lt;maxlines&gt;,&lt;mode&gt;,&lt;output&gt;,&lt;maxdelay&gt;,&lt;options&gt;,&lt;persistent_dir&gt;]</b> |            |   |   |   |                |                |   |   |   |   |   |
| <i>persistent_dir</i>  | -          | X | X | X | X              | X              | X | X | X | X | X |
| ▲  |            |   |   |   |                |                |   |   |   |   |   |
| <b>logrt.count[file_regexp,&lt;regexp&gt;,&lt;encoding&gt;,&lt;maxproclines&gt;,&lt;mode&gt;,&lt;maxdelay&gt;,&lt;options&gt;,&lt;persistent_dir&gt;]</b>      |            |   |   |   |                |                |   |   |   |   |   |
| <i>persistent_dir</i>  | -          | X | X | X | X              | X              | X | X | X | X | X |
| ▲  |            |   |   |   |                |                |   |   |   |   |   |
| <b>modbus.get[endpoint,&lt;slave id&gt;,&lt;function&gt;,&lt;address&gt;,&lt;count&gt;,&lt;type&gt;,&lt;endianness&gt;,&lt;offset&gt;]</b>                     |            |   |   |   |                |                |   |   |   |   |   |
| <b>net.dns[&lt;ip&gt;,&lt;zone&gt;,&lt;type&gt;,&lt;timeout&gt;,&lt;count&gt;,&lt;protocol&gt;]</b>  |            |   |   |   |                |                |   | X | X | X | X |
| <b>net.dns.record[&lt;ip&gt;,&lt;zone&gt;,&lt;type&gt;,&lt;timeout&gt;,&lt;count&gt;,&lt;protocol&gt;]</b>   |            |   |   |   |                |                |   | X | X | X | X |
| <b>net.if.collisions[if]</b>   |            | X | X | X | X              | -              | X | - | X | X | r |
| <b>net.if.discovery</b>  | X          | X | X | X | X              | X              | X | - | - | X | X |
| <b>net.if.in[if,&lt;mode&gt;]</b>  |            | X | X | X | X              | X <sup>1</sup> | X | - | X | X | r |
| <i>mode</i>  | bytes      | X | X | X | X <sup>2</sup> | X              | X | - | X | X | r |
| ▲  | (de-fault) |   |   |   |                |                |   |   |   |   |   |
| packets  | X          | X | X | X | X              | X              | X | - | X | X | r |
| errors   | X          | X | X | X | X <sup>2</sup> | X              | X | - | X | X | r |
| dropped  | X          | X | X | X | -              | X              | - | - | X | X | r |
| overruns   | -          | X | X | - | -              | -              | - | - | - | - | - |
| frame  | -          | X | X | - | -              | -              | - | - | - | - | - |
| compressed   |            | X | X | - | -              | -              | - | - | - | - | - |
| multicast  |            | X | X | - | -              | -              | - | - | - | - | - |
| <b>net.if.out[if,&lt;mode&gt;]</b>   |            | X | X | X | X              | X <sup>1</sup> | X | - | X | X | r |
| <i>mode</i>  | bytes      | X | X | X | X <sup>2</sup> | X              | X | - | X | X | r |
| ▲  | (de-fault) |   |   |   |                |                |   |   |   |   |   |
| packets  | X          | X | X | X | X              | X              | X | - | X | X | r |
| errors   | X          | X | X | X | X <sup>2</sup> | X              | X | - | X | X | r |
| dropped  | X          | X | X | - | -              | X              | - | - | - | - | - |
| overruns   | -          | X | X | - | -              | -              | - | - | - | - | - |
| collision  | -          | X | X | - | -              | -              | - | - | - | - | - |
| carrier  | -          | X | X | - | -              | -              | - | - | - | - | - |
| compressed   |            | X | X | - | -              | -              | - | - | - | - | - |
| <b>net.if.total[if,&lt;mode&gt;]</b>   |            | X | X | X | X              | X <sup>1</sup> | X | - | X | X | r |
| <i>mode</i>  | bytes      | X | X | X | X <sup>2</sup> | X              | X | - | X | X | r |
| ▲  | (de-fault) |   |   |   |                |                |   |   |   |   |   |
| packets  | X          | X | X | X | X              | X              | X | - | X | X | r |
| errors   | X          | X | X | X | X <sup>2</sup> | X              | X | - | X | X | r |
| dropped  | X          | X | X | - | -              | X              | - | - | - | - | - |
| overruns   | -          | X | X | - | -              | -              | - | - | - | - | - |
| compressed   |            | X | X | - | -              | -              | - | - | - | - | - |
| <b>net.tcp.listen[port]</b>  |            | X | X | X | X              | -              | - | - | X | - | - |
| <b>net.tcp.port[&lt;ip&gt;,&lt;port&gt;]</b>   |            | X | X | X | X              | X              | X | X | X | X | X |
| <b>net.tcp.service[service,&lt;ip&gt;,&lt;port&gt;]</b>  |            |   |   | X | X              | X              | X | X | X | X | X |
| <b>net.tcp.service.perf[service,&lt;ip&gt;,&lt;port&gt;]</b>   |            |   |   | X | X              | X              | X | X | X | X | X |
| <b>net.tcp.socket.count[&lt;laddr&gt;,&lt;lport&gt;,&lt;raddr&gt;,&lt;rport&gt;,&lt;state&gt;]</b>   |            | - | - | - | -              | -              | - | - | - | - | - |
| <b>net.udp.listen[port]</b>  |            | X | X | X | X              | -              | - | - | X | - | - |
| <b>net.udp.service[service,&lt;ip&gt;,&lt;port&gt;]</b>  |            |   |   | X | X              | X              | X | X | X | X | X |
| <b>net.udp.service.perf[service,&lt;ip&gt;,&lt;port&gt;]</b>   |            |   |   | X | X              | X              | X | X | X | X | X |
| <b>net.udp.socket.count[&lt;laddr&gt;,&lt;lport&gt;,&lt;raddr&gt;,&lt;rport&gt;,&lt;state&gt;]</b>   |            | - | - | - | -              | -              | - | - | - | - | - |

|  |            | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|--|------------|---|---|---|---|---|---|---|---|---|----|----|
| <b>proc.cpu.util[&lt;name&gt;,&lt;user&gt;,&lt;type&gt;,&lt;cmdline&gt;,&lt;mode&gt;,&lt;zone&gt;]</b> |            | - | - | - | - | - | - | - | - | - | -  | -  |
| type   | total      | - | X | X | - | X | - | - | - | - | -  | -  |
| ▲  | (de-fault) |   |   |   |   |   |   |   |   |   |    |    |
|  | user       | - | X | X | - | X | - | - | - | - | -  | -  |
|  | system     | - | X | X | - | X | - | - | - | - | -  | -  |
| mode   | avg1       | - | X | X | - | X | - | - | - | - | -  | -  |
| ▲  | (de-fault) |   |   |   |   |   |   |   |   |   |    |    |
|  | avg5       | - | X | X | - | X | - | - | - | - | -  | -  |
|  | avg15      | - | X | X | - | X | - | - | - | - | -  | -  |
| zone   | current    | - | - | - | - | X | - | - | - | - | -  | -  |
| ▲  | (de-fault) |   |   |   |   |   |   |   |   |   |    |    |
|  | all        | - | - | - | - | X | - | - | - | - | -  | -  |
| <b>proc.mem[&lt;name&gt;,&lt;user&gt;,&lt;mode&gt;,&lt;cmdline&gt;,&lt;memtype&gt;]</b>                |            | X | X | - | X | X | X | X | X | - | X  | X  |
| mode   | sum        | - | X | X | X | X | - | X | X | - | X  | X  |
| ▲  | (de-fault) |   |   |   |   |   |   |   |   |   |    |    |
|  | avg        | - | X | X | X | X | - | X | X | - | X  | X  |
|  | max        | - | X | X | X | X | - | X | X | - | X  | X  |
|  | min        | - | X | X | X | X | - | X | X | - | X  | X  |
| memtype  |            | - | X | X | X | X | - | X | - | - | -  | -  |
| ▲  |            |   |   |   |   |   |   |   |   |   |    |    |
| <b>proc.num[&lt;name&gt;,&lt;user&gt;,&lt;state&gt;,&lt;cmdline&gt;,&lt;zone&gt;]</b>                  |            | X | X | X | X | X | X | X | X | - | X  | X  |
| state  | all        | - | X | X | X | X | X | X | X | - | X  | X  |
| ▲  | (de-fault) |   |   |   |   |   |   |   |   |   |    |    |
|  | disk       | - | X | X | X | - | - | - | - | - | X  | X  |
|  | sleep      | - | X | X | X | X | X | X | X | - | X  | X  |
|  | zomb       | - | X | X | X | X | X | X | X | - | X  | X  |
|  | run        | - | X | X | X | X | X | X | X | - | X  | X  |
|  | trace      | - | X | X | X | - | - | - | - | - | X  | X  |
| cmdline  |            | - | X | X | X | X | X | X | X | - | X  | X  |
| ▲  |            |   |   |   |   |   |   |   |   |   |    |    |
| zone   | current    | - | - | - | - | X | - | - | - | - | -  | -  |
| ▲  | (de-fault) |   |   |   |   |   |   |   |   |   |    |    |
|  | all        | - | - | - | - | X | - | - | - | - | -  | -  |
| <b>sensor[device,sensor,&lt;mode&gt;]</b>  |            | X | - | - | - | - | - | - | - | - | X  | -  |
| <b>system.boottime</b>   |            | X | X | X | X | X | - | - | - | X | X  | X  |
| <b>system.cpu.discovery</b>  |            | X | X | X | X | X | X | X | X | X | X  | X  |
| <b>system.cpu.intr</b>   |            | - | X | X | X | X | - | X | - | - | X  | X  |
| <b>system.cpu.load[&lt;cpu&gt;,&lt;mode&gt;]</b>   |            | X | X | X | X | X | X | X | X | X | X  | X  |
| cpu ▲  | all        | X | X | X | X | X | X | X | X | X | X  | X  |
|  | (de-fault) |   |   |   |   |   |   |   |   |   |    |    |
|  | percpu     | X | X | X | X | X | X | X | - | X | X  | X  |
| mode   | avg1       | X | X | X | X | X | X | X | X | X | X  | X  |
| ▲  | (de-fault) |   |   |   |   |   |   |   |   |   |    |    |
|  | avg5       | X | X | X | X | X | X | X | X | X | X  | X  |
|  | avg15      | X | X | X | X | X | X | X | X | X | X  | X  |
| <b>system.cpu.num[&lt;type&gt;]</b>  |            | X | X | X | X | X | X | X | - | X | X  | X  |
| type   | online     | X | X | X | X | X | X | X | - | X | X  | X  |
| ▲  | (de-fault) |   |   |   |   |   |   |   |   |   |    |    |
|  | max        | - | X | X | X | X | - | - | - | X | -  | -  |
| <b>system.cpu.switches</b>   |            | X | X | X | X | X | - | X | - | - | X  | X  |
| <b>system.cpu.util[&lt;cpu&gt;,&lt;type&gt;,&lt;mode&gt;,&lt;logical or physical&gt;]</b>              |            | X | X | - | X | X | - | X | - | - | X  | X  |

| type                | user  | - | X | X | X | X | X | X | X | -  | X  | X |
|---------------------|---|---|---|---|---|---|---|---|---|----|----|---|
| ▲                   | (de-fault)  |   |   |   |   |   |   |   |   |    |    |   |
|                     | nice  | - | X | X | X | - | X | - | X | -  | X  | X |
|                     | idle  | - | X | X | X | X | X | X | X | -  | X  | X |
|                     | system  | X | X | X | X | X | X | X | X | -  | X  | X |
|                     | (de-fault for Windows)                              |   |   |   |   |   |   |   |   |    |    |   |
|                     | iowait  | - | - | X | - | X | - | X | - | -  | -  | - |
|                     | interrupt   | - | - | X | X | - | - | - | - | -  | X  | - |
|                     | softirq   | - | - | X | - | - | - | - | - | -  | -  | - |
|                     | steal   | - | - | X | - | - | - | - | - | -  | -  | - |
|                     | guest   | - | - | X | - | - | - | - | - | -  | -  | - |
|                     | guest_nice  | - | - | X | - | - | - | - | - | -  | -  | - |
| mode                | avg1  | X | X | X | X | X | X | X | X | -  | X  | X |
| ▲                   | (de-fault)  |   |   |   |   |   |   |   |   |    |    |   |
|                     | avg5  | X | X | X | X | X | X | X | - | -  | X  | X |
|                     | avg15   | X | X | X | X | X | X | X | - | -  | X  | X |
| logical_or_physical | logical   | - | - | - | - | - | - | X | - | -  | -  | - |
| ▲                   | (de-fault)  |   |   |   |   |   |   |   |   |    |    |   |
|                     | physical  | - | - | - | - | - | - | X | - | -  | -  | - |
|                     | 1   | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |   |
|                     | system.hostname[<type>,<transform>]                 | X | X | X | X | X | X | X | X | X  | X  | X |
|                     | system.hw.chassis[<info>]                           | X | X | - | - | - | - | - | - | -  | -  | - |
|                     | system.hw.cpu[<cpu>,<info>]                         | X | X | - | - | - | - | - | - | -  | -  | - |
|                     | system.hw.devices[<type>]                           | X | X | - | - | - | - | - | - | -  | -  | - |
|                     | system.hw.macaddr[<interface>,<format>]             | - | - | - | - | - | - | - | - | -  | -  | - |
|                     | system.localtime[<type>]                            | X | X | X | X | X | X | X | X | X  | X  | X |
| type                | utc   | X | X | X | X | X | X | X | X | X  | X  | X |
| ▲                   | (de-fault)  |   |   |   |   |   |   |   |   |    |    |   |
|                     | local   | X | X | X | X | X | X | X | X | X  | X  | X |
|                     | system.run[command,<mode>]                          | X | X | X | X | X | X | X | X | X  | X  | X |
| mode                | wait  | X | X | X | X | X | X | X | X | X  | X  | X |
| ▲                   | (de-fault)  |   |   |   |   |   |   |   |   |    |    |   |
|                     | nowait  | X | X | X | X | X | X | X | X | X  | X  | X |
|                     | system.stat[resource,<type>]                        | - | - | - | - | - | X | - | - | -  | -  | - |
|                     | system.sw.arch                                      | X | X | X | X | X | X | X | X | X  | X  | X |
|                     | system.sw.os[<info>]                                | X | X | - | - | - | - | - | - | -  | -  | - |
|                     | system.sw.packages[<repo>,<manager>,<format>]       | - | - | - | - | - | - | - | - | -  | -  | - |
|                     | system.swap.in[<device>,<type>]                     | - | X | - | - | - | - | - | - | X  | -  | - |
|                     | (specifying a device is only supported under Linux) |   |   |   |   |   |   |   |   |    |    |   |

|   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| type  | count   | - | X | X | - | X | - | - | - | - | X | - |
| ▲<br>(pages will only work if<br>was not speci-<br>fied)  | (de-<br>fault<br>under<br>all ex-<br>cept<br>Linux) |   |   |   |   |   |   |   |   |   |   |   |
|   | sectors   | - | X | X | - | - | - | - | - | - | - | - |
|   | pages   | - | X | X | - | X | - | - | - | - | X | - |
|   | (de-<br>fault<br>under<br>Linux)                    |   |   |   |   |   |   |   |   |   |   |   |
| <b>system.swap.out[&lt;device&gt;,&lt;type&gt;]</b><br>(specifying<br>a de-<br>vice is<br>only<br>sup-<br>ported<br>under<br>Linux)   |   |   |   |   |   | X | - | - | - | - | X | - |
| type  | count   | - | X | X | - | X | - | - | - | - | X | - |
| ▲<br>(pages will only work if<br>was not speci-<br>fied)  | (de-<br>fault<br>under<br>all ex-<br>cept<br>Linux) |   |   |   |   |   |   |   |   |   |   |   |
|   | sectors   | - | X | X | - | - | - | - | - | - | - | - |
|   | pages   | - | X | X | - | X | - | - | - | - | X | - |
|   | (de-<br>fault<br>under<br>Linux)                    |   |   |   |   |   |   |   |   |   |   |   |
| <b>system.swap.size[&lt;device&gt;,&lt;type&gt;]</b><br>(specifying<br>a de-<br>vice is<br>only<br>sup-<br>ported<br>under<br>FreeBSD,<br>for<br>other<br>plat-<br>forms<br>must<br>be<br>empty<br>or<br>"all") |   |   |   |   | X | X | - | X | X | - | X | - |

|      |  |                |   |   |   |   |   |   |   |    |    |   |
|------|--|----------------|---|---|---|---|---|---|---|----|----|---|
| type | free   | X              | X | X | X | X | - | X | X | -  | X  | - |
| ▲    | (de-fault)   |                |   |   |   |   |   |   |   |    |    |   |
|      | total  | X              | X | X | X | X | - | X | X | -  | X  | - |
|      | used   | X              | X | X | X | X | - | X | X | -  | X  | - |
|      | pfree  | X              | X | X | X | X | - | X | X | -  | X  | - |
|      | pusd   | X <sup>6</sup> | X | X | X | X | - | X | X | -  | X  | - |
|      | system.uname   | X              | X | X | X | X | X | X | X | X  | X  | X |
|      | system.uptime  | X              | X | X | X | X | - | X | ? | X  | X  | X |
|      | system.users.num   |                | X | X | X | X | X | X | X | X  | X  | X |
|      | systemd.unit.discovery   |                | X | X | - | - | - | - | - | -  | -  | - |
|      | systemd.unit.get   |                | X | X | - | - | - | - | - | -  | -  | - |
|      | systemd.unit.info  |                | X | X | - | - | - | - | - | -  | -  | - |
|      | 1  | 2              | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |   |
|      | vfs.dev.discovery  |                | X | X | - | - | - | - | - | -  | -  | - |
|      | vfs.dev.read[<device>,<type>,<mode>]                               |                | X | X | X | X | - | X | - | -  | X  | - |
| type | sectors  | -              | X | X | - | - | - | - | - | -  | -  | - |
| ▲    |  |                |   |   |   |   |   |   |   |    |    |   |
|      | operations<br>(de-fault<br>for<br>OpenBSD,<br>AIX)                 |                | X | X | X | X | - | X | - | -  | X  | - |
|      | bytes<br>(de-fault<br>for So-laris)                                | -              | - | - | X | X | - | X | - | -  | X  | - |
|      | sps<br>(de-fault<br>for<br>Linux)                                  | -              | X | X | - | - | - | - | - | -  | -  | - |
|      | ops  | -              | X | X | X | - | - | - | - | -  | -  | - |
|      | bps<br>(de-fault<br>for<br>FreeBSD)                                | -              | - | - | X | - | - | - | - | -  | -  | - |
| mode | avg1<br>(de-fault)   | -              | X | X | X | - | - | - | - | -  | -  | - |
| ▲    | (compatible<br>only<br>with<br>type<br>in:<br>sps,<br>ops,<br>bps) |                |   |   |   |   |   |   |   |    |    |   |
|      | avg5   | -              | X | X | X | - | - | - | - | -  | -  | - |
|      | avg15  | -              | X | X | X | - | - | - | - | -  | -  | - |
|      | vfs.dev.write[<device>,<type>,<mode>]                              | X              | X | X | X | X | - | X | - | -  | X  | - |
| type | sectors  | -              | X | X | - | - | - | - | - | -  | -  | - |
| ▲    |  |                |   |   |   |   |   |   |   |    |    |   |
|      | operations<br>(de-fault<br>for<br>OpenBSD,<br>AIX)                 |                | X | X | X | X | - | X | - | -  | X  | - |



|      |  |                |   |   |   |   |   |   |   |   |   |   |
|------|--|----------------|---|---|---|---|---|---|---|---|---|---|
|      | bytes  | -              | - | - | X | X | - | X | - | - | X | - |
|      | (de-fault for Solaris)   |                |   |   |   |   |   |   |   |   |   |   |
|      | sps  | -              | X | X | - | - | - | - | - | - | - | - |
|      | (de-fault for Linux)   |                |   |   |   |   |   |   |   |   |   |   |
|      | ops  | -              | X | X | X | - | - | - | - | - | - | - |
|      | bps  | -              | - | - | X | - | - | - | - | - | - | - |
|      | (de-fault for FreeBSD)   |                |   |   |   |   |   |   |   |   |   |   |
| mode | avg1   | -              | X | X | X | - | - | - | - | - | - | - |
| ▲    | (de-fault)   |                |   |   |   |   |   |   |   |   |   |   |
|      | only   |                |   |   |   |   |   |   |   |   |   |   |
|      | with<br>type   |                |   |   |   |   |   |   |   |   |   |   |
|      | in:  |                |   |   |   |   |   |   |   |   |   |   |
|      | sps,   |                |   |   |   |   |   |   |   |   |   |   |
|      | ops,   |                |   |   |   |   |   |   |   |   |   |   |
|      | bps)   |                |   |   |   |   |   |   |   |   |   |   |
|      | avg5   | -              | X | X | X | - | - | - | - | - | - | - |
|      | avg15  | -              | X | X | X | - | - | - | - | - | - | - |
|      | vfs.dir.count[dir,<regex_incl>,<regex_excl>,<types_incl>,<types_excl>,<max_depth>,<min_size>,<max_size>,<min_age>,<max_age>] |                |   |   |   |   |   |   |   |   |   |   |
|      | vfs.dir.get[dir,<regex_incl>,<regex_excl>,<types_incl>,<types_excl>,<max_depth>,<min_size>,<max_size>,<min_age>,<max_age>]   |                |   |   |   |   |   |   |   |   |   |   |
|      | vfs.dir.size[dir,<regex_incl>,<regex_excl>,<mode>,<max_depth>,<regex_excl_dir>]  |                |   |   |   |   |   |   |   |   |   |   |
|      | vfs.file.cksum[file,<mode>]  |                |   | X | X | X | X | X | X | X | X | X |
|      | vfs.file.contents[file,<encoding>]   |                |   | X | X | X | X | X | X | X | X | X |
|      | vfs.file.exists[file,<types_incl>,<types_excl>]  |                |   | X | X | X | X | X | X | X | X | X |
|      | vfs.file.get[file]   | X              | X | X | X | X | X | X | X | X | X | X |
|      | vfs.file.md5sum[file]  |                | X | X | X | X | X | X | X | X | X | X |
|      | vfs.file.owner[file,<owner_type>,<result_type>]  |                |   | X | X | X | X | X | X | X | X | X |
|      | vfs.file.permissions[file]   | X              | X | ? | ? | ? | ? | ? | ? | ? | ? | ? |
|      | vfs.file.regexp[file,regexp,<encoding>,<start line>,<end line>,<output>]   |                |   | X | X | X | X | X | X | X | X | X |
|      | vfs.file.regmatch[file,regexp,<encoding>,<start line>,<end line>]  |                |   | X | X | X | X | X | X | X | X | X |
|      | vfs.file.size[file,<mode>]   |                | X | X | X | X | X | X | X | X | X | X |
|      | 1 2 3 4 5 6 7 8 9 10 11  |                |   |   |   |   |   |   |   |   |   |   |
|      | vfs.file.time[file,<mode>]   |                | X | X | X | X | X | X | X | X | X | X |
| mode | modify   | X              | X | X | X | X | X | X | X | X | X | X |
| ▲    | (de-fault)   |                |   |   |   |   |   |   |   |   |   |   |
|      | access   | X              | X | X | X | X | X | X | X | X | X | X |
|      | change   | X <sup>5</sup> | X | X | X | X | X | X | X | X | X | X |
|      | vfs.fs.discovery   | X              | X | X | X | X | X | - | X | X | X | X |
|      | vfs.fs.get   | X              | X | X | X | X | X | - | X | X | X | X |
|      | vfs.fs.inode[fs,<mode>]  | X              | X | X | X | X | X | X | X | X | X | X |
| mode | total  | -              | X | X | X | X | X | X | X | X | X | X |
| ▲    | (de-fault)   |                |   |   |   |   |   |   |   |   |   |   |
|      | free   | -              | X | X | X | X | X | X | X | X | X | X |
|      | used   | -              | X | X | X | X | X | X | X | X | X | X |
|      | pfree  | -              | X | X | X | X | X | X | X | X | X | X |
|      | pusd   | -              | X | X | X | X | X | X | X | X | X | X |
|      | vfs.fs.size[fs,<mode>]   | X              | X | X | X | X | X | X | X | X | X | X |

|             |  |   |   |   |   |   |   |   |   |   |    |    |
|-------------|--|---|---|---|---|---|---|---|---|---|----|----|
| <i>mode</i> | total  | X | X | X | X | X | X | X | X | X | X  | X  |
| ▲           | (de-fault)   |   |   |   |   |   |   |   |   |   |    |    |
|             | free   | X | X | X | X | X | X | X | X | X | X  | X  |
|             | used   | X | X | X | X | X | X | X | X | X | X  | X  |
|             | pfree  | X | X | X | X | X | X | X | X | X | X  | X  |
|             | pused  | X | X | X | X | X | X | X | X | X | X  | X  |
|             | <b>vm.memory.size[&lt;mode&gt;]</b>  |   |   | X | X | X | X | X | X | X | X  | X  |
| <i>mode</i> | total  | X | X | X | X | X | X | X | X | X | X  | X  |
| ▲           | (de-fault)   |   |   |   |   |   |   |   |   |   |    |    |
|             | active   | - | - | - | X | - | X | - | - | X | X  | X  |
|             | anon   | - | - | - | - | - | - | - | - | - | -  | X  |
|             | buffers  | - | X | X | X | - | - | - | - | - | X  | X  |
|             | cached   | X | X | X | X | - | - | X | - | - | X  | X  |
|             | exec   | - | - | - | - | - | - | - | - | - | -  | X  |
|             | file   | - | - | - | - | - | - | - | - | - | -  | X  |
|             | free   | X | X | X | X | X | X | X | X | X | X  | X  |
|             | inactive   | - | - | - | X | - | - | - | - | X | X  | X  |
|             | pinned   | - | - | - | - | - | - | X | - | - | -  | -  |
|             | shared   | - | X | - | X | - | - | - | - | - | X  | X  |
|             | wired  | - | - | - | X | - | - | - | - | X | X  | X  |
|             | used   | X | X | X | X | X | X | X | X | X | X  | X  |
|             | pused  | X | X | X | X | X | X | X | X | X | X  | X  |
|             | available  | X | X | X | X | X | X | X | X | X | X  | X  |
|             | pavailable   | X | X | X | X | X | X | X | X | X | X  | X  |
|             | <b>web.page.get[host,&lt;path&gt;,&lt;port&gt;]</b>  |   |   |   | X | X | X | X | X | X | X  | X  |
|             | <b>web.page.perf[host,&lt;path&gt;,&lt;port&gt;]</b>                                       |   |   |   | X | X | X | X | X | X | X  | X  |
|             | <b>web.page.regex[host,&lt;path&gt;,&lt;port&gt;,regexp,&lt;length&gt;,&lt;output&gt;]</b> |   |   |   | X | X | X | X | X | X | X  | X  |
|             |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

#### Note:

See also a description of **vm.memory.size** parameters.

#### Footnotes

<sup>1</sup> net.if.in, net.if.out and net.if.total items do not provide statistics of loopback interfaces (e.g. lo0).

<sup>2</sup> These values for these items are not supported for loopback interfaces on Solaris systems up to and including Solaris 10 6/06 as byte, error and utilization statistics are not stored and/or reported by the kernel. However, if you're monitoring a Solaris system via net-snmp, values may be returned as net-snmp carries legacy code from the cmu-snmp dated as old as 1997 that, upon failing to read byte values from the interface statistics returns the packet counter (which does exist on loopback interfaces) multiplied by an arbitrary value of 308. This makes the assumption that the average length of a packet is 308 octets, which is a very rough estimation as the MTU limit on Solaris systems for loopback interfaces is 8892 bytes.

These values should not be assumed to be correct or even closely accurate. They are guesstimates. The Zabbix agent does not do any guess work, but net-snmp will return a value for these fields.

<sup>3</sup> The command line on Solaris, obtained from /proc/pid/psinfo, is limited to 80 bytes and contains the command line as it was when the process was started.

<sup>4</sup> Not supported on Windows Event Log.

<sup>5</sup> On Windows XP vfs.file.time[file,change] may be equal to vfs.file.time[file,access].

<sup>6</sup> Supported only by Zabbix agent 2; not supported by Zabbix agent.

<sup>7</sup> Supported only by Zabbix agent 2 on 64-bit Windows; not supported by Zabbix agent.

## 2 vm.memory.size parameters

### Overview

This section provides some parameter details for the **vm.memory.size[<mode>]** agent item.

## Parameters

The following parameters are available for this item:

- **active** - memory currently in use or very recently used, and so it is in RAM
- **anon** - memory not associated with a file (cannot be re-read from it)
- **available** - available memory, calculated differently depending on the platform (see the table below)
- **buffers** - cache for things like file system metadata
- **cached** - cache for various things
- **exec** - executable code, typically from a (program) file
- **file** - cache for contents of recently accessed files
- **free** - memory that is readily available to any entity requesting memory
- **inactive** - memory that is marked as not used
- **pavailable** - 'available' memory as percentage of 'total' (calculated as  $\text{available}/\text{total} \times 100$ )
- **pinned** - same as 'wired'
- **pusd** - 'used' memory as percentage of 'total' (calculated as  $\text{used}/\text{total} \times 100$ )
- **shared** - memory that may be simultaneously accessed by multiple processes
- **slab** - total amount of memory used by the kernel to cache data structures for its own use
- **total** - total physical memory available
- **used** - used memory, calculated differently depending on the platform (see the table below)
- **wired** - memory that is marked to always stay in RAM. It is never moved to disk.

### Warning:

Some of these parameters are platform-specific and might not be available on your platform. See [Items supported by platform](#) for details.

Platform-specific calculation of **available** and **used**:

| Platform                            | "available"   | "used"                  |
|-------------------------------------|---|-------------------------|
| AIX                                 | free + cached   | real memory in use      |
| FreeBSD                             | inactive + cached + free  | active + wired + cached |
| HP UX                               | free  | total - free            |
| Linux<3.14                          | free + buffers + cached   | total - free            |
| Linux 3.14+                         | /proc/meminfo, see "MemAvailable" in Linux kernel   | total - free            |
| (also backported to 3.10 on RHEL 7) | <a href="#">documentation</a> for details.<br>Note that free + buffers + cached is no longer equal to 'available' due to not all the page cache can be freed and low watermark being used in calculation. |                         |
| NetBSD                              | inactive + execpages + file + free  | total - free            |
| OpenBSD                             | inactive + free + cached  | active + wired          |
| OSX                                 | inactive + free   | active + wired          |
| Solaris                             | free  | total - free            |
| Win32                               | free  | total - free            |

### Attention:

The sum of `vm.memory.size[used]` and `vm.memory.size[available]` does not necessarily equal total. For instance, on FreeBSD:

- \* Active, inactive, wired, cached memories are considered used, because they store some useful information.
- \* At the same time inactive, cached, free memories are considered available, because these kinds of memories can be given instantly to processes that request more memory.

So inactive memory is both used and available simultaneously. Because of this, the `vm.memory.size[used]` item is designed for informational purposes only, while `vm.memory.size[available]` is designed to be used in triggers.

See also

1. [Additional details about memory calculation in different OS](#)

## 3 Passive and active agent checks

Overview

This section provides details on passive and active checks performed by **Zabbix agent**.

Zabbix uses a JSON based communication protocol for communicating with Zabbix agent.

See also: **Zabbix agent 2** protocol details.

#### Passive checks

A passive check is a simple data request. Zabbix server or proxy asks for some data (for example, CPU load) and Zabbix agent sends back the result to the server.

#### Server request

For definition of header and data length please refer to **protocol details**.

<item key>

#### Agent response

<DATA>[\0<ERROR>]

Above, the part in square brackets is optional and is only sent for not supported items.

For example, for supported items:

1. Server opens a TCP connection
2. Server sends **<HEADER><DATALEN>agent.ping**
3. Agent reads the request and responds with **<HEADER><DATALEN>1**
4. Server processes data to get the value, '1' in our case
5. TCP connection is closed

For not supported items:

1. Server opens a TCP connection
2. Server sends **<HEADER><DATALEN>vfs.fs.size[/nono]**
3. Agent reads the request and responds with **<HEADER><DATALEN>ZBX\_NOTSUPPORTED\0Cannot obtain filesystem information: [2] No such file or directory**
4. Server processes data, changes item state to not supported with the specified error message
5. TCP connection is closed

#### Active checks

Active checks require more complex processing. The agent must first retrieve from the server(s) a list of items for independent processing.

The servers to get the active checks from are listed in the 'ServerActive' parameter of the agent **configuration file**. The frequency of asking for these checks is set by the 'RefreshActiveChecks' parameter in the same configuration file. However, if refreshing active checks fails, it is retried after hardcoded 60 seconds.

The agent then periodically sends the new values to the server(s).

#### Note:

If an agent is behind the firewall you might consider using only Active checks because in this case you wouldn't need to modify the firewall to allow initial incoming connections.

#### Getting the list of items

#### Agent request

The active checks request is used to obtain the active checks to be processed by agent. This request is sent by the agent upon start and then with *RefreshActiveChecks* intervals.

```
{
  "request": "active checks",
  "host": "Zabbix server",
  "host_metadata": "mysql,nginx",
  "interface": "zabbix.server.lan",
  "ip": "159.168.1.1",
  "port": 12050
}
```

| Field         | Type          | Mandatory | Value   |
|---------------|---------------|-----------|---|
| request       | <i>string</i> | yes       | active checks   |
| host          | <i>string</i> | yes       | Host name.  |
| host_metadata | <i>string</i> | no        | The configuration parameter HostMetadata or HostMetadataItem metric value.                |
| interface     | <i>string</i> | no        | The configuration parameter HostInterface or HostInterfaceItem metric value.              |
| ip            | <i>string</i> | no        | The configuration parameter ListenIP first IP if set.                                     |
| port          | <i>number</i> | no        | The configuration parameter ListenPort value if set and not default agent listening port. |

## Server response

The active checks response is sent by the server back to agent after processing the active checks request.

```
{
  "response": "success",
  "data": [
    {
      "key": "log[/home/zabbix/logs/zabbix_agentd.log]",
      "key_orig": "log[/home/zabbix/logs/zabbix_agentd.log]",
      "itemid": 1234,
      "delay": 30,
      "lastlogsize": 0,
      "mtime": 0
    },
    {
      "key": "agent.version",
      "key_orig": "agent.version",
      "itemid": 5678,
      "delay": 10,
      "lastlogsize": 0,
      "mtime": 0
    }
  ]
}
```

| Field               | Type                    | Mandatory | Value   |
|---------------------|-------------------------|-----------|---|
| response            | <i>string</i>           | yes       | success   failed                                    |
| info                | <i>string</i>           | no        | Error information in the case of failure.           |
| data                | <i>array of objects</i> | no        | Active check items.                                 |
| key                 | <i>string</i>           | no        | Item key with expanded macros.                      |
| key_orig            | <i>string</i>           | no        | Item key without expanded macros.                   |
| itemid              | <i>number</i>           | no        | Item identifier.                                    |
| delay               | <i>integer</i>          | no        | Item update interval.                               |
| lastlogsize         | <i>number</i>           | no        | Item lastlogsize.                                   |
| mtime               | <i>number</i>           | no        | Item mtime.   |
| refresh_unsupported | <i>number</i>           | no        | Unsupported item refresh interval.                  |
| regexp              | <i>array of objects</i> | no        | Global regular expressions.                         |
| name                | <i>string</i>           | no        | Global regular expression name.                     |
| expression          | <i>string</i>           | no        | Global regular expression.                          |
| expression_type     | <i>number</i>           | no        | Global regular expression type.                     |
| exp_delimiter       | <i>string</i>           | no        | Global regular expression delimiter.                |
| case_sensitive      | <i>number</i>           | no        | Global regular expression case sensitivity setting. |

The server must respond with success.

For example:

1. Agent opens a TCP connection

2. Agent asks for the list of checks
3. Server responds with a list of items (item key, delay)
4. Agent parses the response
5. TCP connection is closed
6. Agent starts periodical collection of data

#### Attention:

Note that (sensitive) configuration data may become available to parties having access to the Zabbix server trapper port when using an active check. This is possible because anyone may pretend to be an active agent and request item configuration data; authentication does not take place unless you use **encryption** options.

Sending in collected data

#### Agent sends

The agent data request contains the gathered item values.

```
{
  "request": "agent data",
  "data": [
    {
      "host": "Zabbix server",
      "key": "agent.version",
      "value": "2.4.0",
      "clock": 1400675595,
      "ns": 76808644
    },
    {
      "host": "Zabbix server",
      "key": "log[/home/zabbix/logs/zabbix_agentd.log]",
      "lastlogsize": 112,
      "value": " 19845:20140621:141708.521 Starting Zabbix Agent [<hostname>]. Zabbix 2.4.0 (revision 5000)",
      "clock": 1400675595,
      "ns": 77053975
    }
  ],
  "session": "1234456akdsjhfoui"
}
```

| Field       | Type             | Mandatory | Value   |
|-------------|------------------|-----------|---|
| request     | string           | yes       | agent data  |
| session     | string           | yes       | Unique session identifier generated each time when agent is started.  |
| data        | array of objects | yes       | Item values.  |
| id          | number           | yes       | The value identifier (incremental counter used for checking duplicated values in the case of network problems). |
| host        | string           | yes       | Host name.  |
| key         | string           | yes       | The item key.   |
| value       | string           | no        | The item value.   |
| lastlogsize | number           | no        | The item lastlogsize.   |
| mtime       | number           | no        | The item mtime.   |
| state       | number           | no        | The item state.   |
| source      | string           | no        | The value event log source.   |
| eventid     | number           | no        | The value event log eventid.  |
| severity    | number           | no        | The value event log severity.   |
| timestamp   | number           | no        | The value event log timestamp.  |
| clock       | number           | yes       | The value timestamp (seconds since Epoch).  |
| ns          | number           | yes       | The value timestamp nanoseconds.  |

A virtual ID is assigned to each value. Value ID is a simple ascending counter, unique within one data session (identified by the session token). This ID is used to discard duplicate values that might be sent in poor connectivity environments.

#### Server response

The agent data response is sent by the server back to agent after processing the agent data request.

```
{
  "response": "success",
  "info": "processed: 2; failed: 0; total: 2; seconds spent: 0.003534"
}
```

| Field    | Type   | Mandatory | Value                    |
|----------|--------|-----------|--------------------------|
| response | string | yes       | success   failed         |
| info     | string | yes       | Item processing results. |

**Attention:**

If sending of some values fails on the server (for example, because host or item has been disabled or deleted), agent will not retry sending of those values.

For example:

1. Agent opens a TCP connection
2. Agent sends a list of values
3. Server processes the data and sends the status back
4. TCP connection is closed

Note how in the example above the not supported status for `vfs.fs.size[/nono]` is indicated by the "state" value of 1 and the error message in "value" property.

**Attention:**

Error message will be trimmed to 2048 symbols on server side.

Older XML protocol

**Note:**

Zabbix will take up to 16 MB of XML Base64-encoded data, but a single decoded value should be no longer than 64 KB otherwise it will be truncated to 64 KB while decoding.

## 4 Trapper items

Overview

Zabbix server uses a JSON- based communication protocol for receiving data from Zabbix sender with the help of **trapper item**.

Request and response messages must begin with **header and data length**.

Zabbix sender request

```
{
  "request": "sender data",
  "data": [
    {
      "host": "<hostname>",
      "key": "trap",
      "value": "test value"
    }
  ]
}
```

Zabbix server response

```
{
  "response": "success",
  "info": "processed: 1; failed: 0; total: 1; seconds spent: 0.060753"
}
```

Zabbix sender request with a timestamp

Alternatively Zabbix sender can send a request with a timestamp and nanoseconds.

```

{
  "request": "sender data",
  "data": [
    {
      "host": "<hostname>",
      "key": "trap",
      "value": "test value",
      "clock": 1516710794,
      "ns": 592397170
    },
    {
      "host": "<hostname>",
      "key": "trap",
      "value": "test value",
      "clock": 1516710795,
      "ns": 192399456
    }
  ],
  "clock": 1516712029,
  "ns": 873386094
}

```

Zabbix server response

```

{
  "response": "success",
  "info": "processed: 2; failed: 0; total: 2; seconds spent: 0.060904"
}

```

## 5 Minimum permission level for Windows agent items

### Overview

When monitoring systems using an agent, a good practice is to obtain metrics from the host on which the agent is installed. To use the principle of least privilege, it is necessary to determine what metrics are obtained from the agent.

The table in this document allows you to select the minimum rights for guaranteed correct operation of Zabbix agent.

If a different user is selected for the agent to work, rather than 'LocalSystem', then for the operation of agent as a Windows service, the new user must have the rights "Log on as a service" from "Local Policy→User Rights Assignment" and the right to create, write and delete the Zabbix agent log file. An Active Directory user must be added to the *Performance Monitor Users* group.

#### Note:

When working with the rights of an agent based on the "minimum technically acceptable" group, prior provision of rights to objects for monitoring is required.

### Common agent items supported on Windows

| Item key         | User group     |   |
|------------------|----------------|---|
|                  | Recommended    | Minimum technically acceptable (functionality is limited) |
| agent.hostname   | Guests         | Guests  |
| agent.ping       | Guests         | Guests  |
| agent.variant    | Guests         | Guests  |
| agent.version    | Guests         | Guests  |
| log              | Administrators | Guests  |
| log.count        | Administrators | Guests  |
| logrt            | Administrators | Guests  |
| logrt.count      | Administrators | Guests  |
| net.dns          | Guests         | Guests  |
| net.dns.record   | Guests         | Guests  |
| net.if.discovery | Guests         | Guests  |
| net.if.in        | Guests         | Guests  |
| net.if.out       | Guests         | Guests  |



| Item key             | User group                |                           |
|----------------------|---------------------------|---------------------------|
| net.if.total         | Guests                    | Guests                    |
| net.tcp.listen       | Guests                    | Guests                    |
| net.tcp.port         | Guests                    | Guests                    |
| net.tcp.service      | Guests                    | Guests                    |
| net.tcp.service.perf | Guests                    | Guests                    |
| net.udp.service      | Guests                    | Guests                    |
| net.udp.service.perf | Guests                    | Guests                    |
| proc.num             | Administrators            | Guests                    |
| system.cpu.discovery | Performance Monitor Users | Performance Monitor Users |
| system.cpu.load      | Performance Monitor Users | Performance Monitor Users |
| system.cpu.num       | Guests                    | Guests                    |
| system.cpu.util      | Performance Monitor Users | Performance Monitor Users |
| system.hostname      | Guests                    | Guests                    |
| system.localtime     | Guests                    | Guests                    |
| system.run           | Administrators            | Guests                    |
| system.sw.arch       | Guests                    | Guests                    |
| system.swap.size     | Guests                    | Guests                    |
| system.uname         | Guests                    | Guests                    |
| system.uptime        | Performance Monitor Users | Performance Monitor Users |
| vfs.dir.count        | Administrators            | Guests                    |
| vfs.dir.get          | Administrators            | Guests                    |
| vfs.dir.size         | Administrators            | Guests                    |
| vfs.file.cksum       | Administrators            | Guests                    |
| vfs.file.contents    | Administrators            | Guests                    |
| vfs.file.exists      | Administrators            | Guests                    |
| vfs.file.md5sum      | Administrators            | Guests                    |
| vfs.file.regex       | Administrators            | Guests                    |
| vfs.file.regmatch    | Administrators            | Guests                    |
| vfs.file.size        | Administrators            | Guests                    |
| vfs.file.time        | Administrators            | Guests                    |
| vfs.fs.discovery     | Administrators            | Guests                    |
| vfs.fs.get           | Administrators            | Guests                    |
| vfs.fs.size          | Administrators            | Guests                    |
| vm.memory.size       | Guests                    | Guests                    |
| web.page.get         | Guests                    | Guests                    |
| web.page.perf        | Guests                    | Guests                    |
| web.page.regex       | Guests                    | Guests                    |
| zabbix.stats         | Guests                    | Guests                    |

#### Windows-specific item keys

| Item key          | User group                |   |
|-------------------|---------------------------|---|
|                   | Recommended               | Minimum technically acceptable (functionality is limited) |
| eventlog          | Event Log Readers         | Guests  |
| net.if.list       | Guests                    | Guests  |
| perf_counter      | Performance Monitor Users | Performance Monitor Users                                 |
| proc_info         | Administrators            | Guests  |
| service.discovery | Guests                    | Guests  |
| service.info      | Guests                    | Guests  |
| services          | Guests                    | Guests  |
| wmi.get           | Administrators            | Guests  |
| vm.vmemory.size   | Guests                    | Guests  |

## 6 Encoding of returned values

Zabbix server expects every returned text value in the UTF8 encoding. This is related to any type of checks: zabbix agent, ssh, telnet, etc.

Different monitored systems/devices and checks can return non-ASCII characters in the value. For such cases, almost all possible zabbix keys contain an additional item key parameter - **<encoding>**. This key parameter is optional but it should be specified if

the returned value is not in the UTF8 encoding and it contains non-ASCII characters. Otherwise the result can be unexpected and unpredictable.

A description of behavior with different database backends in such cases follows.

#### MySQL

If a value contains a non-ASCII character in non UTF8 encoding - this character and the following will be discarded when the database stores this value. No warning messages will be written to the *zabbix\_server.log*.

Relevant for at least MySQL version 5.1.61

#### PostgreSQL

If a value contains a non-ASCII character in non UTF8 encoding - this will lead to a failed SQL query (PGRES\_FATAL\_ERROR:ERROR invalid byte sequence for encoding) and data will not be stored. An appropriate warning message will be written to the *zabbix\_server.log*.

Relevant for at least PostgreSQL version 9.1.3

## 7 Large file support

Large file support, often abbreviated to LFS, is the term applied to the ability to work with files larger than 2 GB on 32-bit operating systems. Since Zabbix 2.0 support for large files has been added. This change affects at least **log file monitoring** and all **vfs.file.\* items**. Large file support depends on the capabilities of a system at Zabbix compilation time, but is completely disabled on a 32-bit Solaris due to its incompatibility with procs and swapctl.

## 8 Sensor

Each sensor chip gets its own directory in the sysfs */sys/devices* tree. To find all sensor chips, it is easier to follow the device symlinks from */sys/class/hwmon/hwmon\**, where *\** is a real number (0,1,2,...).

The sensor readings are located either in */sys/class/hwmon/hwmon\*/* directory for virtual devices, or in */sys/class/hwmon/hwmon\*/device* directory for non-virtual devices. A file, called name, located inside *hwmon\** or *hwmon\*/device* directories contains the name of the chip, which corresponds to the name of the kernel driver used by the sensor chip.

There is only one sensor reading value per file. The common scheme for naming the files that contain sensor readings inside any of the directories mentioned above is: *<type><number>\_<item>*, where

- **type** - for sensor chips is "in" (voltage), "temp" (temperature), "fan" (fan), etc.,
- **item** - "input" (measured value), "max" (high threshold), "min" (low threshold), etc.,
- **number** - always used for elements that can be present more than once (usually starts from 1, except for voltages which start from 0). If files do not refer to a specific element they have a simple name with no number.

The information regarding sensors available on the host can be acquired using **sensor-detect** and **sensors** tools (lm-sensors package: <http://lm-sensors.org/>). **Sensors-detect** helps to determine which modules are necessary for available sensors. When modules are loaded the **sensors** program can be used to show the readings of all sensor chips. The labeling of sensor readings, used by this program, can be different from the common naming scheme (*<type><number>\_<item>*):

- if there is a file called *<type><number>\_label*, then the label inside this file will be used instead of *<type><number><item>* name;
- if there is no *<type><number>\_label* file, then the program searches inside the */etc/sensors.conf* (could be also */etc/sensors3.conf*, or different) for the name substitution.

This labeling allows user to determine what kind of hardware is used. If there is neither *<type><number>\_label* file nor label inside the configuration file the type of hardware can be determined by the name attribute (*hwmon\*/device/name*). The actual names of sensors, which zabbix\_agent accepts, can be obtained by running **sensors** program with -u parameter (**sensors -u**).

In **sensor** program the available sensors are separated by the bus type (ISA adapter, PCI adapter, SPI adapter, Virtual device, ACPI interface, HID adapter).

On Linux 2.4:

(Sensor readings are obtained from */proc/sys/dev/sensors* directory)

- **device** - device name (if *<mode>* is used, it is a regular expression);
- **sensor** - sensor name (if *<mode>* is used, it is a regular expression);
- **mode** - possible values: avg, max, min (if this parameter is omitted, device and sensor are treated verbatim).

Example key: *sensor[w83781d-i2c-0-2d,temp1]*

Prior to Zabbix 1.8.4, the *sensor[temp1]* format was used.

On Linux 2.6+:

(Sensor readings are obtained from `/sys/class/hwmon` directory)

- **device** - device name (non regular expression). The device name could be the actual name of the device (e.g 0000:00:18.3) or the name acquired using `sensors` program (e.g. k8temp-pci-00c3). It is up to the user to choose which name to use;
- **sensor** - sensor name (non regular expression);
- **mode** - possible values: avg, max, min (if this parameter is omitted, device and sensor are treated verbatim).

Example key:

`sensor[k8temp-pci-00c3,temp,max]` or `sensor[0000:00:18.3,temp1]`

`sensor[smc47b397-isa-0880,in,avg]` or `sensor[smc47b397.2176,in1]`

Obtaining sensor names

Sensor labels, as printed by the `sensors` command, cannot always be used directly because the naming of labels may be different for each sensor chip vendor. For example, `sensors` output might contain the following lines:

```
$ sensors
in0:          +2.24 V  (min =  +0.00 V, max =  +3.32 V)
Vcore:        +1.15 V  (min =  +0.00 V, max =  +2.99 V)
+3.3V:        +3.30 V  (min =  +2.97 V, max =  +3.63 V)
+12V:         +13.00 V  (min =  +0.00 V, max = +15.94 V)
M/B Temp:     +30.0°C  (low  = -127.0°C, high = +127.0°C)
```

Out of these, only one label may be used directly:

```
$ zabbix_get -s 127.0.0.1 -k sensor[lm85-i2c-0-2e,in0]
2.240000
```

Attempting to use other labels (like `Vcore` or `+12V`) will not work.

```
$ zabbix_get -s 127.0.0.1 -k sensor[lm85-i2c-0-2e,Vcore]
ZBX_NOTSUPPORTED
```

To find out the actual sensor name, which can be used by Zabbix to retrieve the sensor readings, run `sensors -u`. In the output, the following may be observed:

```
$ sensors -u
...
Vcore:
  in1_input: 1.15
  in1_min: 0.00
  in1_max: 2.99
  in1_alarm: 0.00
...
+12V:
  in4_input: 13.00
  in4_min: 0.00
  in4_max: 15.94
  in4_alarm: 0.00
...
```

So `Vcore` should be queried as `in1`, and `+12V` should be queried as `in4`. According to [specification](#), these are voltages on chip pins and generally speaking may need scaling.

```
$ zabbix_get -s 127.0.0.1 -k sensor[lm85-i2c-0-2e,in1]
1.301000
```

Not only voltage (in), but also current (curr), temperature (temp) and fan speed (fan) readings can be retrieved by Zabbix.

## 9 Notes on memtype parameter in proc.mem items

Overview

The **memtype** parameter is supported on Linux, AIX, FreeBSD, and Solaris platforms.

Three common values of 'memtype' are supported on all of these platforms: `pmem`, `rss` and `vsize`. Additionally, platform-specific 'memtype' values are supported on some platforms.

## AIX

See values supported for 'memtype' parameter on AIX in the table.

| Supported value    | Description                   | Source in proctentry64 structure | Tries to be compatible with |
|--------------------|-------------------------------|----------------------------------|-----------------------------|
| vsize <sup>1</sup> | Virtual memory size           | pi_size                          |                             |
| pmem               | Percentage of real memory     | pi_prm                           | ps -o pmem                  |
| rss                | Resident set size             | pi_trss + pi_drss                | ps -o rssize                |
| size               | Size of process (code + data) | pi_dvm                           | "ps gvw" SIZE column        |
| dsize              | Data size                     | pi_dsize                         |                             |
| tsize              | Text (code) size              | pi_tsize                         | "ps gvw" TSIZ column        |
| sdsiz              | Data size from shared library | pi_sdsiz                         |                             |
| drss               | Data resident set size        | pi_drss                          |                             |
| trss               | Text resident set size        | pi_trss                          |                             |

Notes for AIX:

1. When choosing parameters for proc.mem[] item key on AIX, try to specify narrow process selection criteria. Otherwise there is a risk of getting unwanted processes counted into proc.mem[] result.

Example:

```
$ zabbix_agentd -t proc.mem[,,,NonExistingProcess,rss]
proc.mem[,,,NonExistingProcess,rss] [u|2879488]
```

This example shows how specifying only command line (regular expression to match) parameter results in Zabbix agent self-accounting - probably not what you want.

2. Do not use "ps -ef" to browse processes - it shows only non-kernel processes. Use "ps -Af" to see all processes which will be seen by Zabbix agent.
3. Let's go through example of 'topasrec' how Zabbix agent proc.mem[] selects processes.

```
$ ps -Af | grep topasrec
root 10747984      1   0   Mar 16      -   0:00 /usr/bin/topasrec -L -s 300 -R 1 -r 6 -o /var/perf daily
```

proc.mem[] has arguments:

```
proc.mem[<name>,<user>,<mode>,<cmdline>,<memtype>]
```

The 1st criterion is a process name (argument <name>). In our example Zabbix agent will see it as 'topasrec'. In order to match, you need to either specify 'topasrec' or to leave it empty. The 2nd criterion is a user name (argument <user>). To match, you need to either specify 'root' or to leave it empty. The 3rd criterion used in process selection is an argument <cmdline>. Zabbix agent will see its value as '/usr/bin/topasrec -L -s 300 -R 1 -r 6 -o /var/perf/daily/ -ypersistent=1 -O type=bin -ystart\_time=04:08:54,Mar16,2023'. To match, you need to either specify a regular expression which matches this string or to leave it empty.

Arguments <mode> and <memtype> are applied after using the three criteria mentioned above.

## FreeBSD

See values supported for 'memtype' parameter on FreeBSD in the table.

| Supported value   | Description                           | Source in kinfo_proc structure       | Tries to be compatible with |
|-------------------|---------------------------------------|--------------------------------------|-----------------------------|
| vsize             | Virtual memory size                   | kp_eproc.e_vm.vm_mapsize or ki_size  | ps -o vsize                 |
| pmem              | Percentage of real memory             | calculated from rss                  | ps -o pmem                  |
| rss               | Resident set size                     | kp_eproc.e_vm.vm_rssize or ki_rssize | ps -o rss                   |
| size <sup>1</sup> | Size of process (code + data + stack) | tsize + dsize + ssize                |                             |

| Supported value | Description      | Source in<br>kinfo_proc<br>structure  | Tries to be<br>compatible with |
|-----------------|------------------|---------------------------------------|--------------------------------|
| tsize           | Text (code) size | kp_eproc.e_vm.vm_tsize<br>or ki_tsize | ps -o tsiz                     |
| dsize           | Data size        | kp_eproc.e_vm.vm_dsize<br>or ki_dsize | ps -o dsiz                     |
| ssize           | Stack size       | kp_eproc.e_vm.vm_ssize<br>or ki_ssize | ps -o ssiz                     |

## Linux

See values supported for 'memtype' parameter on Linux in the table.

| Supported value   | Description                                  | Source in /proc/<pid>/status file |
|-------------------|--|-----------------------------------|
| vsiz <sup>1</sup> | Virtual memory size                          | VmSize                            |
| pmem              | Percentage of real memory                    | (VmRSS/total_memory) * 100        |
| rss               | Resident set size                            | VmRSS                             |
| data              | Size of data segment                         | VmData                            |
| exe               | Size of code segment                         | VmExe                             |
| hwm               | Peak resident set size                       | VmHWM                             |
| lck               | Size of locked memory                        | VmLck                             |
| lib               | Size of shared libraries                     | VmLib                             |
| peak              | Peak virtual memory size                     | VmPeak                            |
| pin               | Size of pinned pages                         | VmPin                             |
| pte               | Size of page table entries                   | VmPTE                             |
| size              | Size of process code + data + stack segments | VmExe + VmData + VmStk            |
| stk               | Size of stack segment                        | VmStk                             |
| swap              | Size of swap space used                      | VmSwap                            |

Notes for Linux:

1. Not all 'memtype' values are supported by older Linux kernels. For example, Linux 2.4 kernels do not support hwm, pin, peak, pte and swap values.
2. We have noticed that self-monitoring of the Zabbix agent active check process with `proc.mem[...,...,...,data]` shows a value that is 4 kB larger than reported by VmData line in the agent's /proc/<pid>/status file. At the time of self-measurement the agent's data segment increases by 4 kB and then returns to the previous size.

## Solaris

See values supported for 'memtype' parameter on Solaris in the table.

| Supported value   | Description  | Source in psinfo<br>structure | Tries to be<br>compatible with |
|-------------------|--|-------------------------------|--------------------------------|
| vsiz <sup>1</sup> | Size of process image  | pr_size                       | ps -o vsz                      |
| pmem              | Percentage of real memory  | pr_pctmem                     | ps -o pmem                     |
| rss               | Resident set size<br>It may be underestimated - see rss description in "man ps". | pr_rssize                     | ps -o rss                      |

## Footnotes

- <sup>1</sup> Default value.

## 10 Notes on selecting processes in proc.mem and proc.num items

### Processes modifying their commandline

Some programs use modifying their commandline as a method for displaying their current activity. A user can see the activity by running `ps` and `top` commands. Examples of such programs include *PostgreSQL*, *Sendmail*, *Zabbix*.

Let's see an example from Linux. Let's assume we want to monitor a number of Zabbix agent processes.

ps command shows processes of interest as

```
$ ps -fu zabbix
UID          PID  PPID  C STIME TTY          TIME CMD
...
zabbix      6318     1   0 12:01 ?        00:00:00 sbin/zabbix_agentd -c /home/zabbix/ZBXNEXT-1078/zabbix_age
zabbix      6319    6318   0 12:01 ?        00:00:01 sbin/zabbix_agentd: collector [idle 1 sec]
zabbix      6320    6318   0 12:01 ?        00:00:00 sbin/zabbix_agentd: listener #1 [waiting for connection]
zabbix      6321    6318   0 12:01 ?        00:00:00 sbin/zabbix_agentd: listener #2 [waiting for connection]
zabbix      6322    6318   0 12:01 ?        00:00:00 sbin/zabbix_agentd: listener #3 [waiting for connection]
zabbix      6323    6318   0 12:01 ?        00:00:00 sbin/zabbix_agentd: active checks #1 [idle 1 sec]
...
```

Selecting processes by name and user does the job:

```
$ zabbix_get -s localhost -k 'proc.num[zabbix_agentd,zabbix]'
6
```

Now let's rename zabbix\_agentd executable to zabbix\_agentd\_30 and restart it.

ps now shows

```
$ ps -fu zabbix
UID          PID  PPID  C STIME TTY          TIME CMD
...
zabbix      6715     1   0 12:53 ?        00:00:00 sbin/zabbix_agentd_30 -c /home/zabbix/ZBXNEXT-1078/zabbix_
zabbix      6716    6715   0 12:53 ?        00:00:00 sbin/zabbix_agentd_30: collector [idle 1 sec]
zabbix      6717    6715   0 12:53 ?        00:00:00 sbin/zabbix_agentd_30: listener #1 [waiting for connection]
zabbix      6718    6715   0 12:53 ?        00:00:00 sbin/zabbix_agentd_30: listener #2 [waiting for connection]
zabbix      6719    6715   0 12:53 ?        00:00:00 sbin/zabbix_agentd_30: listener #3 [waiting for connection]
zabbix      6720    6715   0 12:53 ?        00:00:00 sbin/zabbix_agentd_30: active checks #1 [idle 1 sec]
...
```

Now selecting processes by name and user produces an incorrect result:

```
$ zabbix_get -s localhost -k 'proc.num[zabbix_agentd_30,zabbix]'
1
```

Why a simple renaming of executable to a longer name lead to quite different result ?

Zabbix agent starts with checking the process name. /proc/<pid>/status file is opened and the line Name is checked. In our case the Name lines are:

```
$ grep Name /proc/{6715,6716,6717,6718,6719,6720}/status
/proc/6715/status:Name:  zabbix_agentd_3
/proc/6716/status:Name:  zabbix_agentd_3
/proc/6717/status:Name:  zabbix_agentd_3
/proc/6718/status:Name:  zabbix_agentd_3
/proc/6719/status:Name:  zabbix_agentd_3
/proc/6720/status:Name:  zabbix_agentd_3
```

The process name in status file is truncated to 15 characters.

A similar result can be seen with ps command:

```
$ ps -u zabbix
PID TTY          TIME CMD
...
6715 ?          00:00:00 zabbix_agentd_3
6716 ?          00:00:01 zabbix_agentd_3
6717 ?          00:00:00 zabbix_agentd_3
6718 ?          00:00:00 zabbix_agentd_3
6719 ?          00:00:00 zabbix_agentd_3
6720 ?          00:00:00 zabbix_agentd_3
...
```

Obviously, that is not equal to our proc.num[] name parameter value zabbix\_agentd\_30. Having failed to match the process name from status file the Zabbix agent turns to /proc/<pid>/cmdline file.

How the agent sees the "cmdline" file can be illustrated with running a command



```
$ zabbix_get -s localhost -k 'proc.mem[kthreadd] '
4157440
```

`proc.num[]` counted both the kernel thread and the user process. `proc.mem[]` reports memory for the user process only and counts the kernel thread memory as if it was 0. This is different from the case above when `ZBX_NOTSUPPORTED` was reported.

Be careful when using `proc.mem[]` and `proc.num[]` items if the program name happens to match one of the thread.

Before putting parameters into `proc.mem[]` and `proc.num[]` items, you may want to test the parameters using `proc.num[]` item and `ps` command.

## 11 Implementation details of net.tcp.service and net.udp.service checks

Implementation of `net.tcp.service` and `net.udp.service` checks is detailed on this page for various services specified in the service parameter.

Item `net.tcp.service` parameters

### ftp

Creates a TCP connection and expects the first 4 characters of the response to be "220 ", then sends "QUIT\r\n". Default port 21 is used if not specified.

### http

Creates a TCP connection without expecting and sending anything. Default port 80 is used if not specified.

### https

Uses (and only works with) libcurl, does not verify the authenticity of the certificate, does not verify the host name in the SSL certificate, only fetches the response header (HEAD request). Default port 443 is used if not specified.

### imap

Creates a TCP connection and expects the first 4 characters of the response to be "\* OK", then sends "a1 LOGOUT\r\n". Default port 143 is used if not specified.

### ldap

Opens a connection to an LDAP server and performs an LDAP search operation with filter set to (objectClass=\*). Expects successful retrieval of the first attribute of the first entry. Default port 389 is used if not specified.

### nntp

Creates a TCP connection and expects the first 3 characters of the response to be "200" or "201", then sends "QUIT\r\n". Default port 119 is used if not specified.

### pop

Creates a TCP connection and expects the first 3 characters of the response to be "+OK", then sends "QUIT\r\n". Default port 110 is used if not specified.

### smtp

Creates a TCP connection and expects the first 3 characters of the response to be "220", followed by a space, the line ending or a dash. The lines containing a dash belong to a multiline response and the response will be re-read until a line without the dash is received. Then sends "QUIT\r\n". Default port 25 is used if not specified.

### ssh

Creates a TCP connection. If the connection has been established, both sides exchange an identification string (SSH-major.minor-XXXX), where major and minor are protocol versions and XXXX is a string. Zabbix checks if the string matching the specification is found and then sends back the string "SSH-major.minor-zabbix\_agent\r\n" or "0\r\n" on mismatch. Default port 22 is used if not specified.

### tcp

Creates a TCP connection without expecting and sending anything. Unlike the other checks requires the port parameter to be specified.

### telnet

Creates a TCP connection and expects a login prompt (':' at the end). Default port 23 is used if not specified.



Item net.udp.service parameters

## ntp

Sends an SNTP packet over UDP and validates the response according to [RFC 4330, section 5](#). Default port 123 is used if not specified.

## 12 Unreachable/unavailable host interface settings

### Overview

Several configuration **parameters** define how Zabbix server should behave when an agent check (Zabbix, SNMP, IPMI, JMX) fails and a host interface becomes unreachable.

### Unreachable interface

A host interface is treated as unreachable after a failed check (network error, timeout) by Zabbix, SNMP, IPMI or JMX agents. Note that Zabbix agent active checks do not influence interface availability in any way.

From that moment **UnreachableDelay** defines how often an interface is rechecked using one of the items (including LLD rules) in this unreachability situation and such rechecks will be performed already by unreachable pollers (or IPMI pollers for IPMI checks). By default it is 15 seconds before the next check.

In the Zabbix server log unreachability is indicated by messages like these:

```
Zabbix agent item "system.cpu.load[percpu,avg1]" on host "New host" failed: first network error, wait for
Zabbix agent item "system.cpu.load[percpu,avg15]" on host "New host" failed: another network error, wait f
```

Note that the exact item that failed is indicated and the item type (Zabbix agent).

#### Note:

The *Timeout* parameter will also affect how early an interface is rechecked during unreachability. If the Timeout is 20 seconds and UnreachableDelay 30 seconds, the next check will be in 50 seconds after the first attempt.

The **UnreachablePeriod** parameter defines how long the unreachability period is in total. By default UnreachablePeriod is 45 seconds. UnreachablePeriod should be several times bigger than UnreachableDelay, so that an interface is rechecked more than once before an interface becomes unavailable.

### Switching interface back to available

When the unreachability period is over, the interface is polled again, decreasing priority for item that turned the interface into unreachable state. If the unreachable interface reappears, the monitoring returns to normal automatically:

```
resuming Zabbix agent checks on host "New host": connection restored
```

#### Note:

Once interface becomes available, the host does not poll all its items immediately for two reasons:

- It might overload the host.
- The interface restore time is not always matching planned item polling schedule time.

So, after the interface becomes available, items are not polled immediately, but they are getting rescheduled to their next polling round.

### Unavailable interface

After the UnreachablePeriod ends and the interface has not reappeared, the interface is treated as unavailable.

In the server log it is indicated by messages like these:

```
temporarily disabling Zabbix agent checks on host "New host": interface unavailable
```

and in the **frontend** the host availability icon goes from green/gray to yellow/red (the unreachable interface details can be seen in the hint box that is displayed when a mouse is positioned on the host availability icon):

| ZBX Items 7 Triggers 3 Graphs Discovery rules Web scenarios 2 |                 |               |   |
|---|-----------------|---------------|---|
|   | Interface       | Status        | Error   |
|   | 127.0.0.1:10050 | Available     |   |
| me: S   | 192.0.0.1:10050 | Not available | Get value from agent failed: cannot connect to [[192.0.0.1]:10050]: [4] system call |

The **UnavailableDelay** parameter defines how often an interface is checked during interface unavailability.

By default it is 60 seconds (so in this case "temporarily disabling", from the log message above, will mean disabling checks for one minute).

When the connection to the interface is restored, the monitoring returns to normal automatically, too:

enabling Zabbix agent checks on host "New host": interface became available

### 13 Remote monitoring of Zabbix stats

#### Overview

It is possible to make some internal metrics of Zabbix server and proxy accessible remotely by another Zabbix instance or a third-party tool. This can be useful so that supporters/service providers can monitor their client Zabbix servers/proxies remotely or, in organizations where Zabbix is not the main monitoring tool, that Zabbix internal metrics can be monitored by a third-party system in an umbrella-monitoring setup.

Zabbix internal stats are exposed to a configurable set of addresses listed in the new 'StatsAllowedIP' **server/proxy** parameter. Requests will be accepted only from these addresses.

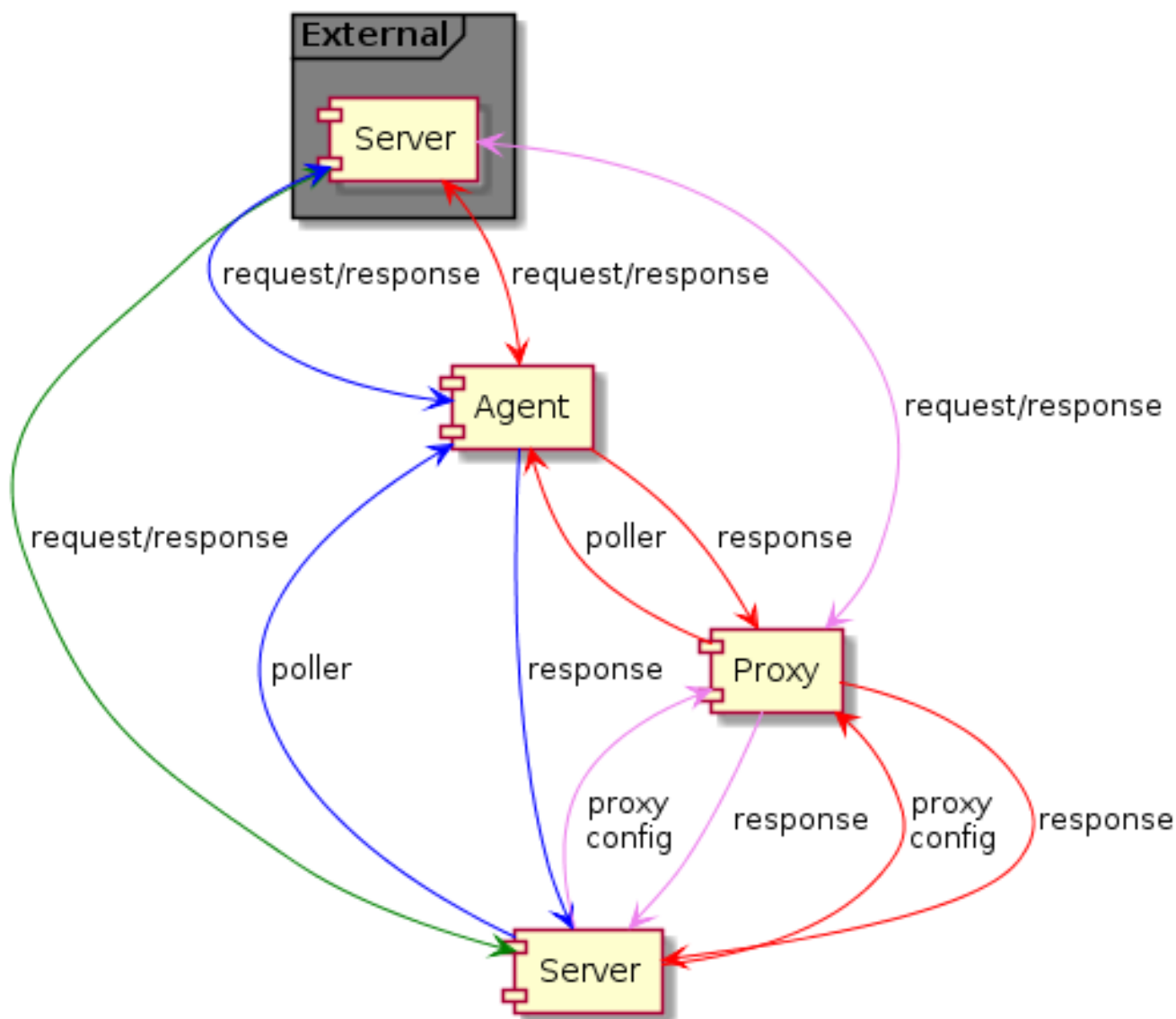
#### Items

To configure querying of internal stats on another Zabbix instance, you may use two items:

- `zabbix[stats,<ip>,<port>]` internal item - for direct remote queries of Zabbix server/proxy. `<ip>` and `<port>` are used to identify the target instance.
- `zabbix.stats[<ip>,<port>]` agent item - for agent-based remote queries of Zabbix server/proxy. `<ip>` and `<port>` are used to identify the target instance.

See also: [Internal items](#), [Zabbix agent items](#)

The following diagram illustrates the use of either item depending on the context.



- █ - Server → external Zabbix instance (zabbix[stats,<ip>,<port>])
- █ - Server → proxy → external Zabbix instance (zabbix[stats,<ip>,<port>])
- █ - Server → agent → external Zabbix instance (zabbix.stats[<ip>,<port>])
- █ - Server → proxy → agent → external Zabbix instance (zabbix.stats[<ip>,<port>])

To make sure that the target instance allows querying it by the external instance, list the address of the external instance in the 'StatsAllowedIP' parameter on the target instance.

#### Exposed metrics

The stats items gather the statistics in bulk and return a JSON, which is the basis for dependent items to get their data from. The following **internal metrics** are returned by either of the two items:

- zabbix[boottime]
- zabbix[hosts]
- zabbix[items]
- zabbix[items\_unsupported]
- zabbix[preprocessing\_queue] (server only)
- zabbix[process,<type>,<mode>,<state>] (only process type based statistics)
- zabbix[rcache,<cache>,<mode>]
- zabbix[requiredperformance]
- zabbix[triggers] (server only)
- zabbix[uptime]
- zabbix[vcache,buffer,<mode>] (server only)
- zabbix[vcache,cache,<parameter>]

- zabbix[version]
- zabbix[vmware,buffer,<mode>]
- zabbix[wcache,<cache>,<mode>] ('trends' cache type server only)

## Templates

Templates are available for remote monitoring of Zabbix server or proxy internal metrics from an external instance:

- Remote Zabbix server health
- Remote Zabbix proxy health

Note that in order to use a template for remote monitoring of multiple external instances, a separate host is required for each external instance monitoring.

## Trapper process

Receiving internal metric requests from an external Zabbix instance is handled by the trapper process that validates the request, gathers the metrics, creates the JSON data buffer and sends the prepared JSON back, for example, from server:

```
{
  "response": "success",
  "data": {
    "boottime": N,
    "uptime": N,
    "hosts": N,
    "items": N,
    "items_unsupported": N,
    "preprocessing_queue": N,
    "process": {
      "alert_manager": {
        "busy": {
          "avg": N,
          "max": N,
          "min": N
        },
        "idle": {
          "avg": N,
          "max": N,
          "min": N
        },
        "count": N
      },
      ...
    },
    "queue": N,
    "rcache": {
      "total": N,
      "free": N,
      "pfree": N,
      "used": N,
      "pused": N
    },
    "requiredperformance": N,
    "triggers": N,
    "uptime": N,
    "vcache": {
      "buffer": {
        "total": N,
        "free": N,
        "pfree": N,
        "used": N,
        "pused": N
      },
      "cache": {
        "requests": N,
        "hits": N,
```

```

        "misses": N,
        "mode": N
    }
},
"vmware": {
    "total": N,
    "free": N,
    "pfree": N,
    "used": N,
    "pused": N
},
"version": "N",
"wcache": {
    "values": {
        "all": N,
        "float": N,
        "uint": N,
        "str": N,
        "log": N,
        "text": N,
        "not supported": N
    },
    "history": {
        "pfree": N,
        "free": N,
        "total": N,
        "used": N,
        "pused": N
    },
    "index": {
        "pfree": N,
        "free": N,
        "total": N,
        "used": N,
        "pused": N
    },
    "trend": {
        "pfree": N,
        "free": N,
        "total": N,
        "used": N,
        "pused": N
    }
}
}
}
}

```

#### Internal queue items

There are also another two items specifically allowing to remote query internal queue stats on another Zabbix instance:

- `zabbix[stats,<ip>,<port>,queue,<from>,<to>]` internal item - for direct internal queue queries to remote Zabbix server/proxy
- `zabbix.stats[<ip>,<port>,queue,<from>,<to>]` agent item - for agent-based internal queue queries to remote Zabbix server/proxy

See also: [Internal items](#), [Zabbix agent items](#)

## 14 Configuring Kerberos with Zabbix

### Overview

Kerberos authentication can be used in web monitoring and HTTP items in Zabbix since version 4.4.0.

This section describes an example of configuring Kerberos with Zabbix server to perform web monitoring of `www.example.com` with user 'zabbix'.

#### Steps

##### Step 1

Install Kerberos package.

For Debian/Ubuntu:

```
apt install krb5-user
```

For RHEL:

```
dnf install krb5-workstation
```

##### Step 2

Configure Kerberos configuration file (see MIT documentation for details)

```
cat /etc/krb5.conf
[libdefaults]
    default_realm = EXAMPLE.COM

#### The following krb5.conf variables are only for MIT Kerberos.
    kdc_timesync = 1
    ccache_type = 4
    forwardable = true
    proxiable = true

[realms]
    EXAMPLE.COM = {
    }

[domain_realm]
    .example.com=EXAMPLE.COM
    example.com=EXAMPLE.COM
```

##### Step 3

Create a Kerberos ticket for user *zabbix*. Run the following command as user *zabbix*:

```
kinit zabbix
```

#### Attention:

It is important to run the above command as user *zabbix*. If you run it as *root* the authentication will not work.

##### Step 4

Create a web scenario or HTTP agent item with Kerberos authentication type.

Optionally can be tested with the following curl command:

```
curl -v --negotiate -u : http://example.com
```

Note that for lengthy web monitoring it is necessary to take care of renewing the Kerberos ticket. Default time of ticket expiration is 10h.

## 15 modbus.get parameters

#### Overview

The table below presents details of the `modbus.get[]` *item* parameters.

#### Parameters

| Parameter       | Description   | Defaults   | Example  |
|-----------------|---|--|--|
| <i>endpoint</i> | <p>Protocol and address of the endpoint, defined as <code>protocol://connection_string</code></p> <p>Possible protocol values: <i>rtu</i>, <i>ascii</i> (Agent 2 only), <i>tcp</i></p> <p>Connection string format:</p> <p>with <i>tcp</i> - <code>address:port</code><br/> with serial line: <i>rtu</i>, <i>ascii</i> - <code>port_name:speed:params</code><br/> where<br/> 'speed' - 1200, 9600 etc<br/> 'params' - data bits (5,6,7 or 8), parity (n,e or o for none/even/odd), stop bits (1 or 2)</p> | <p>protocol: none</p> <p><i>rtu/ascii</i> protocol:<br/> port_name: none<br/> speed: 115200<br/> params: 8n1</p> <p><i>tcp</i> protocol:<br/> address: none<br/> port: 502</p> | <p><code>tcp://192.168.6.1:511</code><br/> <code>tcp://192.168.6.2</code><br/> <code>tcp://[::1]:511</code><br/> <code>tcp://:1</code><br/> <code>tcp://localhost:511</code><br/> <code>tcp://localhost</code><br/> <code>rtu://COM1:9600:8n</code><br/> <code>ascii://COM2:1200:7o2</code><br/> <code>rtu://ttyS0:9600</code><br/> <code>ascii://ttyS1</code></p> |
| <i>slave id</i> | Modbus address of the device it is intended for (1 to 247), see <a href="#">MODBUS Messaging Implementation Guide</a> (page 23)   | <p>serial: 1</p> <p>tcp: 255 (0xFF)</p>  | 2  |
| <i>function</i> | <p>tcp device (not GW) will ignore the field</p> <p>Empty or value of a supported function:</p> <p>1 - Read Coil,<br/> 2 - Read Discrete Input,<br/> 3 - Read Holding Registers,<br/> 4 - Read Input Registers</p>  | empty  | 3  |
| <i>address</i>  | <p>Address of the first registry, coil or input.</p> <p>If 'function' is empty, then 'address' should be in range for:<br/> Coil - 00001 - 09999<br/> Discrete input - 10001 - 19999<br/> Input register - 30001 - 39999<br/> Holding register - 40001 - 49999</p> <p>If 'function' is not empty, the 'address' field will be from 0 till 65535 and used without modification (PDU)</p>   | <p>empty function:<br/> 00001</p> <p>non-empty<br/> function: 0</p>  | 9999   |
| <i>count</i>    | <p>Count of sequenced 'type' which will be read from device, where:</p> <p>for Coil or Discrete input the 'type' = 1 bit<br/> for other cases: <math>(count * sizeof(type)) / 2 = \text{real count of registers for reading}</math><br/> If 'offset' is not 0, the value will be added to 'real count'</p> <p>Acceptable range for 'real count' is 1:65535</p>  | 1  | 2  |
| <i>type</i>     | <p>Data type:</p> <p>for Read Coil and Read Discrete Input - <i>bit</i></p> <p>for Read Holding Registers and Read Input Registers:<br/> <i>int8</i> - 8bit<br/> <i>uint8</i> - 8bit (unsigned)<br/> <i>int16</i> - 16bit<br/> <i>uint16</i> - 16bit (unsigned)<br/> <i>int32</i> - 32bit<br/> <i>uint32</i> - 32bit (unsigned)<br/> <i>float</i> - 32bit<br/> <i>uint64</i> - 64bit (unsigned)<br/> <i>double</i> - 64bit</p>  | <p>bit</p> <p>uint16</p>   | uint64   |

| Parameter         | Description   | Defaults | Example |
|-------------------|---|----------|---------|
| <i>endianness</i> | Endianness type:<br><i>be</i> - Big Endian<br><i>le</i> - Little Endian<br><i>mbe</i> - Mid-Big Endian<br><i>mle</i> - Mid-Little Endian<br><br>Limitations:<br>for 1 bit - be<br>for 8 bits - be,le<br>for 16 bits - be,le | be       | le      |
| <i>offset</i>     | Number of registers, starting from 'address', the result of which will be discarded.<br><br>The size of each register is 16bit (needed to support equipment that does not support random read access).                      | 0        | 4       |

## 16 Creating custom performance counter names for VMware

### Overview

The VMware performance counter path has the `group/counter[rollup]` format where:

- `group` - the performance counter group, for example *cpu*
- `counter` - the performance counter name, for example *usagemhz*
- `rollup` - the performance counter rollup type, for example *average*

So the above example would give the following counter path: `cpu/usagemhz[average]`

The performance counter group descriptions, counter names and rollup types can be found in [VMware documentation](#).

It is possible to obtain internal names and create custom performance counter names by using script item in Zabbix.

### Configuration

1. Create disabled Script item on the main VMware host (where the **eventlog[]** item is present) with the following parameters:



Item
Tags
Preprocessing

\* Name

VMware metrics

Type

Script

\* Key

vmware.metrics

Type of information

Text

Parameters

| Name | Value |
|------|-------|
|      |       |

Add

\* Script

try {...

\* Timeout

10s

\* Update interval

1m

Custom intervals

| Type     | Interval   | Period       |
|----------|------------|--------------|
| Flexible | Scheduling | 50s          |
|          |            | 1-7,00:00-24 |

Add

\* History storage period

Do not keep history

Storage period

Populates host inventory field

-None-

Description

Enabled

☐

Add

Test

Cancel

- *Name*: VMware metrics
- *Type*: Script
- *Key*: vmware.metrics
- *Type of information*: Text
- *Script*: copy and paste the **script** provided below
- *Timeout*: 10
- *History storage period*: Do not keep history
- *Enabled*: unmarked

Script

```
try {
  Zabbix.log(4, 'vmware metrics script');

  var result, resp,
  req = new HttpRequest();
  req.addHeader('Content-Type: application/xml');
```

```

req.addHeader('SOAPAction: "urn:vim25/6.0"');

login = '<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:urn="urn:vim25/6.0">\n
<soapenv:Header/>\n
<soapenv:Body>\n
  <urn:Login>\n
    <urn:_this type="SessionManager">SessionManager</urn:_this>\n
    <urn:userName>{$VMWARE.USERNAME}</urn:userName>\n
    <urn:password>{$VMWARE.PASSWORD}</urn:password>\n
  </urn:Login>\n
</soapenv:Body>\n
</soapenv:Envelope>'
resp = req.post("{$VMWARE.URL}", login);
if (req.getStatus() != 200) {
  throw 'Response code: '+req.getStatus();
}

query = '<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:urn="urn:vim25/6.0">\n
<soapenv:Header/>\n
<soapenv:Body>\n
  <urn:RetrieveProperties>\n
    <urn:_this type="PropertyCollector">propertyCollector</urn:_this>\n
    <urn:specSet>\n
      <urn:propSet>\n
        <urn:type>PerformanceManager</urn:type>\n
        <urn:pathSet>perfCounter</urn:pathSet>\n
      </urn:propSet>\n
      <urn:objectSet>\n
        <urn:obj type="PerformanceManager">PerfMgr</urn:obj>\n
      </urn:objectSet>\n
    </urn:specSet>\n
  </urn:RetrieveProperties>\n
</soapenv:Body>\n
</soapenv:Envelope>'
resp = req.post("{$VMWARE.URL}", query);
if (req.getStatus() != 200) {
  throw 'Response code: '+req.getStatus();
}
Zabbix.log(4, 'vmware metrics=' + resp);
result = resp;

logout = '<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:urn="urn:vim25/6.0">\n
<soapenv:Header/>\n
<soapenv:Body>\n
  <urn:Logout>\n
    <urn:_this type="SessionManager">SessionManager</urn:_this>\n
  </urn:Logout>\n
</soapenv:Body>\n
</soapenv:Envelope>'

resp = req.post("{$VMWARE.URL}", logout);
if (req.getStatus() != 200) {
  throw 'Response code: '+req.getStatus();
}

} catch (error) {
  Zabbix.log(4, 'vmware call failed : '+error);
  result = {};
}

return result;

```

Once the item is configured, press *Test* button, then press *Get value*.

Get value from host ☒

Host address

Port

Proxy

(no proxy) [Get value](#)

Copy received XML to any XML formatter and find the desired metric.

An example of XML for one metric:

```
<PerfCounterInfo xsi:type="PerfCounterInfo">
  <key>6</key>
  <nameInfo>
    <label>Usage in MHz</label>
    <summary>CPU usage in megahertz during the interval</summary>
    <key>usagemhz</key>
  </nameInfo>
  <groupInfo>
    <label>CPU</label>
    <summary>CPU</summary>
    <key>cpu</key>
  </groupInfo>
  <unitInfo>
    <label>MHz</label>
    <summary>Megahertz</summary>
    <key>megaHertz</key>
  </unitInfo>
  <rollupType>average</rollupType>
  <statsType>rate</statsType>
  <level>1</level>
  <perDeviceLevel>3</perDeviceLevel>
</PerfCounterInfo>
```

Use XPath to extract the counter path from received XML. For the example above, the XPath will be:

| field   | xPath                     | value    |
|---------|---------------------------|----------|
| group   | //groupInfo[../key=6]/key | cpu      |
| counter | //nameInfo[../key=6]/key  | usagemhz |
| rollup  | //rollupType[../key=6]    | average  |

Resulting performance counter path in this case is: `cpu/usagemhz[average]`

## 17 Notes on system.cpu.util items on Windows

`system.cpu.util` item provides the CPU utilization percentage.

When a collector process is started on Zabbix agent for Windows, a buffer for N items for N logical processors (threads) is initialized. Values are periodically updated in the buffer using Windows performance counters. These values are reported when `system.cpu.util[n]` is requested, where  $0 \leq n < N$ .

One more item in the buffer is used for `system.cpu.util[total]`.

Zabbix automatically selects different performance counters to support both NUMA systems and older Windows versions with no processor group support.

If logical processor (thread) count is less or equal than 64 and number of processor groups is equal to 1, then:

N is logical processor (thread) count.

```
\Processor(_Total)\% Processor Time
\Processor(0)\% Processor Time
\Processor(1)\% Processor Time
```

```

\Processor(2)\% Processor Time
...
\Processor(N-1)\% Processor Time

```

Else:

G is processor group count and N is logical processor (thread) count in group.

```

\Processor Information(_Total)\% Processor Time
\Processor Information(0,0)\% Processor Time
\Processor Information(0,1)\% Processor Time
\Processor Information(0,2)\% Processor Time
...
\Processor Information(0,N-1)\% Processor Time
...
\Processor Information(G-1,0)\% Processor Time
\Processor Information(G-1,1)\% Processor Time
\Processor Information(G-1,2)\% Processor Time
...
\Processor Information(G-1,N-1)\% Processor Time

```

## 5 Supported functions

Click on the respective function group to see more details.

| Function group                  | Functions   |
|---------------------------------|---|
| <b>Aggregate func-tions</b>     | avg, bucket_percentile, count, histogram_quantile, item_count, kurtosis, mad, max, min, skewness, stddevpop, stddevsamp, sum, sumofsquares, varpop, varsamp   |
| <b>Foreach functions</b>        | avg_foreach, bucket_rate_foreach, count_foreach, exists_foreach, last_foreach, max_foreach, min_foreach, sum_foreach  |
| <b>Bitwise func-tions</b>       | bitand, bitlshift, bitnot, bitor, bitrshift, bitxor   |
| <b>Date and time func-tions</b> | date, dayofmonth, dayofweek, now, time  |
| <b>History func-tions</b>       | change, changecount, count, countunique, find, first, fuzzytime, last, logeventid, logseverity, logsource, monodec, monoinc, nodata, percentile, rate   |
| <b>Trend func-tions</b>         | baselinedev, baselinewma, trendavg, trendcount, trendmax, trendmin, trendstl, trendsum  |
| <b>Mathematical func-tions</b>  | abs, acos, asin, atan, atan2, avg, cbrt, ceil, cos, cosh, cot, degrees, e, exp, expm1, floor, log, log10, max, min, mod, pi, power, radians, rand, round, signum, sin, sinh, sqrt, sum, tan, truncate |
| <b>Operator func-tions</b>      | between, in   |
| <b>Prediction func-tions</b>    | forecast, timeleft  |
| <b>String func-tions</b>        | ascii, bitlength, bytelength, char, concat, insert, left, length, ltrim, mid, repeat, replace, right, rtrim, trim   |

These functions are supported in **trigger expressions** and **calculated items**.

Foreach functions are supported only for **aggregate calculations**.

## 1 Aggregate functions

Except where stated otherwise, all functions listed here are supported in:

- **Trigger expressions**
- **Calculated items**

Aggregate functions can work with either:

- history of items, for example, `min(/host/key,1h)`
- **foreach functions** as the only parameter, for example, `min(last_foreach(/*/key))` (only in calculated items; cannot be used in triggers)

Some general notes on function parameters:

- Function parameters are separated by a comma
- Optional function parameters (or parameter parts) are indicated by `< >`
- Function-specific parameters are described with each function
- `/host/key` and `(sec|#num)<:time shift>` parameters must never be quoted

Common parameters

- `/host/key` is a common mandatory first parameter for the functions referencing the host item history
- `(sec|#num)<:time shift>` is a common second parameter for the functions referencing the host item history, where:
  - **sec** - maximum **evaluation period** in seconds (time **suffixes** can be used), or
  - **#num** - maximum **evaluation range** in latest collected values (if preceded by a hash mark)
  - **time shift** (optional) allows to move the evaluation point back in time. See **more details** on specifying time shift.

Aggregate functions

| FUNCTION   |                                |   |
|--|--------------------------------|---|
| Description  | Function-specific parameters   | Comments  |
| <b>avg</b> (/host/key,(sec #num)<:time shift>)<br>Average value of an item within the defined evaluation period. | See <b>common parameters</b> . | Supported value types: float, int<br><br>Supported <b>foreach functions</b> :<br>avg_foreach, count_foreach, exists_foreach, last_foreach, max_foreach, min_foreach, sum_foreach<br><br>Examples:<br>=> <b>avg</b> (/host/key, <b>1h</b> ) → average value for the last hour until <b>now</b><br>=> <b>avg</b> (/host/key, <b>1h:now-1d</b> ) → average value for an hour from 25 hours ago to 24 hours ago from <b>now</b><br>=> <b>avg</b> (/host/key, <b>#5</b> ) → average value of the five latest values<br>=> <b>avg</b> (/host/key, <b>#5:now-1d</b> ) → average value of the five latest values excluding the values received in the last 24 hours<br><br>Time shift is useful when there is a need to compare the current average value with the average value some time ago. |
| <b>bucket_percentile</b> (item filter,time period,percentage)  |                                |   |

---

## FUNCTION

---

Calculates the percentile from the buckets of a histogram.

**item filter** - see [item filter](#)  
**time period** - see [time period](#)  
**percentage** - percentage (0-100)

Supported only in calculated items.

This function is an alias for `histogram_quantile(percentage/100, bucket_rate_foreach(item filter, time period, 1))`

**count** (func\_foreach(item filter,<time period>))

Count of values in an array returned by a foreach function.

**func\_foreach** - foreach function for which the number of returned values should be counted (with supported arguments). See [foreach functions](#) for details.

Supported value type: int

Supported [foreach functions](#):  
 avg\_foreach, count\_foreach, exists\_foreach, last\_foreach, max\_foreach, min\_foreach, sum\_foreach

Example:

=>

**count**(max\_foreach(/\*/net.if.in[\*],1h))  
 → number of net.if.in items that received data in the last hour until [now](#)

Note that using **count()** with a history-related foreach function (max\_foreach, avg\_foreach, etc.) may lead to performance implications, whereas using **exists\_foreach()**, which works only with configuration data, will not have such effect.

**histogram\_quantile** (quantile,bucket1,value1,bucket2,value2,...)

Calculates the  $\phi$ -quantile from the buckets of a histogram.

**quantile** -  $0 \leq \phi \leq 1$   
**bucketN, valueN** - manually entered pairs ( $\geq 2$ ) of parameters or response of [bucket\\_rate\\_foreach](#)

Supported only in calculated items.

Supported [foreach functions](#):  
 bucket\_rate\_foreach

Functionally corresponds to '[histogram\\_quantile](#)' of PromQL.

Returns -1 if values of the last 'Infinity' bucket ("*inf*") are equal to 0.

Examples:

=> **his-**

**togram\_quantile**(0.75,1.0,last(/host/rate\_bucket[1.0

=> **his-**

**togram\_quantile**(0.5,bucket\_rate\_foreach(/item\_ke

**item\_count** (item filter)

Count of existing items in configuration that match filter criteria.

**item filter** - criteria for item selection, allows referencing by host group, host, item key, and tags. Wildcards are supported. See [item filter](#) for more details.

Supported only in calculated items.

Supported value type: int

Works as an alias for the `count(exists_foreach(item_filter))` function.

Example:

=>

**item\_count**(/\*/agent.ping?[group="Host group 1"]) → number of hosts with the *agent.ping* item in the "Host group 1"

---

## FUNCTION

---

**kurtosis** (/host/key,(sec|#num)<:time shift>)

"Tailedness" of the probability distribution in collected values within the defined evaluation period.

See [common parameters](#).

Supported value types: float, int

Supported [foreach functions](#):  
last\_foreach

See also: [Kurtosis](#)

Example:

=> **kurtosis**(/host/key,**1h**) → kurtosis for the last hour until **now**

**mad** (/host/key,(sec|#num)<:time shift>)

Median absolute deviation in collected values within the defined evaluation period.

See [common-parameters](#).

Supported value types: float, int

Supported [foreach functions](#):  
last\_foreach

See also: [Median absolute deviation](#)

Example:

=> **mad**(/host/key,**1h**) → median absolute deviation for the last hour until **now**

**max** (/host/key,(sec|#num)<:time shift>)

Highest value of an item within the defined evaluation period.

See [common parameters](#).

Supported value types: float, int

Supported [foreach functions](#):  
avg\_foreach, count\_foreach, exists\_foreach, last\_foreach, max\_foreach, min\_foreach, sum\_foreach

Example:

=> **max**(/host/key,**1h**) - **min**(/host/key,**1h**) → calculate the difference between the maximum and minimum values within the last hour until **now** (delta of values)

**min** (/host/key,(sec|#num)<:time shift>)

Lowest value of an item within the defined evaluation period.

See [common parameters](#).

Supported value types: float, int

Supported [foreach functions](#):  
avg\_foreach, count\_foreach, exists\_foreach, last\_foreach, max\_foreach, min\_foreach, sum\_foreach

Example:

=> **max**(/host/key,**1h**) - **min**(/host/key,**1h**) → calculate the difference between the maximum and minimum values within the last hour until **now** (delta of values)

**skewness**

(/host/key,(sec|#num)<:time shift>)

---

## FUNCTION

---

Asymmetry of the probability distribution in collected values within the defined evaluation period.

See also: [Skewness](#)

### **stddevpop**

(/host/key,(sec|#num)<:time shift>)

Population standard deviation in collected values within the defined evaluation period.

See also: [Standard deviation](#)

### **stddevsamp**

(/host/key,(sec|#num)<:time shift>)

Sample standard deviation in collected values within the defined evaluation period.

See also: [Standard deviation](#)

**sum** (/host/key,(sec|#num)<:time shift>)

Sum of collected values within the defined evaluation period.

### **sumofsquares**

(/host/key,(sec|#num)<:time shift>)

The sum of squares in collected values within the defined evaluation period.

**varpop** (/host/key,(sec|#num)<:time shift>)

See [common parameters](#).

See [common parameters](#).

See [common parameters](#).

See [common parameters](#).

See [common parameters](#).

Supported value types: float, int

Supported [foreach functions](#):  
last\_foreach

Example:

=> **skewness**(/host/key,**1h**) →  
skewness for the last hour until **now**

Supported value types: float, int

Supported [foreach functions](#):  
last\_foreach

Example:

=> **stddevpop**(/host/key,**1h**) →  
population standard deviation for the  
last hour until **now**

Supported value types: float, int

Supported [foreach functions](#):  
last\_foreach

At least two data values are required  
for this function to work.

Example:

=> **stddevsamp**(/host/key,**1h**) →  
sample standard deviation for the last  
hour until **now**

Supported value types: float, int

Supported [foreach functions](#):  
avg\_foreach, count\_foreach,  
exists\_foreach, last\_foreach,  
max\_foreach, min\_foreach,  
sum\_foreach

Example:

=> **sum**(/host/key,**1h**) → sum of  
values for the last hour until **now**

Supported value types: float, int

Supported [foreach functions](#):  
last\_foreach

Example:

=> **sumofsquares**(/host/key,**1h**) →  
sum of squares for the last hour until  
**now**



---

## FUNCTION

---

Population variance of collected values within the defined evaluation period. See [common parameters](#).

Supported value types: float, int

Supported [foreach functions](#):  
`last_foreach`

Example:

=> **varpop**(/host/key,**1h**) →  
population variance for the last hour  
until **now**

### **varsamp**

(/host/key,(sec|#num)<:time shift>)

Sample variance of collected values within the defined evaluation period. See [common parameters](#).

Supported value types: float, int

Supported [foreach functions](#):  
`last_foreach`

See also: [Variance](#)

At least two data values are required for this function to work.

Example:

=> **varsamp**(/host/key,**1h**) → sample  
variance for the last hour until **now**

---

## 1 Foreach functions

### Overview

Foreach functions are used in [aggregate calculations](#) to return one aggregate value for each item that is selected by the used **item filter**. An array of values is returned.

For example, the *avg\_foreach* function will return an array of values, where each value is the *average* history value of the selected item, during the time interval that is specified.

The **item filter** is part of the syntax used by foreach functions. The use of wildcards is supported in the item filter, thus the required items can be selected quite flexibly.

### Supported functions

| Function                   | Description   |
|----------------------------|---|
| <i>avg_foreach</i>         | Returns the average value for each item.  |
| <i>bucket_rate_foreach</i> | Returns pairs (bucket upper bound, rate value) suitable for use in the <a href="#">histogram_quantile()</a> function, where "bucket upper bound" is the value of item key parameter defined by the <parameter number> <a href="#">parameter</a> . |
| <i>count_foreach</i>       | Returns the number of values for each item.   |
| <i>exists_foreach</i>      | Returns '1' for each enabled item.  |
| <i>last_foreach</i>        | Returns the last value for each item.   |
| <i>max_foreach</i>         | Returns the maximum value for each item.  |
| <i>min_foreach</i>         | Returns the minimum value for each item.  |
| <i>sum_foreach</i>         | Returns the sum of values for each item.  |

---

### Function syntax

Foreach functions support two common parameters: `item filter` (see details below) and `time period`:

`foreach_function(item filter,time period)`

For example:

`avg_foreach(/*/mysql.qps?[group="MySQL Servers"],5m)`

will return the five-minute average of each 'mysql.qps' item in the MySQL server group.

Note that some functions support additional [parameters](#).

## Item filter syntax

The item filter:

`/host/key[parameters]?[conditions]`

consists of four parts, where:

- host - host name
- key - item key (without parameters)
- parameters - item key parameters
- conditions - host group and/or item tag based conditions (as expression)

Spaces are allowed only inside the conditions expression.

### Wildcard usage

- Wildcard can be used to replace the host name, item key or an individual item key parameter.
- Either the host or item key must be specified without wildcard. So `/host/*` and `/*/key` are valid filters, but `/*/*` is invalid.
- Wildcard cannot be used for a *part* of host name, item key, item key parameter.
- Wildcard does not match more than a single item key parameter. So a wildcard must be specified for each parameter in separation (i.e. `key[abc,*,*]`).

### Conditions expression

The conditions expression supports:

- operands:
  - group - host group
  - tag - item tag
  - "<text>" - string constant, with the `\` escape character to escape `"` and `\`
- case-sensitive string comparison operators: `=`, `<>`
- logical operators: `and`, `or`, `not`
- grouping with parentheses: `( )`

Quotation of string constants is mandatory. Only case-sensitive full string comparison is supported.

#### Warning:

When specifying tags in the filter (i.e. `tag="tagname:value"`), the colon `:` is used as a delimiter. Everything after it is considered the tag value. Thus it is currently not supported to specify a tag name containing `:` in it.

### Examples

A complex filter may be used, referencing the item key, host group and tags, as illustrated by the examples:

| Syntax example  | Description   |
|---|---|
| <code>/host/key[abc,*]</code>   | Matches similar items on this host.   |
| <code>/*/key</code>   | Matches the same item of any host.  |
| <code>/*/key?[group="ABC" and tag="tagname:value"]</code>   | Matches the same item of any host from the ABC group having 'tagname:value' tags.     |
| <code>/*/key[a,*,c]?[(group="ABC" and tag="Tag1") or (group="DEF" and (tag="Tag2" or tag="Tag3:value"))]</code> | Matches similar items of any host from the ABC or DEF group with the respective tags. |

All referenced items must exist and collect data. Only enabled items on enabled hosts are included in the calculations.

#### Attention:

If the item key of a referenced item is changed, the filter must be updated manually.

Specifying a parent host group includes the parent group and all nested host groups with their items.

### Time period

The **second** parameter allows to specify the time period for aggregation. The time period can only be expressed as time, the amount of values (prefixed with `#`) is not supported.

**Supported unit symbols** can be used in this parameter for convenience, for example `'5m'` (five minutes) instead of `'300s'` (300 seconds) or `'1d'` (one day) instead of `'86400'` (86400 seconds).

Time period is ignored by the server if passed with the *last\_foreach* function and can thus be omitted:

```
last_foreach(/*/key?[group="host group"])
```

Time period is not supported with the *exists\_foreach* function.

Additional parameters

A third optional parameter is supported by the *bucket\_rate\_foreach* function:

```
bucket_rate_foreach(item filter,time period,<parameter number>)
```

where <parameter number> is the position of the "bucket" value in the item key. For example, if the "bucket" value in myItem[aaa,0.2] is '0.2', then its position is 2.

The default value of <parameter number> is '1'.

See [aggregate calculations](#) for more details and examples on using foreach functions.

Behavior depending on availability

The following table illustrates how each function behaves in cases of limited availability of host/item and history data.

| Function                   | Disabled host | Unavailable host with data | Unavailable host without data | Disabled item | Unsupported item | Data retrieval error (SQL) |
|----------------------------|---------------|----------------------------|-------------------------------|---------------|------------------|----------------------------|
| <i>avg_foreach</i>         | ignore        | return avg                 | ignore                        | ignore        | ignore           | ignore                     |
| <i>bucket_rate_foreach</i> | ignore        | return bucket rate         | ignore                        | ignore        | ignore           | ignore                     |
| <i>count_foreach</i>       | ignore        | return count               | 0                             | ignore        | ignore           | ignore                     |
| <i>exists_foreach</i>      | ignore        | 1                          | 1                             | ignore        | 1                | n/a                        |
| <i>last_foreach</i>        | ignore        | return last                | ignore                        | ignore        | ignore           | ignore                     |
| <i>max_foreach</i>         | ignore        | return max                 | ignore                        | ignore        | ignore           | ignore                     |
| <i>min_foreach</i>         | ignore        | return min                 | ignore                        | ignore        | ignore           | ignore                     |
| <i>sum_foreach</i>         | ignore        | return sum                 | ignore                        | ignore        | ignore           | ignore                     |

If the item is *ignored*, nothing is added to the aggregation.

## 2 Bitwise functions

All functions listed here are supported in:

- [Trigger expressions](#)
- [Calculated items](#)

Some general notes on function parameters:

- Function parameters are separated by a comma
- Expressions are accepted as parameters
- Optional function parameters (or parameter parts) are indicated by < >

### FUNCTION

| Description                | Function-specific parameters | Comments |
|----------------------------|------------------------------|----------|
| <b>bitand</b> (value,mask) |                              |          |

---

## FUNCTION

---

Value of "bitwise AND" of an item value and mask.

**value** - value to check  
**mask** (mandatory) - 64-bit unsigned integer (0 - 18446744073709551615)

Supported value types: int

Although the comparison is done in a bitwise manner, all the values must be supplied and are returned in decimal. For example, checking for the 3rd bit is done by comparing to 4, not 100.

Examples:

=> **bitand**(last(/host/key),**12**)=8 or  
**bitand**(last(/host/key),**12**)=4 → 3rd or 4th bit set, but not both at the same time  
=> **bitand**(last(/host/key),**20**)=16 → 3rd bit not set and 5th bit set.

**bitlshift** (value,bits to shift)

Bitwise shift left of an item value.

**value** - value to check  
**bits to shift** (mandatory) - number of bits to shift

Supported value types: int

Although the comparison is done in a bitwise manner, all the values must be supplied and are returned in decimal. For example, checking for the 3rd bit is done by comparing to 4, not 100.

**bitnot** (value)

Value of "bitwise NOT" of an item value.

**value** - value to check

Supported value types: int

Although the comparison is done in a bitwise manner, all the values must be supplied and are returned in decimal. For example, checking for the 3rd bit is done by comparing to 4, not 100.

**bitor** (value,mask)

Value of "bitwise OR" of an item value and mask.

**value** - value to check  
**mask** (mandatory) - 64-bit unsigned integer (0 - 18446744073709551615)

Supported value types: int

Although the comparison is done in a bitwise manner, all the values must be supplied and are returned in decimal. For example, checking for the 3rd bit is done by comparing to 4, not 100.

**bitrshift** (value,bits to shift)

Bitwise shift right of an item value.

**value** - value to check  
**bits to shift** (mandatory) - number of bits to shift

Supported value types: int

Although the comparison is done in a bitwise manner, all the values must be supplied and are returned in decimal. For example, checking for the 3rd bit is done by comparing to 4, not 100.

**bitxor** (value,mask)

Value of "bitwise exclusive OR" of an item value and mask.

**value** - value to check  
**mask** (mandatory) - 64-bit unsigned integer (0 - 18446744073709551615)

Supported value types: int

Although the comparison is done in a bitwise manner, all the values must be supplied and are returned in decimal. For example, checking for the 3rd bit is done by comparing to 4, not 100.

---

### 3 Date and time functions

All functions listed here are supported in:

- **Trigger expressions**

- [Calculated items](#)

#### Attention:

Date and time functions cannot be used in the expression by themselves; at least one function from [another group](#), referencing the host item, must be included in the expression (except the nodata function). For detailed information on how date and time functions work within expressions, see [Calculation time](#).

| FUNCTION   |                              |   |
|--|------------------------------|---|
| Description  | Function-specific parameters | Comments  |
| <b>date</b><br>Current date in YYYYMMDD format.                                  |                              | Example:<br>=> <b>date()</b> <20220101  |
| <b>dayofmonth</b><br>Day of month in range of 1 to 31.                           |                              | Example:<br>=> <b>dayofmonth()</b> =1   |
| <b>dayofweek</b><br>Day of week in range of 1 to 7 (Mon - 1, Sun - 7).           |                              | Example (only weekdays):<br>=> <b>dayofweek()</b> <6<br><br>Example (only weekend):<br>=> <b>dayofweek()</b> >5 |
| <b>now</b><br>Number of seconds since the Epoch (00:00:00 UTC, January 1, 1970). |                              | Example:<br>=> <b>now()</b> <1640998800   |
| <b>time</b><br>Current time in HHMMSS format.                                    |                              | Example (only nighttime, 00:00-06:00):<br>=> <b>time()</b> <060000  |

## 4 History functions

All functions listed here are supported in:

- [Trigger expressions](#)
- [Calculated items](#)

Some general notes on function parameters:

- Function parameters are separated by a comma
- Optional function parameters (or parameter parts) are indicated by < >
- Function-specific parameters are described with each function
- /host/key and (sec|#num)<:time shift> parameters must never be quoted

Common parameters

- /host/key is a common mandatory first parameter for the functions referencing the host item history
- (sec|#num)<:time shift> is a common second parameter for the functions referencing the host item history, where:
  - **sec** - maximum [evaluation period](#) in seconds (time [suffixes](#) can be used), or
  - **#num** - maximum [evaluation range](#) in latest collected values (if preceded by a hash mark)
  - **time shift** (optional) allows to move the evaluation point back in time. See [more details](#) on specifying time shift.

History functions

| FUNCTION                  |                              |          |
|---------------------------|------------------------------|----------|
| Description               | Function-specific parameters | Comments |
| <b>change</b> (/host/key) |                              |          |

---

## FUNCTION

---

The amount of difference between the previous and latest value.

Supported value types: float, int, str, text, log

For strings returns:  
0 - values are equal  
1 - values differ

Example:  
=> **change**(/host/key)>10

Numeric difference will be calculated, as seen with these incoming example values ('previous' and 'latest' value = difference):

'1' and '5' = +4

'3' and '1' = -2

'0' and '-2.5' = -2.5

See also: [abs](#) for comparison

### **changecount**

(/host/key,(sec|#num)<:time shift>,<mode>)

Number of changes between adjacent values within the defined evaluation period.

See [common parameters](#).

**mode** (optional; must be double-quoted)

Supported modes:  
*all* - count all changes (default)  
*dec* - count decreases  
*inc* - count increases

Supported value types: float, int, str, text, log

For non-numeric value types, *mode* parameter is ignored.

Examples:  
=> **changecount**(/host/key, 1w) →  
number of value changes for the last week until [now](#)  
=>

**changecount**(/host/key,#10,"inc") →  
number of value increases (relative to the adjacent value) among the last 10 values  
=>

**changecount**(/host/key,24h,"dec") →  
number of value decreases (relative to the adjacent value) for the last 24 hours until [now](#)

**count** (/host/key,(sec|#num)<:time shift>,<operator>,<pattern>)

## FUNCTION

Number of values within the defined evaluation period.

See [common parameters](#).

**operator** (optional; must be double-quoted)

Supported operators:

*eq* - equal (default for integer, float)

*ne* - not equal

*gt* - greater

*ge* - greater or equal

*lt* - less

*le* - less or equal

*like* (default for string, text, log) - matches if contains pattern (case-sensitive)

*bitand* - bitwise AND

*regexp* - case-sensitive match of the regular expression given in *pattern*

*iregexp* - case-insensitive match of the regular expression given in *pattern*

Note that:

*eq* (default), *ne*, *gt*, *ge*, *lt*, *le*, *band*, *regexp*, *iregexp* are supported for integer items

*eq* (default), *ne*, *gt*, *ge*, *lt*, *le*, *regexp*, *iregexp* are supported for float items

*like* (default), *eq*, *ne*, *regexp*, *iregexp* are supported for string, text and log items

**pattern** (optional) - required pattern (string arguments must be double-quoted)

Supported value types: float, integer, string, text, log

Float items match with the precision of 2.22e-16; if database is [not upgraded](#) the precision is 0.000001.

With *bitand* as the third parameter, the fourth *pattern* parameter can be specified as two numbers, separated by '/':

**number\_to\_compare\_with/mask.**

*count()* calculates "bitwise AND" from the value and the *mask* and compares the result to

*number\_to\_compare\_with*. If the result of "bitwise AND" is equal to *number\_to\_compare\_with*, the value is counted.

If *number\_to\_compare\_with* and *mask* are equal, only the *mask* need be specified (without '/').

With *regexp* or *iregexp* as the third parameter, the fourth *pattern* parameter can be an ordinary or [global](#) (starting with '@') regular expression. In case of global regular expressions case sensitivity is inherited from global regular expression settings. For the purpose of regexp matching, float values will always be represented with 4 decimal digits after '.'. Also note that for large numbers difference in decimal (stored in database) and binary (used by Zabbix server) representation may affect the 4th decimal digit.

Examples:

=> **count**(/host/key,**10m**) → number of values for the last 10 minutes until [now](#)

=>

**count**(/host/key,**10m**,"like","error") → number of values for the last 10 minutes until [now](#) that contain 'error'

=> **count**(/host/key,**10m**,12) → number of values for the last 10 minutes until [now](#) that equal '12'

=> **count**(/host/key,**10m**,"gt",12) → number of values for the last 10 minutes until [now](#) that are over '12'

=> **count**(/host/key,**#10**,"gt",12) → number of values within the last 10 values until [now](#) that are over '12'

=> **count**(/host/key,**10m:now-1d**,"gt",12) → number of values between 24 hours and 10 minutes and 24 hours ago from [now](#) that were over '12'

=>

**count**(/host/key,**10m**,"bitand","6/7") → number of values for the last 10 minutes until [now](#) having '110' (in

---

FUNCTION

---

**countunique**

(/host/key,(sec|#num)<:time  
shift>,<operator>,<pattern>)



## FUNCTION

Number of unique values within the defined evaluation period.

See [common parameters](#).

**operator** (optional; must be double-quoted)

Supported operators:

*eq* - equal (default for integer, float)

*ne* - not equal

*gt* - greater

*ge* - greater or equal

*lt* - less

*le* - less or equal

*like* (default for string, text, log) - matches if contains pattern (case-sensitive)

*bitand* - bitwise AND

*regex* - case-sensitive match of the regular expression given in *pattern*

*iregex* - case-insensitive match of the regular expression given in *pattern*

Note that:

*eq* (default), *ne*, *gt*, *ge*, *lt*, *le*, *band*, *regex*, *iregex* are supported for integer items

*eq* (default), *ne*, *gt*, *ge*, *lt*, *le*, *regex*, *iregex* are supported for float items

*like* (default), *eq*, *ne*, *regex*, *iregex* are supported for string, text and log items

**pattern** (optional) - required pattern (string arguments must be double-quoted)

Supported value types: float, integer, string, text, log

Float items match with the precision of 2.22e-16; if database is [not upgraded](#) the precision is 0.000001.

With *bitand* as the third parameter, the fourth *pattern* parameter can be specified as two numbers, separated by '/':

**number\_to\_compare\_with/mask.**

*countunique()* calculates "bitwise AND" from the value and the *mask* and compares the result to *number\_to\_compare\_with*. If the result of "bitwise AND" is equal to *number\_to\_compare\_with*, the value is counted.

If *number\_to\_compare\_with* and *mask* are equal, only the *mask* need be specified (without '/').

With *regex* or *iregex* as the third parameter, the fourth *pattern* parameter can be an ordinary or [global](#) (starting with '@') regular expression. In case of global regular expressions case sensitivity is inherited from global regular expression settings. For the purpose of regex matching, float values will always be represented with 4 decimal digits after '.'. Also note that for large numbers difference in decimal (stored in database) and binary (used by Zabbix server) representation may affect the 4th decimal digit.

Examples:

=> **countunique(/host/key,10m)** → number of unique values for the last 10 minutes until **now**

=> **countunique(/host/key,10m,"like","error")** → number of unique values for the last 10 minutes until **now** that contain 'error'

=> **countunique(/host/key,10m,"gt",12)** → number of unique values for the last 10 minutes until **now** that are over '12'

=> **countunique(/host/key,#10,"gt",12)** → number of unique values within the last 10 values until **now** that are over '12'

=> **countunique(/host/key,10m:now-1d,"gt",12)** → number of unique values between 24 hours and 10 minutes and 24 hours ago from **now** that were over '12'

=> **countunique(/host/key,10m,"bitand","6/7")**

---

## FUNCTION

---

**find** (/host/key,<(sec|#num)<:time shift>,<operator>,<pattern>)  
Find a value match.

See [common parameters](#).

**sec** or **#num** (optional) - defaults to the latest value if not specified

**operator** (optional; must be double-quoted)

Supported operators:

*eq* - equal (default for integer, float)

*ne* - not equal

*gt* - greater

*ge* - greater or equal

*lt* - less

*le* - less or equal

*like* (default for string, text, log) - value contains the string given in *pattern* (case-sensitive)

*bitand* - bitwise AND

*regex* - case-sensitive match of the regular expression given in *pattern*

*iregex* - case-insensitive match of the regular expression given in *pattern*

Note that:

*eq* (default), *ne*, *gt*, *ge*, *lt*, *le*, *band*, *regex*, *iregex* are supported for integer items

*eq* (default), *ne*, *gt*, *ge*, *lt*, *le*, *regex*, *iregex* are supported for float items

*like* (default), *eq*, *ne*, *regex*, *iregex* are supported for string, text and log items

**pattern** - required pattern (string arguments must be double-quoted); [Perl Compatible Regular Expression](#) (PCRE) regular expression if operator is *regex*, *iregex*.

Supported value types: float, int, str, text, log

Returns:

1 - found

0 - otherwise

If more than one value is processed, '1' is returned if there is at least one matching value.

With *regex* or *iregex* as the third parameter, the fourth *pattern* parameter can be an ordinary or [global](#) (starting with '@') regular expression. In case of global regular expressions case sensitivity is inherited from global regular expression settings.

Example:

=> **find**(/host/key,**10m**,"like","error")  
→ find a value that contains 'error' within the last 10 minutes until **now**

**first** (/host/key,sec<:time shift>)  
The first (the oldest) value within the defined evaluation period.

See [common parameters](#).

Supported value types: float, int, str, text, log

Example:

=> **first**(/host/key,**1h**) → retrieve the oldest value within the last hour until **now**

See also `last()`.

**fuzzytime** (/host/key,sec)

---

## FUNCTION

---

Checking how much the passive agent time differs from the Zabbix server/proxy time.

See [common parameters](#).

Supported value types: float, int

Returns:

1 - difference between the passive item value (as timestamp) and Zabbix server/proxy timestamp (clock of value collection) is less than or equal to *sec* seconds

0 - otherwise

Usually used with the 'system.localtime' item to check that local time is in sync with the local time of Zabbix server. *Note* that 'system.localtime' must be configured as a [passive check](#).

Can be used also with `vfs.file.time[/path/file,modify]` key to check that file didn't get updates for long time.

Example:

=> **fuzzytime**(/host/key,**60s**)=0 → detect a problem if the time difference is over 60 seconds

This function is not recommended for use in complex trigger expressions (with multiple items involved), because it may cause unexpected results (time difference will be measured with the most recent metric), e.g. in

`fuzzytime(/Host/system.localtime,60s)=0`  
or `last(/Host/trap)<>0`

**last** (/host/key,<#num<:time shift>)

The most recent value.

See [common parameters](#).

**#num** (optional) - the Nth most recent value

Supported value types: float, int, str, text, log

Take note that a hash-tagged time period (**#N**) works differently here than with many other functions.

For example:

`last(/host/key)` is always equal to

`last(/host/key,#1)`

`last(/host/key,#3)` - third most recent value (*not* three latest values)

Zabbix does not guarantee the exact order of values if more than two values exist within one second in history.

Example:

=> **last**(/host/key) → retrieve the last value

=> **last**(/host/key,**#2**) → retrieve the previous value

=> **last**(/host/key,**#1**) <>

**last**(/host/key,**#2**) → the last and previous values differ

See also `first()`.

---

## FUNCTION

---

**logeventid** (/host/key,<#num<:time shift>,<pattern>)

Checking if event ID of the last log entry matches a regular expression.

See [common parameters](#).

**#num** (optional) - the Nth most recent value

**pattern** (optional) - regular expression describing the required pattern, [Perl Compatible Regular Expression](#) (PCRE) style (string arguments must be double-quoted).

Supported value types: log

Returns:  
0 - does not match  
1 - matches

**logseverity** (/host/key,<#num<:time shift>)

Log severity of the last log entry.

See [common parameters](#).

**#num** (optional) - the Nth most recent value

Supported value types: log

Returns:  
0 - default severity  
N - severity (integer, useful for Windows event logs: 1 - Information, 2 - Warning, 4 - Error, 7 - Failure Audit, 8 - Success Audit, 9 - Critical, 10 - Verbose).  
Zabbix takes log severity from **Information** field of Windows event log.

**logsource** (/host/key,<#num<:time shift>,<pattern>)

Checking if log source of the last log entry matches a regular expression.

See [common parameters](#).

**#num** (optional) - the Nth most recent value

**pattern** (optional) - regular expression describing the required pattern, [Perl Compatible Regular Expression](#) (PCRE) style (string arguments must be double-quoted).

Supported value types: log

Returns:  
0 - does not match  
1 - matches

Normally used for Windows event logs.  
For example, logsource("VMware Server").

**monodec**

(/host/key,(sec|#num)<:time shift>,<mode>)

Check if there has been a monotonous decrease in values.

See [common parameters](#).

**mode** (must be double-quoted) - *weak* (every value is smaller or the same as the previous one; default) or *strict* (every value has decreased)

Supported value types: int

Returns 1 if all elements in the time period continuously decrease, 0 otherwise.

Example:

=> **monodec**(/Host1/system.swap.size[all,free],**60s**)  
+ **monodec**(/Host2/system.swap.size[all,free],**60s**)  
+ **monodec**(/Host3/system.swap.size[all,free],**60s**)  
- calculate in how many hosts there has been a decrease in free swap size

**monoinc**

(/host/key,(sec|#num)<:time shift>,<mode>)

---

## FUNCTION

---

Check if there has been a monotonous increase in values.

See **common parameters**.

**mode** (must be double-quoted) - *weak* (every value is bigger or the same as the previous one; default) or *strict* (every value has increased)

Supported value types: int

Returns 1 if all elements in the time period continuously increase, 0 otherwise.

Example:

=>

**monoinc**(/Host1/system.localtime,#3,"strict")=0

- check if system local time has been increasing consistently

**nodata** (/host/key,sec,<mode>)

---

## FUNCTION

---

Checking for no data received.

See [common parameters](#).

All value types are supported.

**sec** period should not be less than 30 seconds because the history syncer process calculates this function only every 30 seconds.

Returns:  
1 - if no data received during the defined period of time  
0 - otherwise

`nodata(/host/key,0)` is disallowed.

Since Zabbix 5.0, the 'nodata' triggers monitored by proxy are, by default, sensitive to proxy availability - if proxy becomes unavailable, the 'nodata' triggers will not fire immediately after a restored connection, but will skip the data for the delayed period. Note that for passive proxies suppression is activated if connection is restored more than 15 seconds and no less than 2 seconds later. For active proxies suppression is activated if connection is restored more than 15 seconds later.

**mode** - if set to *strict* (double-quoted), this function will be insensitive to proxy availability (see comments for details).

To turn off sensitiveness to proxy availability, use the third parameter, e.g.: `nodata(/host/key,5m,"strict");` in this case the function will work the same as before 5.0.0 and fire as soon as the evaluation period (five minutes) without data has past.

Note that this function will display an error if, within the period of the 1st parameter:

- there's no data and Zabbix server was restarted
- there's no data and maintenance was completed
- there's no data and the item was added or re-enabled

Errors are displayed in the *Info* column in trigger [configuration](#).

This function may not work properly if there are time differences between Zabbix server, proxy and agent. See also: [Time synchronization requirement](#);

`nodata()` function cannot be used in the expression by itself; at least one function from [another group](#), referencing the host item, must be included in the expression (except [date and time functions](#)). For detailed information on how the `nodata()` function works within expressions, see [Calculation time](#).

### percentile

`(/host/key,(sec|#num)<:time shift>,percentage)`

| FUNCTION  |  |  |
|---|--|--|
| P-th percentile of a period, where P (percentage) is specified by the third parameter.  | See <a href="#">common parameters</a> .<br><br><b>percentage</b> - a floating-point number between 0 and 100 (inclusive) with up to 4 digits after the decimal point | Supported value types: float, int  |
| <b>rate</b> (/host/key,sec<:time shift>)<br>Per-second average rate of the increase in a monotonically increasing counter within the defined time period. | See <a href="#">common parameters</a> .  | Supported value types: float, int<br><br>Functionally corresponds to 'rate' of PromQL.<br><br>Example:<br>=> <b>rate</b> (/host/key, <b>30s</b> ) → If the monotonic increase over 30 seconds is 20, this function will return 0.67. |

## 5 Trend functions

Trend functions, in contrast to [history functions](#), use [trend](#) data for calculations.

Trends store hourly aggregate values. Trend functions use these hourly averages, and thus are useful for long-term analysis.

Trend function results are cached so multiple calls to the same function with the same parameters fetch info from the database only once. The trend function cache is controlled by the [TrendFunctionCacheSize](#) server parameter.

Triggers that reference trend functions **only** are evaluated once per the smallest time period in the expression. For instance, a trigger like

```
trendavg(/host/key,1d:now/d) > 1 or trendavg(/host/key2,1w:now/w) > 2
```

will be evaluated once per day. If the trigger contains both trend and history (or [date and time](#) and/or [nodata\(\)](#)) functions, it is calculated in accordance with the [usual principles](#).

All functions listed here are supported in:

- [Trigger expressions](#)
- [Calculated items](#)

Some general notes on function parameters:

- Function parameters are separated by a comma
- Optional function parameters (or parameter parts) are indicated by < >
- Function-specific parameters are described with each function
- /host/key and time period:time shift parameters must never be quoted

Common parameters

- /host/key is a common mandatory first parameter
- time period:time shift is a common second parameter, where:
  - **time period** - the time period (minimum '1h'), defined as <N><time unit> where N - the number of time units, time unit - h (hour), d (day), w (week), M (month) or y (year).
  - **time shift** - the time period offset (see function examples)

Trend functions

| FUNCTION  |                              |          |
|---|------------------------------|----------|
| Description   | Function-specific parameters | Comments |
| <b>baselinedev</b> (/host/key,data period:time shift,season_unit,num_seasons) |                              |          |

---

## FUNCTION

---

Returns the number of deviations (by stddevpop algorithm) between the last data period and the same data periods in preceding seasons.

**data\_period** - the data gathering period within a season, defined as `<N><time unit>` where `N` - number of time units  
`time unit` - h (hour), d (day), w (week), M (month) or y (year), must be equal to or less than season

**Time shift** - the time period offset (see examples)

**season\_unit** - duration of one season (h, d, w, M, y), cannot be smaller than data period

**num\_seasons** - number of seasons to evaluate

**baselinewma** (/host/key,data period:time

shift,season\_unit,num\_seasons)

Calculates the baseline by averaging data from the same timeframe in multiple equal time periods ('seasons') using the weighted moving average algorithm.

**data\_period** - the data gathering period within a season, defined as `<N><time unit>` where `N` - number of time units  
`time unit` - h (hour), d (day), w (week), M (month) or y (year), must be equal to or less than season

**Time shift** - the time period offset, defines the end of data gathering time frame in seasons (see examples)

**season\_unit** - duration of one season (h, d, w, M, y), cannot be smaller than data period

**num\_seasons** - number of seasons to evaluate

**trendavg** (/host/key,time period:time shift)

Examples:

=> **base-linedev**(/host/key,1d:now/d,"M",6) → calculating the number of standard deviations (population) between the previous day and the same day in the previous 6 months. If the date doesn't exist in a previous month, the last day of the month will be used (Jul,31 will be analysed against Jan,31, Feb, 28,... June, 30).

=> **base-linedev**(/host/key,1h:now/h,"d",10) → calculating the number of standard deviations (population) between the previous hour and the same hours over the period of ten days before yesterday.

Examples:

=> **base-linewma**(/host/key,1h:now/h,"d",3) → calculating baseline based on the last full hour within a 3-day period that ended yesterday. If "now" is Monday 13:30, the data for 12:00-12:59 on Friday, Saturday, and Sunday will be analyzed.

=> **base-linewma**(/host/key,2h:now/h,"d",3) → calculating baseline based on the last two hours within a 3-day period that ended yesterday. If "now" is Monday 13:30, the data for 11:00-12:59 on Friday, Saturday, and Sunday will be analyzed.

=> **base-linewma**(/host/key,1d:now/d,"M",4) → calculating baseline based on the same day of month as 'yesterday' in the 4 months preceding the last full month. If required date doesn't exist, the last day of month is taken. If today is September 1st, the data for July 31st, June 30th, May 31st, April 30th will be analyzed.



---

## FUNCTION

---

Average of trend values within the defined time period.

See [common parameters](#).

Examples:

=> **trendavg**(/host/key,**1h:now/h**) →  
average for the previous hour (e.g.  
12:00-13:00)

=>

**trendavg**(/host/key,**1h:now/h-1h**) →  
average for two hours ago  
(11:00-12:00)

=>

**trendavg**(/host/key,**1h:now/h-2h**) →  
average for three hours ago  
(10:00-11:00)

=>

**trendavg**(/host/key,**1M:now/M-1y**) →  
average for the previous month a year  
ago

**trendcount** (/host/key,time  
period:time shift)

Number of successfully retrieved  
history values used to calculate the  
trend value within the defined time  
period.

See [common parameters](#).

Examples:

=> **trendcount**(/host/key,**1h:now/h**)  
→ count for the previous hour (e.g.  
12:00-13:00)

=>

**trendcount**(/host/key,**1h:now/h-1h**)  
→ count for two hours ago  
(11:00-12:00)

=>

**trendcount**(/host/key,**1h:now/h-2h**)  
→ count for three hours ago  
(10:00-11:00)

=>

**trendcount**(/host/key,**1M:now/M-1y**)  
→ count for the previous month a year  
ago

**trendmax** (/host/key,time period:time  
shift)

The maximum in trend values within  
the defined time period.

See [common parameters](#).

Examples:

=> **trendmax**(/host/key,**1h:now/h**) →  
maximum for the previous hour (e.g.  
12:00-13:00)

=> **trendmax**(/host/key,**1h:now/h**) -  
**trendmin**(/host/key,**1h:now/h**) →  
calculate the difference between the  
maximum and minimum values (trend  
delta) for the previous hour  
(12:00-13:00)

=>

**trendmax**(/host/key,**1h:now/h-1h**) →  
maximum for two hours ago  
(11:00-12:00)

=>

**trendmax**(/host/key,**1h:now/h-2h**) →  
maximum for three hours ago  
(10:00-11:00)

=>

**trendmax**(/host/key,**1M:now/M-1y**)  
→ maximum for the previous month a  
year ago

**trendmin** (/host/key,time period:time  
shift)

---

## FUNCTION

---

The minimum in trend values within the defined time period.

See [common parameters](#).

Examples:

=> **trendmin**(/host/key,**1h:now/h**) → minimum for the previous hour (e.g. 12:00-13:00)

=> **trendmax**(/host/key,**1h:now/h**) - **trendmin**(/host/key,**1h:now/h**) → calculate the difference between the maximum and minimum values (trend delta) for the previous hour (12:00-13:00)

=>

**trendmin**(/host/key,**1h:now/h-1h**) → minimum for two hours ago (11:00-12:00)

=>

**trendmin**(/host/key,**1h:now/h-2h**) → minimum for three hours ago (10:00-11:00)

=>

**trendmin**(/host/key,**1M:now/M-1y**) → minimum for the previous month a year ago

**trendstl** (/host/key,eval period:time shift,detection period,season,<deviations>,<devalg>,<s\_window>)

---

## FUNCTION

---

Returns the rate of anomalies during the detection period - a decimal value between 0 and 1 that is ((the number of anomaly values)/(total number of values)).

**eval period** - the time period that must be decomposed (minimum '1h'), defined as <N><time unit> where N - number of time units  
time unit - h (hour), d (day), w (week), M (month) or y (year).

**Time shift** - the time period offset (see examples)

**detection period** - the time period before the end of eval period for which anomalies are calculated (minimum '1h', cannot be longer than eval period), defined as <N><time unit> where  
N - number of time units  
time unit - h (hour), d (day), w (week).

**season** - the shortest time period where a repeating pattern ("season") is expected (minimum '2h', cannot be longer than eval period, number of entries in the eval period must be greater than the two times of the resulting frequency (season/h)), defined as <N><time unit> where  
N - number of time units  
time unit - h (hour), d (day), w (week).

**deviations** - the number of deviations (calculated by devalg) to count as anomaly (can be decimal), (must be greater than or equal to 1, default is 3)

**devalg** (must be double-quoted) - deviation algorithm, can be *stddevpop*, *stddevsamp* or *mad* (default)

**s\_window** - the span (in lags) of the loess window for seasonal extraction (default is 10 \* number of entries in eval period + 1)

Examples:

=> **trend-stl**(/host/key,**100h:now/h**,10h,2h) → analyse the last 100 hours of trend data, find the anomaly rate for the last 10 hours of that period, expecting the periodicity to be 2h, the remainder series values of the evaluation period are considered anomalies if they reach the value of 3 deviations of the MAD of that remainder series  
=> **trendstl**(/host/key,**100h:now/h-10h**,100h,2h,2.1,"mad") → analyse the period of 100 hours of trend data, up to 10 hours ago, find the anomaly rate for that entire period expecting the periodicity to be 2h, the remainder series values of the evaluation period are considered anomalies if they reach the value of 2,1 deviations of the MAD of that remainder series  
=> **trendstl**(/host/key,**100d:now/d-1d**,10d,1d,4,,10) → analyse 100 days of trend data up to a day ago, find the anomaly rate for the period of last 10d of that period, expecting the periodicity to be 1d, the remainder series values of the evaluation period are considered anomalies if they reach the value of 4 deviations of the MAD of that remainder series, overriding the default span of the loess window for seasonal extraction of "10 \* number of entries in eval period + 1" with the span of 10 lags  
=> **trendstl**(/host/key,**1M:now/M-1y**,1d,2h,,,"stddevsamp") → analyse the previous month a year ago, find the anomaly rate of the last day of that period expecting the periodicity to be 2h, the remainder series values of the evaluation period are considered anomalies if they reach the value of 3 deviation of the sample standard deviation of that remainder series

**trendsum** (/host/key,time period:time shift)

---

## FUNCTION

---

Sum of trend values within the defined time period. See [common parameters](#).

Examples:  
=> **trendsum**(/host/key,**1h:now/h**) →  
sum for the previous hour (e.g.  
12:00-13:00)  
=>  
**trendsum**(/host/key,**1h:now/h-1h**) →  
sum for two hours ago (11:00-12:00)  
=>  
**trendsum**(/host/key,**1h:now/h-2h**) →  
sum for three hours ago (10:00-11:00)  
=>  
**trendsum**(/host/key,**1M:now/M-1y**)  
→ sum for the previous month a year ago

---

## 6 Mathematical functions

All functions listed here are supported in:

- [Trigger expressions](#)
- [Calculated items](#)

Mathematical functions are supported with float and integer value types, unless stated otherwise.

Some general notes on function parameters:

- Function parameters are separated by a comma
- Expressions are accepted as parameters
- Optional function parameters (or parameter parts) are indicated by < >

---

## FUNCTION

---

### Description

**abs** (value)

The absolute value (from 0) of a value.

### Function-specific parameters

**value** - value to check

### Comments

For example, the absolute value of either '3' or '-3' will be '3'.

Example:

=> **abs**(last(/host/key))>10

**acos** (value)

The arccosine of a value as an angle, expressed in radians.

**value** - value to check

The value must be between -1 and 1.

For example, the arccosine of a value '0.5' will be '2.0943951'.

Example:

=> **acos**(last(/host/key))

**asin** (value)

The arcsine of a value as an angle, expressed in radians.

**value** - value to check

The value must be between -1 and 1.

For example, the arcsine of a value '0.5' will be '-0.523598776'.

Example:

=> **asin**(last(/host/key))

**atan** (value)

The arctangent of a value as an angle, expressed in radians.

**value** - value to check

For example, the arctangent of a value '1' will be '0.785398163'.

Example:

=> **atan**(last(/host/key))

**atan2** (value,abscissa)

---

## FUNCTION

---

The arctangent of the ordinate (value) and abscissa coordinates specified as an angle, expressed in radians.

**value** - value to check  
**abscissa** - abscissa value

For example, the arctangent of the ordinate and abscissa coordinates of a value '1' will be '2.21429744'.

Example:  
=> **atan2**(last(/host/key),2)

**avg** (<value1>,<value2>,...)

Average value of the referenced item values.

**valueX** - value returned by another function that is working with item history

Example:  
=> **avg**(avg(/host/key),avg(/host2/key2))

**cbrt** (value)

Cube root of a value.

**value** - value to check

For example, the cube root of '64' will be '4', of '63' will be '3.97905721'.

Example:  
=> **cbrt**(last(/host/key))

**ceil** (value)

Round the value up to the nearest greater or equal integer.

**value** - value to check

For example, '2.4' will be rounded up to '3'.

Example:  
=> **ceil**(last(/host/key))

See also floor().

**cos** (value)

The cosine of a value, where the value is an angle expressed in radians.

**value** - value to check

For example, the cosine of a value '1' will be '0.54030230586'.

Example:  
=> **cos**(last(/host/key))

**cosh** (value)

The hyperbolic cosine of a value.

**value** - value to check

For example, the hyperbolic cosine of a value '1' will be '1.54308063482'.

Returns value as a real number, not as scientific notation.

Example:  
=> **cosh**(last(/host/key))

**cot** (value)

The cotangent of a value, where the value is an angle, expressed in radians.

**value** - value to check

For example, the cotangent of a value '1' will be '0.54030230586'.

Example:  
=> **cot**(last(/host/key))

**degrees** (value)

Converts a value from radians to degrees.

**value** - value to check

For example, a value '1' converted to degrees will be '57.2957795'.

Example:  
=> **degrees**(last(/host/key))

**e**

Euler's number (2.718281828459045).

Example:  
=> **e**()

**exp** (value)

Euler's number at a power of a value.

**value** - value to check

For example, Euler's number at a power of a value '2' will be '7.38905609893065'.

Example:  
=> **exp**(last(/host/key))

---

## FUNCTION

---

### **expm1 (value)**

Euler's number at a power of a value minus 1.

**value** - value to check

For example, Euler's number at a power of a value '2' minus 1 will be '6.38905609893065'.

Example:

=> **expm1**(last(/host/key))

### **floor (value)**

Round the value down to the nearest smaller or equal integer.

**value** - value to check

For example, '2.6' will be rounded down to '2'.

Example:

=> **floor**(last(/host/key))

### **log (value)**

Natural logarithm.

**value** - value to check

For example, the natural logarithm of a value '2' will be '0.69314718055994529'.

Example:

=> **log**(last(/host/key))

### **log10 (value)**

Decimal logarithm.

**value** - value to check

For example, the decimal logarithm of a value '5' will be '0.69897000433'.

Example:

=> **log10**(last(/host/key))

### **max (<value1>,<value2>,...)**

Highest value of the referenced item values.

**valueX** - value returned by another function that is working with item history

Example:

=>

**max**(avg(/host/key),avg(/host2/key2))

### **min (<value1>,<value2>,...)**

Lowest value of the referenced item values.

**valueX** - value returned by another function that is working with item history

Example:

=>

**min**(avg(/host/key),avg(/host2/key2))

### **mod (value,denominator)**

Division remainder.

**value** - value to check

**denominator** - division denominator

For example, division remainder of a value '5' with division denominator '2' will be '1'.

Example:

=> **mod**(last(/host/key),2)

### **pi**

Pi constant (3.14159265358979).

Example:

=> **pi**()

### **power (value,power value)**

The power of a value.

**value** - value to check

**power value** - the Nth power to use

For example, the 3rd power of a value '2' will be '8'.

Example:

=> **power**(last(/host/key),3)

### **radians (value)**

Convert a value from degrees to radians.

**value** - value to check

For example, a value '1' converted to radians will be '0.0174532925'.

Example:

=> **radians**(last(/host/key))

### **rand**

---

## FUNCTION

---

Return a random integer value.

A pseudo-random generated number using time as seed (enough for mathematical purposes, but not cryptography).

Example:

=> **rand()**

**round** (value,decimal places)

Round the value to decimal places.

**value** - value to check

**decimal places** - specify decimal places for rounding (0 is also possible)

For example, a value '2.5482' rounded to 2 decimal places will be '2.55'.

Example:

=> **round**(last(/host/key),2)

**signum** (value)

Returns '-1' if a value is negative, '0' if a value is zero, '1' if a value is positive.

**value** - value to check

**sin** (value)

The sine of a value, where the value is an angle expressed in radians.

**value** - value to check

Example:

=> **signum**(last(/host/key))

For example, the sine of a value '1' will be '0.8414709848'.

Example:

=> **sin**(last(/host/key))

**sinh** (value)

The hyperbolical sine of a value.

**value** - value to check

For example, the hyperbolical sine of a value '1' will be '1.17520119364'.

Example:

=> **sinh**(last(/host/key))

**sqrt** (value)

Square root of a value.

**value** - value to check

This function will fail with a negative value.

For example, the square root of a value '3.5' will be '1.87082869339'.

Example:

=> **sqrt**(last(/host/key))

**sum** (<value1>,<value2>,...)

Sum of the referenced item values.

**valueX** - value returned by another function that is working with item history

Example:

=>

**sum**(avg(/host/key),avg(/host2/key2))

**tan** (value)

The tangent of a value.

**value** - value to check

For example, the tangent of a value '1' will be '1.55740772465'.

Example:

=> **tan**(last(/host/key))

**truncate** (value,decimal places)

Truncate the value to decimal places.

**value** - value to check

**decimal places** - specify decimal places for truncating (0 is also possible)

Example:

=> **truncate**(last(/host/key),2)

---

## 7 Operator functions

All functions listed here are supported in:

- Trigger expressions
- Calculated items

Some general notes on function parameters:

- Function parameters are separated by a comma
- Expressions are accepted as parameters

---

## FUNCTION

---

| Description  | Function-specific parameters  | Comments   |
|--|---|--|
| <b>between</b> (value,min,max)<br>Check if a value belongs to the given range.                               | <b>value</b> - value to check<br><b>min</b> - minimum value<br><b>max</b> - maximum value                             | Supported value types: integer, float<br><br>Returns:<br>1 - in range<br>0 - otherwise<br><br>Example:<br>=> <b>between</b> (last(/host/key), <b>1,10</b> )=1<br>- trigger if the value is between 1 and 10.   |
| <b>in</b> (value,value1,value2,...valueN)<br>Check if a value is equal to at least one of the listed values. | <b>value</b> - value to check<br><b>value1,value2,...valueN</b> - listed values (string values must be double-quoted) | Supported value types: all<br><br>Returns:<br>1 - if equal<br>0 - otherwise<br><br>The value is compared to the listed values as numbers, if all of these values can be converted to numeric; otherwise compared as strings.<br><br>Example:<br>=> <b>in</b> (last(/host/key), <b>5,10</b> )=1 - trigger if the last value is equal to 5 or 10<br>=> <b>in</b> ("text", last(/host/key),last(/host/key,#2))=1 - trigger if "text" is equal to either of the last 2 values. |

---

## 8 Prediction functions

All functions listed here are supported in:

- [Trigger expressions](#)
- [Calculated items](#)

Some general notes on function parameters:

- Function parameters are separated by a comma
- Optional function parameters (or parameter parts) are indicated by < >
- Function-specific parameters are described with each function
- /host/key and (sec|#num)<:time shift> parameters must never be quoted

Common parameters

- /host/key is a common mandatory first parameter for the functions referencing the host item history
- (sec|#num)<:time shift> is a common second parameter for the functions referencing the host item history, where:
  - **sec** - maximum [evaluation period](#) in seconds (time [suffixes](#) can be used), or
  - **#num** - maximum [evaluation range](#) in latest collected values (if preceded by a hash mark)
  - **time shift** (optional) allows to move the evaluation point back in time. See [more details](#) on specifying time shift.

Prediction functions

---

## FUNCTION

---

| Description | Function-specific parameters | Comments |
|-------------|------------------------------|----------|
|-------------|------------------------------|----------|



**forecast**

(/host/key,(sec|#num)<:time  
shift>,time,<fit>,<mode>)

Future value, max, min, delta or avg of  
the item.

See [common parameters](#).

Supported value types: float, int

**time** - forecasting horizon in seconds  
(time suffixes can be used); negative  
values are supported

If value to return is larger than  
1.7976931348623157E+308 or less  
than -1.7976931348623157E+308,  
return value is cropped to  
1.7976931348623157E+308 or  
-1.7976931348623157E+308  
correspondingly.

**fit** (optional; must be double-quoted) -  
function used to fit historical data

Becomes unsupported only if misused  
in expression (wrong item type, invalid  
parameters), otherwise returns -1 in  
case of errors.

Supported fits:

*linear* - linear function

*polynomialN* - polynomial of degree N  
(1 ≤ N ≤ 6)

*exponential* - exponential function

*logarithmic* - logarithmic function

*power* - power function

Examples:

=> **forecast**(/host/key,#10,1h) →  
forecast item value in one hour based  
on the last 10 values

=> **forecast**(/host/key,1h,30m) →  
forecast item value in 30 minutes  
based on the last hour data

=>

**forecast**(/host/key,1h:now-1d,12h)  
→ forecast item value in 12 hours  
based on one hour one day ago

=> **fore-**  
**cast**(/host/key,1h,10m,"exponential")  
→ forecast item value in 10 minutes  
based on the last hour data and  
exponential function

=> **fore-**  
**cast**(/host/key,1h,2h,"polynomial3","max")  
→ forecast the maximum value the  
item can reach in the next two hours  
based on last hour data and cubic  
(third degree) polynomial

=> **forecast**(/host/key,#2,-20m) →  
estimate the item value 20 minutes  
ago based on the last two values (this  
can be more precise than using last(),  
especially if item is updated rarely,  
say, once an hour)

See also additional information on  
[predictive trigger functions](#).

Note that:

*linear* is default, *polynomial1* is  
equivalent to *linear*

**mode** (optional; must be  
double-quoted) - demanded output

Supported modes:

*value* - value (default)

*max* - maximum

*min* - minimum

*delta* - max-min

*avg* - average

Note that:

*value* estimates item value at the  
moment now + time

*max*, *min*, *delta* and *avg* investigate  
item value estimate on the interval  
between now and now + time

**timeleft** (/host/key,(sec|#num)<:time  
shift>,threshold,<fit>)

---

## FUNCTION

---

Time in seconds needed for an item to reach a specified threshold.

See [common parameters](#).

Supported value types: float, int

**threshold** - value to reach ([unit suffixes](#) can be used)

If value to return is larger than 1.7976931348623157E+308, return value is cropped to 1.7976931348623157E+308.

**fit** (optional; must be double-quoted) - see [forecast\(\)](#)

Returns 1.7976931348623157E+308 if threshold cannot be reached.

Becomes unsupported only if misused in the expression (wrong item type, invalid parameters), otherwise returns -1 in case of errors.

Examples:

=> **timeleft(/host/key,#10,0)** → time until the item value reaches zero based on the last 10 values

=> **timeleft(/host/key,1h,100)** → time until the item value reaches 100 based on the last hour data

=>

**timeleft(/host/key,1h:now-1d,100)**

→ time until the item value reaches 100 based on one hour one day ago

=>

**timeleft(/host/key,1h,200,"polynomial2")**

→ time until the item value reaches 200 based on the last hour data and assumption that the item behaves like quadratic (second degree) polynomial  
See also additional information on [predictive trigger functions](#).

---

## 9 String functions

All functions listed here are supported in:

- [Trigger expressions](#)
- [Calculated items](#)

Some general notes on function parameters:

- Function parameters are separated by a comma
- Expressions are accepted as parameters
- String parameters must be double-quoted; otherwise they might get misinterpreted
- Optional function parameters (or parameter parts) are indicated by < >

---

## FUNCTION

---

### Description

**ascii** (value)

The ASCII code of the leftmost character of the value.

### Function-specific parameters

**value** - value to check

### Comments

Supported value types: string, text, log

For example, a value like 'Abc' will return '65' (ASCII code for 'A').

Example:

=> **ascii**(last(/host/key))

**bitlength** (value)

---

## FUNCTION

---

|   |   |  |
|---|---|--|
| The length of value in bits.  | <b>value</b> - value to check   | Supported value types: string, text, log, integer<br><br>Example:<br>=> <b>bitlength</b> (last(/host/key))   |
| <b>bitlength</b> (value)<br>The length of value in bytes.   | <b>value</b> - value to check   | Supported value types: string, text, log, integer<br><br>Example:<br>=> <b>bitlength</b> (last(/host/key))   |
| <b>char</b> (value)<br>Return the character by interpreting the value as ASCII code.  | <b>value</b> - value to check   | Supported value types: integer<br><br>The value must be in the 0-255 range. For example, a value like '65' (interpreted as ASCII code) will return 'A'.<br><br>Example:<br>=> <b>char</b> (last(/host/key))  |
| <b>concat</b> (<value1>,<value2>,...)<br>The string resulting from concatenating referenced item values or constant values.   | <b>value</b> - a value returned by one of the history functions or a constant value (string, integer, or float number)                            | Supported value types: string, text, log, float, integer<br><br>For example, a value like 'Zab' concatenated to 'bix' (the constant string) will return 'Zabbix'.<br><br>Must contain at least two parameters.<br><br>Examples:<br>=> <b>concat</b> (last(/host/key),"bix")<br>=> <b>concat</b> ("1 min:",last(/host/system.cpu.load[all,avg1]),",",15 min:",last(/host/system.cpu.load[all,avg15])) |
| <b>insert</b><br>(value,start,length,replacement)<br>Insert specified characters or spaces into the character string beginning at the specified position in the string. | <b>value</b> - value to check<br><b>start</b> - start position<br><b>length</b> - positions to replace<br><b>replacement</b> - replacement string | Supported value types: string, text, log<br><br>For example, a value like 'Zabbbix' will be replaced by 'Zabbix' if 'bb' (starting position 3, positions to replace 2) is replaced by 'b'.<br><br>Example:<br>=> <b>insert</b> (last(/host/key),3,2,"b")   |
| <b>left</b> (value,count)<br>The leftmost characters of the value.  | <b>value</b> - value to check<br><b>count</b> - number of characters to return  | Supported value types: string, text, log<br><br>For example, you may return 'Zab' from 'Zabbix' by specifying 3 leftmost characters to return.<br><br>Example:<br>=> <b>left</b> (last(/host/key),3) - return three leftmost characters<br><br>See also right().   |

---

## FUNCTION

---

### **length** (value)

The length of value in characters.

**value** - value to check

Supported value types: str, text, log

Example:

=> **length**(last(/host/key)) → length of the latest value

=> **length**(last(/host/key,#3)) →

length of the third most recent value

=> **length**(last(/host/key,#1:now-1d))

→ length of the most recent value one day ago

### **ltrim** (value,<chars>)

Remove specified characters from the beginning of string.

**value** - value to check

**chars** - (optional) specify characters to remove

Supported value types: string, text, log

Example:

=> **ltrim**(last(/host/key)) - remove whitespace from the beginning of string

=> **ltrim**(last(/host/key),"Z") -

remove any 'Z' from the beginning of string

=> **ltrim**(last(/host/key)," Z") -

remove any space and 'Z' from the beginning of string

See also: rtrim(), trim()

### **mid** (value,start,length)

Return a substring of N characters beginning at the character position specified by 'start'.

**value** - value to check

**start** - start position of substring

**length** - positions to return in substring

Supported value types: string, text, log

For example, it is possible return 'abbi' from a value like 'Zabbix' if starting position is 2, and positions to return is 4).

Example:

=> **mid**(last(/host/key),2,4)="abbi"

### **repeat** (value,count)

Repeat a string.

**value** - value to check

**count** - number of times to repeat

Supported value types: string, text, log

Example:

=> **repeat**(last(/host/key),2) - repeat the value two times

### **replace** (value,pattern,replacement)

Find pattern in the value and replace with replacement. All occurrences of the pattern will be replaced.

**value** - value to check

**pattern** - pattern to find

**replacement** - string to replace the pattern with

Supported value types: string, text, log

Example:

=>

**replace**(last(/host/key),"ibb","abb")

- replace all 'ibb' with 'abb'

### **right** (value,count)

---

## FUNCTION

---

The rightmost characters of the value.

**value** - value to check  
**count** - number of characters to return

Supported value types: string, text, log

For example, you may return 'bix' from 'Zabbix' by specifying 3 rightmost characters to return.

Example:

=> **right**(last(/host/key),**3**) - return three rightmost characters

See also left().

**rtrim** (value,<chars>)

Remove specified characters from the end of string.

**value** - value to check  
**chars** - (optional) specify characters to remove

Whitespace is right-trimmed by default (if no optional characters are specified).

Supported value types: string, text, log

Example:

=> **rtrim**(last(/host/key)) - remove whitespace from the end of string  
=> **rtrim**(last(/host/key),"**x**") - remove any 'x' from the end of string  
=> **rtrim**(last(/host/key),"**x** ") - remove any 'x' or space from the end of string

See also: ltrim(), trim()

**trim** (value,<chars>)

Remove specified characters from the beginning and end of string.

**value** - value to check  
**chars** - (optional) specify characters to remove

Whitespace is trimmed from both sides by default (if no optional characters are specified).

Supported value types: string, text, log

Example:

=> **trim**(last(/host/key)) - remove whitespace from the beginning and end of string  
=> **trim**(last(/host/key),"**\_**") - remove '\_' from the beginning and end of string

See also: ltrim(), rtrim()

---

## 6 Macros

It is possible to use out-of-the-box [Supported macros](#) and [User macros supported by location](#).

### 1 Supported macros

#### Overview

The table contains a complete list of macros supported by Zabbix out-of-the-box.

#### Note:

To see all macros supported in a location (for example, in "map URL"), you may paste the location name into the search box at the bottom of your browser window (accessible by pressing CTRL+F) and do a search for *next*.

| Macro                        | Supported in  | Description  |
|------------------------------|---|--|
| {ACTION.ID}                  | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Service-based notifications and commands</li> <li>→ Service update notifications and commands</li> <li>→ Discovery notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> </ul>   | <i>Numeric ID of the triggered action.</i>   |
| {ACTION.NAME}                | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Service-based notifications and commands</li> <li>→ Service update notifications and commands</li> <li>→ Discovery notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> </ul>   | <i>Name of the triggered action.</i>   |
| {ALERT.MESSAGE}              | → Alert script parameters   | <i>'Default message' value from action configuration.</i><br>Supported since 3.0.0.  |
| {ALERT.SENDTO}               | → Alert script parameters   | <i>'Send to' value from user media configuration.</i><br>Supported since 3.0.0.  |
| {ALERT.SUBJECT}              | → Alert script parameters   | <i>'Default subject' value from action configuration.</i><br>Supported since 3.0.0.  |
| {DATE}                       | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Service-based notifications and commands</li> <li>→ Service update notifications and commands</li> <li>→ Discovery notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> <li>→ Manual event action <b>scripts</b></li> </ul> | <i>Current date in yyyy.mm.dd. format.</i>   |
| {DISCOVERY.DEVICE.IPADDRESS} | → Discovery notifications and commands  | <i>IP address of the discovered device.</i><br>Available always, does not depend on host being added.  |
| {DISCOVERY.DEVICE.DNS}       | → Discovery notifications and commands  | <i>DNS name of the discovered device.</i><br>Available always, does not depend on host being added.  |
| {DISCOVERY.DEVICE.STATUS}    | → Discovery notifications and commands  | <i>Status of the discovered device: can be either UP or DOWN.</i>  |
| {DISCOVERY.DEVICE.UPTIME}    | → Discovery notifications and commands  | <i>Time since the last change of discovery status for a particular device, with precision down to a second.</i><br>For example: 1h 29m 01s.<br>For devices with status DOWN, this is the period of their downtime.   |
| {DISCOVERY.RULE.NAME}        | → Discovery notifications and commands  | <i>Name of the discovery rule that discovered the presence or absence of the device or service.</i>  |
| {DISCOVERY.SERVICE.NAME}     | → Discovery notifications and commands  | <i>Name of the service that was discovered.</i><br>For example: HTTP.  |
| {DISCOVERY.SERVICE.PORT}     | → Discovery notifications and commands  | <i>Port of the service that was discovered.</i><br>For example: 80.  |
| {DISCOVERY.SERVICE.STATUS}   | → Discovery notifications and commands  | <i>Status of the discovered service: can be either UP or DOWN.</i>   |
| {DISCOVERY.SERVICE.UPTIME}   | → Discovery notifications and commands  | <i>Time since the last change of discovery status for a particular service, with precision down to a second.</i><br>For example: 1h 29m 01s.<br>For services with status DOWN, this is the period of their downtime. |
| {ESC.HISTORY}                | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Service-based notifications and commands</li> <li>→ Service update notifications and commands</li> <li>→ Internal notifications</li> </ul>  | <i>Escalation history. Log of previously sent messages.</i><br>Shows previously sent notifications, on which escalation step they were sent and their status ( <i>sent, in progress or failed</i> ).                 |

| Macro              | Supported in   | Description  |
|--------------------|--|--|
| {EVENT.ACK.STATUS} | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Manual event action <b>scripts</b>  | <i>Acknowledgment status of the event (Yes/No).</i>  |
| {EVENT.AGE}        | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Service-based notifications and commands<br>→ Service update notifications and commands<br>→ Service recovery notifications and commands<br>→ Discovery notifications and commands<br>→ Autoregistration notifications and commands<br>→ Internal notifications<br>→ Manual event action <b>scripts</b>                   | <i>Age of the event that triggered an action, with precision down to a second.<br/>Useful in escalated messages.</i>   |
| {EVENT.DATE}       | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Service-based notifications and commands<br>→ Service update notifications and commands<br>→ Service recovery notifications and commands<br>→ Discovery notifications and commands<br>→ Autoregistration notifications and commands<br>→ Internal notifications<br>→ Manual event action <b>scripts</b>                   | <i>Date of the event that triggered an action.</i>   |
| {EVENT.DURATION}   | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Service-based notifications and commands<br>→ Service update notifications and commands<br>→ Service recovery notifications and commands<br>→ Internal notifications<br>→ Manual event action <b>scripts</b>  | <i>Duration of the event (time difference between problem and recovery events), with precision down to a second.<br/>Useful in problem recovery messages.</i><br><br>Supported since 5.0.0.                  |
| {EVENT.ID}         | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Service-based notifications and commands<br>→ Service update notifications and commands<br>→ Service recovery notifications and commands<br>→ Discovery notifications and commands<br>→ Autoregistration notifications and commands<br>→ Internal notifications<br>→ Trigger URLs<br>→ Manual event action <b>scripts</b> | <i>Numeric ID of the event that triggered an action.</i>   |
| {EVENT.NAME}       | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Service-based notifications and commands<br>→ Service update notifications and commands<br>→ Service recovery notifications and commands<br>→ Internal notifications<br>→ Manual event action <b>scripts</b>  | <i>Name of the problem event that triggered an action.</i><br>Supported since 4.0.0.   |
| {EVENT.NSEVERITY}  | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Service-based notifications and commands<br>→ Service update notifications and commands<br>→ Service recovery notifications and commands<br>→ Manual event action <b>scripts</b>  | <i>Numeric value of the event severity. Possible values: 0 - Not classified, 1 - Information, 2 - Warning, 3 - Average, 4 - High, 5 - Disaster.</i><br>Supported since 4.0.0.                                |
| {EVENT.OBJECT}     | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Service-based notifications and commands<br>→ Service update notifications and commands<br>→ Service recovery notifications and commands<br>→ Discovery notifications and commands<br>→ Autoregistration notifications and commands<br>→ Internal notifications<br>→ Manual event action <b>scripts</b>                   | <i>Numeric value of the event object. Possible values: 0 - Trigger, 1 - Discovered host, 2 - Discovered service, 3 - Autoregistration, 4 - Item, 5 - Low-level discovery rule.</i><br>Supported since 4.4.0. |

| Macro                     | Supported in  | Description  |
|---------------------------|---|--|
| {EVENT.OPDATA}            | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Manual event action <b>scripts</b>   | <i>Operational data of the underlying trigger of a problem.</i><br>Supported since 4.4.0.  |
| {EVENT.RECOVERY.DATE}     | → Problem <b>recovery notifications</b> and commands<br>→ Problem update notifications and commands (if recovery took place)<br>→ Service recovery notifications and commands<br>→ Manual event action <b>scripts</b> (if recovery took place)                                  | <i>Date of the recovery event.</i>   |
| {EVENT.RECOVERY.ID}       | → Problem <b>recovery notifications</b> and commands<br>→ Problem update notifications and commands (if recovery took place)<br>→ Service recovery notifications and commands<br>→ Manual event action <b>scripts</b> (if recovery took place)                                  | <i>Numeric ID of the recovery event.</i>   |
| {EVENT.RECOVERY.NAME}     | → Problem <b>recovery notifications</b> and commands<br>→ Problem update notifications and commands (if recovery took place)<br>→ Service recovery notifications and commands<br>→ Manual event action <b>scripts</b> (if recovery took place)                                  | <i>Name of the recovery event.</i><br>Supported since 4.4.1.   |
| {EVENT.RECOVERY.START}    | → Problem <b>recovery notifications</b> and commands<br>→ Problem update notifications and commands (if recovery took place)<br>→ Service recovery notifications and commands<br>→ Manual event action <b>scripts</b> (if recovery took place)                                  | <i>Verbal value of the recovery event.</i>   |
| {EVENT.RECOVERY.TAGS}     | → Problem <b>recovery notifications</b> and commands<br>→ Problem update notifications and commands (if recovery took place)<br>→ Service recovery notifications and commands<br>→ Manual event action <b>scripts</b> (if recovery took place)                                  | <i>A comma separated list of recovery event tags.</i><br>Expanded to an empty string if no tags exist.<br>Supported since 3.2.0.   |
| {EVENT.RECOVERY.TAGSJSON} | → Problem <b>recovery notifications</b> and commands<br>→ Problem update notifications and commands (if recovery took place)<br>→ Service recovery notifications and commands<br>→ Manual event action <b>scripts</b> (if recovery took place)                                  | <i>A JSON array containing event tag <b>objects</b>.</i><br>Expanded to an empty array if no tags exist.<br>Supported since 5.0.0. |
| {EVENT.RECOVERY.TIME}     | → Problem <b>recovery notifications</b> and commands<br>→ Problem update notifications and commands (if recovery took place)<br>→ Service recovery notifications and commands<br>→ Manual event action <b>scripts</b> (if recovery took place)                                  | <i>Time of the recovery event.</i>   |
| {EVENT.RECOVERY.VALUE}    | → Problem <b>recovery notifications</b> and commands<br>→ Problem update notifications and commands (if recovery took place)<br>→ Service recovery notifications and commands<br>→ Manual event action <b>scripts</b> (if recovery took place)                                  | <i>Numeric value of the recovery event.</i>  |
| {EVENT.SEVERITY}          | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Service-based notifications and commands<br>→ Service update notifications and commands<br>→ Service recovery notifications and commands<br>→ Manual event action <b>scripts</b> | <i>Name of the event severity.</i><br>Supported since 4.0.0.   |



| Macro                   | Supported in   | Description   |
|-------------------------|--|---|
| {EVENT.SOURCE}          | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Service-based notifications and commands</li> <li>→ Service update notifications and commands</li> <li>→ Service recovery notifications and commands</li> <li>→ Discovery notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> <li>→ Manual event action <b>scripts</b></li> </ul> | <i>Numeric value of the event source.</i> Possible values: 0 - Trigger, 1 - Discovery, 2 - Autoregistration, 3 - Internal, 4 - Service. Supported since 4.4.0.  |
| {EVENT.STATUS}          | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Service-based notifications and commands</li> <li>→ Service update notifications and commands</li> <li>→ Service recovery notifications and commands</li> <li>→ Internal notifications</li> <li>→ Manual event action <b>scripts</b></li> </ul>  | <i>Verbal value of the event that triggered an action.</i>  |
| {EVENT.TAGS}            | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Service-based notifications and commands</li> <li>→ Service update notifications and commands</li> <li>→ Service recovery notifications and commands</li> <li>→ Manual event action <b>scripts</b></li> </ul>  | <i>A comma separated list of event tags.</i> Expanded to an empty string if no tags exist. Supported since 3.2.0.   |
| {EVENT.TAGSJSON}        | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Service-based notifications and commands</li> <li>→ Service update notifications and commands</li> <li>→ Service recovery notifications and commands</li> <li>→ Manual event action <b>scripts</b></li> </ul>  | <i>A JSON array containing event tag <b>objects</b>.</i> Expanded to an empty array if no tags exist. Supported since 5.0.0.  |
| {EVENT.TAGS.<tag name>} | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Service-based notifications and commands</li> <li>→ Service update notifications and commands</li> <li>→ Service recovery notifications and commands</li> <li>→ Webhook media type URL names and URLs</li> <li>→ Manual event action <b>scripts</b></li> </ul>   | <i>Event tag value referenced by the tag name.</i> A tag name containing non-alphanumeric characters (including non-English multibyte-UTF characters) should be double quoted. Quotes and backslashes inside a quoted tag name must be escaped with a backslash. Supported since 4.4.2.   |
| {EVENT.TIME}            | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Service-based notifications and commands</li> <li>→ Service update notifications and commands</li> <li>→ Service recovery notifications and commands</li> <li>→ Discovery notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> <li>→ Manual event action <b>scripts</b></li> </ul> | <i>Time of the event that triggered an action.</i>  |
| {EVENT.UPDATE.ACTION}   | <ul style="list-style-type: none"> <li>→ Problem update notifications and commands</li> </ul>  | <i>Human-readable name of the action(s) performed during <b>problem update</b>.</i> Resolves to the following values: <i>acknowledged</i> , <i>commented</i> , <i>changed severity from (original severity) to (updated severity)</i> and <i>closed</i> (depending on how many actions are performed in one update). Supported since 4.0.0. |
| {EVENT.UPDATE.DATE}     | <ul style="list-style-type: none"> <li>→ Problem update notifications and commands</li> <li>→ Service update notifications and commands</li> </ul>   | <i>Date of event <b>update</b> (acknowledgment, etc).</i> Deprecated name: {ACK.DATE}   |
| {EVENT.UPDATE.HISTORY}  | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Manual event action <b>scripts</b></li> </ul>  | <i>Log of problem updates (acknowledgments, etc).</i> Deprecated name: {EVENT.ACK.HISTORY}  |
| {EVENT.UPDATE.MESSAGE}  | <ul style="list-style-type: none"> <li>→ Problem update notifications and commands</li> </ul>  | <i>Problem update message.</i> Deprecated name: {ACK.MESSAGE}   |
| {EVENT.UPDATE.SEVERITY} | <ul style="list-style-type: none"> <li>→ Problem update notifications and commands</li> </ul>  | <i>Numeric value of the new event severity set during problem update operation.</i>   |

| Macro                     | Supported in  | Description   |
|---------------------------|---|---|
| {EVENT.UPDATE.SEVERITY}   | → Service update notifications and commands   | <i>Name of the new event severity set during problem update operation.</i>  |
| {EVENT.UPDATE.STATUS}     | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Manual event action <b>scripts</b>   | <i>Numeric value of the problem update status.</i><br>Possible values: 0 - Webhook was called because of problem/recovery event, 1 - Update operation.<br>Supported since 4.4.0.  |
| {EVENT.UPDATE.TIME}       | → Problem update notifications and commands<br>→ Service update notifications and commands  | <i>Time of event <b>update</b> (acknowledgment, etc).</i><br>Deprecated name: {ACK.TIME}  |
| {EVENT.VALUE}             | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Service-based notifications and commands<br>→ Service update notifications and commands<br>→ Service recovery notifications and commands<br>→ Internal notifications<br>→ Manual event action <b>scripts</b> | <i>Numeric value of the event that triggered an action (1 for problem, 0 for recovering).</i>   |
| {FUNCTION.VALUE}          | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Manual event action <b>scripts</b><br>→ Event names  | <i>Results of the Nth item-based function in the trigger expression at the time of the event.</i><br>Only functions with /host/key as the first parameter are counted.<br><br>This macro may be used with a numeric index e.g. {FUNCTION.VALUE<1-9>} to point to the first, second, third, etc. function in a trigger expression.<br>See <b>indexed macros</b> .  |
| {FUNCTION.RECOVERY.VALUE} | → <b>recovery notifications</b> and commands<br>→ Problem update notifications and commands<br>→ Manual event action <b>scripts</b>   | <i>Results of the Nth item-based function in the recovery expression at the time of the event.</i><br>Only functions with /host/key as the first parameter are counted.<br><br>This macro may be used with a numeric index e.g. {FUNCTION.RECOVERY.VALUE<1-9>} to point to the first, second, third, etc. function in a trigger expression. See <b>indexed macros</b> .<br><br><b>Note</b> that before Zabbix 6.0.35, {FUNCTION.RECOVERY.VALUE} is not supported; use {FUNCTION.RECOVERY.VALUE1} instead. |

| Macro             | Supported in   | Description  |
|-------------------|--|--|
| {HOST.CONN}       | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Map element labels, map URL names and values</li> <li>→ Item key parameters<sup>1</sup></li> <li>→ Host interface IP/DNS</li> <li>→ Trapper item "Allowed hosts" field</li> <li>→ Database monitoring additional parameters</li> <li>→ SSH and Telnet scripts</li> <li>→ JMX item endpoint field</li> <li>→ Web monitoring<sup>4</sup></li> <li>→ Low-level discovery rule filter regular expressions</li> <li>→ URL field of dynamic URL dashboard widget</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ <b>Tag names and values</b></li> <li>→ Script type item, item prototype and discovery rule parameter names and values</li> <li>→ HTTP agent type item, item prototype and discovery rule fields:<br/>URL, Query fields, Request body, Headers, SSL certificate file, SSL key file, Allowed hosts.</li> <li>→ Manual host action <b>scripts</b> (including confirmation text)</li> <li>→ Manual event action <b>scripts</b> (including confirmation text)</li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <b>Top hosts</b> widget</li> </ul> | <p><i>Host IP address or DNS name, depending on host settings<sup>2</sup>.</i></p> <p>May be used with a numeric index as {HOST.CONN&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p> |
| {HOST.DESCRPTION} | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Map element labels</li> <li>→ Manual event action <b>scripts</b></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <b>Top hosts</b> widget</li> </ul>  | <p><i>Host description.</i></p> <p>This macro may be used with a numeric index e.g. {HOST.DESCRPTION&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p>                                 |

| Macro      | Supported in  | Description   |
|------------|---|---|
| {HOST.DNS} | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Map element labels, map URL names and values</li> <li>→ Item key parameters<sup>1</sup></li> <li>→ Host interface IP/DNS</li> <li>→ Trapper item "Allowed hosts" field</li> <li>→ Database monitoring additional parameters</li> <li>→ SSH and Telnet scripts</li> <li>→ JMX item endpoint field</li> <li>→ Web monitoring<sup>4</sup></li> <li>→ Low-level discovery rule filter regular expressions</li> <li>→ URL field of dynamic URL dashboard widget</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ <b>Tag names and values</b></li> <li>→ Script type item, item prototype and discovery rule parameter names and values</li> <li>→ HTTP agent type item, item prototype and discovery rule fields:<br/>URL, Query fields, Request body, Headers, SSL certificate file, SSL key file, Allowed hosts.</li> <li>→ Manual host action <b>scripts</b> (including confirmation text)</li> <li>→ Manual event action <b>scripts</b> (including confirmation text)</li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <i>Top hosts</i> widget</li> </ul>  | <p><i>Host DNS name</i><sup>2</sup>.</p> <p>This macro may be used with a numeric index e.g. {HOST.DNS&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p>                              |
|            | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> <li>→ Item key parameters</li> <li>→ Map element labels, map URL names and values</li> <li>→ Host interface IP/DNS</li> <li>→ Trapper item "Allowed hosts" field</li> <li>→ Database monitoring additional parameters</li> <li>→ SSH and Telnet scripts</li> <li>→ JMX item endpoint field</li> <li>→ Web monitoring<sup>4</sup></li> <li>→ Low-level discovery rule filter regular expressions</li> <li>→ URL field of dynamic URL dashboard widget</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ <b>Tag names and values</b></li> <li>→ Script type item, item prototype and discovery rule parameter names and values</li> <li>→ HTTP agent type item, item prototype and discovery rule fields:<br/>URL, Query fields, Request body, Headers, SSL certificate file, SSL key file, Allowed hosts.</li> <li>→ Manual host action <b>scripts</b> (including confirmation text)</li> <li>→ Manual event action <b>scripts</b> (including confirmation text)</li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <i>Top hosts</i> widget</li> </ul> | <p><i>Host name.</i></p> <p>This macro may be used with a numeric index e.g. {HOST.HOST&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p> <p>{HOSTNAME&lt;1-9&gt;} is deprecated.</p> |

| Macro           | Supported in   | Description  |
|-----------------|--|--|
| {HOST.ID}       | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Map element labels, map URL names and values</li> <li>→ URL field of dynamic URL dashboard widget</li> <li>→ Trigger URLs</li> <li>→ Tag names and values</li> <li>→ Manual event action <i>scripts</i></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <i>Top hosts</i> widget</li> </ul>   | <p><i>Host ID.</i></p> <p>May be used with a numeric index as {HOST.ID&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <i>indexed macros</i>.</p>   |
| {HOST.IP}       | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> <li>→ Map element labels, map URL names and values</li> <li>→ Item key parameters<sup>1</sup></li> <li>→ Host interface IP/DNS</li> <li>→ Trapper item "Allowed hosts" field</li> <li>→ Database monitoring additional parameters</li> <li>→ SSH and Telnet scripts</li> <li>→ JMX item endpoint field</li> <li>→ Web monitoring<sup>4</sup></li> <li>→ Low-level discovery rule filter regular expressions</li> <li>→ URL field of dynamic URL dashboard widget</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Tag names and values</li> <li>→ Script type item, item prototype and discovery rule parameter names and values</li> <li>→ HTTP agent type item, item prototype and discovery rule fields:<br/>URL, Query fields, Request body, Headers, SSL certificate file, SSL key file, Allowed hosts.</li> <li>→ Manual host action <i>scripts</i> (including confirmation text)</li> <li>→ Manual event action <i>scripts</i> (including confirmation text)</li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <i>Top hosts</i> widget</li> </ul> | <p><i>Host IP address<sup>2</sup>.</i></p> <p>This macro may be used with a numeric index e.g. {HOST.IP&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <i>indexed macros</i>.</p> <p>{IPADDRESS&lt;1-9&gt;} is deprecated.</p> |
| {HOST.METADATA} | <ul style="list-style-type: none"> <li>→ Autoregistration notifications and commands</li> </ul>  | <p><i>Host metadata.</i></p> <p>Used only for active agent autoregistration.</p>   |

| Macro              | Supported in  | Description   |
|--------------------|---|---|
| {HOST.NAME}        | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Map element labels, map URL names and values</li> <li>→ Item key parameters</li> <li>→ Host interface IP/DNS</li> <li>→ Trapper item "Allowed hosts" field</li> <li>→ Database monitoring additional parameters</li> <li>→ SSH and Telnet scripts</li> <li>→ Web monitoring<sup>4</sup></li> <li>→ Low-level discovery rule filter regular expressions</li> <li>→ URL field of dynamic URL dashboard widget</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ <b>Tag names and values</b></li> <li>→ Script type item, item prototype and discovery rule parameter names and values</li> <li>→ HTTP agent type item, item prototype and discovery rule fields: URL, Query fields, Request body, Headers, SSL certificate file, SSL key file, Allowed hosts.</li> <li>→ Manual host action <b>scripts</b> (including confirmation text)</li> <li>→ Manual event action <b>scripts</b> (including confirmation text)</li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <b>Top hosts</b> widget</li> </ul> | <p><i>Visible host name.</i></p> <p>This macro may be used with a numeric index e.g. {HOST.NAME&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p>             |
| {HOST.PORT}        | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Autoregistration notifications and commands</li> <li>→ Internal notifications</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ JMX item endpoint field</li> <li>→ <b>Tag names and values</b></li> <li>→ Manual event action <b>scripts</b></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <b>Top hosts</b> widget</li> </ul>   | <p><i>Host (agent) port<sup>2</sup>.</i></p> <p>This macro may be used with a numeric index e.g. {HOST.PORT&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p> |
| {HOST.TARGET.CONN} | <ul style="list-style-type: none"> <li>→ Trigger-based commands</li> <li>→ Problem update commands</li> <li>→ Discovery commands</li> <li>→ Autoregistration commands</li> </ul>  | <p><i>IP address or DNS name of the target host, depending on host settings.</i></p> <p>Supported since 5.4.0.</p>  |
| {HOST.TARGET.DNS}  | <ul style="list-style-type: none"> <li>→ Trigger-based commands</li> <li>→ Problem update commands</li> <li>→ Discovery commands</li> <li>→ Autoregistration commands</li> </ul>  | <p><i>DNS name of the target host.</i></p> <p>Supported since 5.4.0.</p>  |
| {HOST.TARGET.HOST} | <ul style="list-style-type: none"> <li>→ Trigger-based commands</li> <li>→ Problem update commands</li> <li>→ Discovery commands</li> <li>→ Autoregistration commands</li> </ul>  | <p><i>Technical name of the target host.</i></p> <p>Supported since 5.4.0.</p>  |
| {HOST.TARGET.IP}   | <ul style="list-style-type: none"> <li>→ Trigger-based commands</li> <li>→ Problem update commands</li> <li>→ Discovery commands</li> <li>→ Autoregistration commands</li> </ul>  | <p><i>IP address of the target host.</i></p> <p>Supported since 5.4.0.</p>  |
| {HOST.TARGET.NAME} | <ul style="list-style-type: none"> <li>→ Trigger-based commands</li> <li>→ Problem update commands</li> <li>→ Discovery commands</li> <li>→ Autoregistration commands</li> </ul>  | <p><i>Visible name of the target host.</i></p> <p>Supported since 5.4.0.</p>  |

| Macro                         | Supported in   | Description  |
|-------------------------------|--|--|
| {HOSTGROUP.ID}                | → Map element labels, map URL names and values   | <i>Host group ID.</i>  |
| {INVENTORY.ALIAS}             | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <i>Text</i> in <b>Top hosts</b> widget | <i>Alias field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.ALIAS<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .  |
| {INVENTORY.ASSET.TAG}         | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <i>Text</i> in <b>Top hosts</b> widget | <i>Asset tag field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.ASSET.TAG<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .  |
| {INVENTORY.CHASSIS}           | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <i>Text</i> in <b>Top hosts</b> widget | <i>Chassis field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.CHASSIS<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .  |
| {INVENTORY.CONTACT}           | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <i>Text</i> in <b>Top hosts</b> widget | <i>Contact field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.CONTACT<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .  |
| {INVENTORY.CONTRACT}          | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <i>Text</i> in <b>Top hosts</b> widget | {PROFILE.CONTACT<1-9>} is deprecated.<br><i>Contract number field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.CONTRACT.NUMBER<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> . |
| {INVENTORY.CONTRACT.NUMBER}   | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <i>Text</i> in <b>Top hosts</b> widget | <i>Contract number field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.CONTRACT.NUMBER<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .  |
| {INVENTORY.DEPLOYMENT.STATUS} | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <i>Text</i> in <b>Top hosts</b> widget | <i>Deployment status field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.DEPLOYMENT.STATUS<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .                                      |
| {INVENTORY.HARDWARE}          | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <i>Text</i> in <b>Top hosts</b> widget | <i>Hardware field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.HARDWARE<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .  |
|                               |  | {PROFILE.HARDWARE<1-9>} is deprecated.   |

| Macro                      | Supported in   | Description   |
|----------------------------|--|---|
| {INVENTORY.HARDWARE.FULL}  | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <a href="#">Tag names and values</a><br>→ Map element labels, map URL names and values<br>→ Manual event action <a href="#">scripts</a><br>→ Description of item value widget<br>→ Column of data type Text in <a href="#">Top hosts</a> widget | <i>Hardware (Full details) field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.HARDWARE.FULL<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .            |
| {INVENTORY.HOST.NETMASK}   | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <a href="#">Tag names and values</a><br>→ Map element labels, map URL names and values<br>→ Manual event action <a href="#">scripts</a><br>→ Description of item value widget<br>→ Column of data type Text in <a href="#">Top hosts</a> widget | <i>Host subnet mask field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.HOST.NETMASK<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .                    |
| {INVENTORY.HOST.NETWORKS}  | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <a href="#">Tag names and values</a><br>→ Map element labels, map URL names and values<br>→ Manual event action <a href="#">scripts</a><br>→ Description of item value widget<br>→ Column of data type Text in <a href="#">Top hosts</a> widget | <i>Host networks field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.HOST.NETWORKS<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .                      |
| {INVENTORY.HOST.ROUTER}    | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <a href="#">Tag names and values</a><br>→ Map element labels, map URL names and values<br>→ Manual event action <a href="#">scripts</a><br>→ Description of item value widget<br>→ Column of data type Text in <a href="#">Top hosts</a> widget | <i>Host router field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.HOST.ROUTER<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .                          |
| {INVENTORY.HW.ARCH}        | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <a href="#">Tag names and values</a><br>→ Map element labels, map URL names and values<br>→ Manual event action <a href="#">scripts</a><br>→ Description of item value widget<br>→ Column of data type Text in <a href="#">Top hosts</a> widget | <i>Hardware architecture field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.HW.ARCH<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .                    |
| {INVENTORY.HW.DATE.DECOMM} | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <a href="#">Tag names and values</a><br>→ Map element labels, map URL names and values<br>→ Manual event action <a href="#">scripts</a><br>→ Description of item value widget<br>→ Column of data type Text in <a href="#">Top hosts</a> widget | <i>Date hardware decommissioned field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.HW.DATE.DECOMM<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> .      |
| {INVENTORY.HW.DATE.EXPIRY} | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <a href="#">Tag names and values</a><br>→ Map element labels, map URL names and values<br>→ Manual event action <a href="#">scripts</a><br>→ Description of item value widget<br>→ Column of data type Text in <a href="#">Top hosts</a> widget | <i>Date hardware maintenance expires field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.HW.DATE.EXPIRY<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a> . |



| Macro                        | Supported in   | Description  |
|------------------------------|--|--|
| {INVENTORY.HW.DATE.INSTALL}  | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>Date hardware installed field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.HW.DATE.INSTALL<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .                                  |
| {INVENTORY.HW.DATE.PURCHASE} | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>Date hardware purchased field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.HW.DATE.PURCHASE<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .                                 |
| {INVENTORY.INSTALLER.NAME}   | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>Installer name field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.INSTALLER.NAME<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .  |
| {INVENTORY.LOCATION}         | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>Location field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.LOCATION<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .  |
| {INVENTORY.LOCATION.LAT}     | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | {PROFILE.LOCATION<1-9>} is deprecated.<br><i>Location latitude field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.LOCATION.LAT<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> . |
| {INVENTORY.LOCATION.LON}     | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>Location longitude field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.LOCATION.LON<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .  |
| {INVENTORY.MACADDRESS.A}     | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>MAC address A field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.MACADDRESS.A<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .   |
|                              |  | {PROFILE.MACADDRESS<1-9>} is deprecated.   |

| Macro                    | Supported in  | Description   |
|--------------------------|---|---|
| {INVENTORY.MACADDRESS.B} | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>MAC address B field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.MACADDRESS.B&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>   |
| {INVENTORY.MODEL}        | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>Model field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.MODEL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>  |
| {INVENTORY.NAME}         | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>Name field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.NAME&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>  |
| {INVENTORY.NOTES}        | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p>{PROFILE.NAME&lt;1-9&gt;} is deprecated.</p> <p><i>Notes field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.NOTES&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>            |
| {INVENTORY.OOB.IP}       | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p>{PROFILE.NOTES&lt;1-9&gt;} is deprecated.</p> <p><i>OOB IP address field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.OOB.IP&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p> |
| {INVENTORY.OOB.NETMASK}  | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>OOB subnet mask field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.OOB.NETMASK&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>  |
| {INVENTORY.OOB.ROUTER}   | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>OOB router field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.OOB.ROUTER&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>  |

| Macro                         | Supported in  | Description  |
|-------------------------------|---|--|
| {INVENTORY.OS}                | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>OS field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.OS&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p> <p>{PROFILE.OS&lt;1-9&gt;} is deprecated.</p> |
| {INVENTORY.OS.FULL}           | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>OS (Full details) field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.OS.FULL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>                           |
| {INVENTORY.OS.SHORT}          | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>OS (Short) field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.OS.SHORT&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>                                 |
| {INVENTORY.POC.PRIMARY.CELL}  | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>Primary POC cell field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.CELL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>                   |
| {INVENTORY.POC.PRIMARY.EMAIL} | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>Primary POC email field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.EMAIL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>                 |
| {INVENTORY.POC.PRIMARY.NAME}  | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>Primary POC name field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.NAME&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>                   |
| {INVENTORY.POC.PRIMARY.NOTES} | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>Primary POC notes field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.NOTES&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>                 |

| Macro                           | Supported in  | Description  |
|---------------------------------|---|--|
| {INVENTORY.POC.PRIMARY.PHONE.A} | <p>→ Problem update notifications and commands</p> <p>→ Internal notifications</p> <p>→ <b>Tag names and values</b></p> <p>→ Map element labels, map URL names and values</p> <p>→ Manual event action <b>scripts</b></p> <p>→ Description of item value widget</p> <p>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget</p> | <p><i>Primary POC phone A field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.PHONE.A&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p>    |
| {INVENTORY.POC.PRIMARY.PHONE.B} | <p>→ Problem update notifications and commands</p> <p>→ Internal notifications</p> <p>→ <b>Tag names and values</b></p> <p>→ Map element labels, map URL names and values</p> <p>→ Manual event action <b>scripts</b></p> <p>→ Description of item value widget</p> <p>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget</p> | <p><i>Primary POC phone B field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.PHONE.B&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p>    |
| {INVENTORY.POC.PRIMARY.SCREEN}  | <p>→ Problem update notifications and commands</p> <p>→ Internal notifications</p> <p>→ <b>Tag names and values</b></p> <p>→ Map element labels, map URL names and values</p> <p>→ Manual event action <b>scripts</b></p> <p>→ Description of item value widget</p> <p>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget</p> | <p><i>Primary POC screen name field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.PRIMARY.SCREEN&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p> |
| {INVENTORY.POC.SECONDARY.CELL}  | <p>→ Problem update notifications and commands</p> <p>→ Internal notifications</p> <p>→ <b>Tag names and values</b></p> <p>→ Map element labels, map URL names and values</p> <p>→ Manual event action <b>scripts</b></p> <p>→ Description of item value widget</p> <p>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget</p> | <p><i>Secondary POC cell field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.CELL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p>      |
| {INVENTORY.POC.SECONDARY.EMAIL} | <p>→ Problem update notifications and commands</p> <p>→ Internal notifications</p> <p>→ <b>Tag names and values</b></p> <p>→ Map element labels, map URL names and values</p> <p>→ Manual event action <b>scripts</b></p> <p>→ Description of item value widget</p> <p>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget</p> | <p><i>Secondary POC email field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.EMAIL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p>    |
| {INVENTORY.POC.SECONDARY.NAME}  | <p>→ Problem update notifications and commands</p> <p>→ Internal notifications</p> <p>→ <b>Tag names and values</b></p> <p>→ Map element labels, map URL names and values</p> <p>→ Manual event action <b>scripts</b></p> <p>→ Description of item value widget</p> <p>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget</p> | <p><i>Secondary POC name field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.NAME&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p>      |
| {INVENTORY.POC.SECONDARY.NOTES} | <p>→ Problem update notifications and commands</p> <p>→ Internal notifications</p> <p>→ <b>Tag names and values</b></p> <p>→ Map element labels, map URL names and values</p> <p>→ Manual event action <b>scripts</b></p> <p>→ Description of item value widget</p> <p>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget</p> | <p><i>Secondary POC notes field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.NOTES&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b>.</p>    |

| Macro                             | Supported in   | Description  |
|-----------------------------------|--|--|
| {INVENTORY.POC.SECONDARY.PHONE.A} | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ Tag names and values<br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type Text in <b>Top hosts</b> widget | <i>Secondary POC phone A field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.PHONE.A<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .                          |
| {INVENTORY.POC.SECONDARY.PHONE.B} | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ Tag names and values<br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type Text in <b>Top hosts</b> widget | <i>Secondary POC phone B field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.PHONE.B<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .                          |
| {INVENTORY.POC.SECONDARY.SCREEN}  | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ Tag names and values<br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type Text in <b>Top hosts</b> widget | <i>Secondary POC screen name field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.POC.SECONDARY.SCREEN<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .                       |
| {INVENTORY.SERIALNO.A}            | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ Tag names and values<br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type Text in <b>Top hosts</b> widget | <i>Serial number A field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.SERIALNO.A<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .   |
| {INVENTORY.SERIALNO.B}            | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ Tag names and values<br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type Text in <b>Top hosts</b> widget | {PROFILE.SERIALNO<1-9>} is deprecated.<br><i>Serial number B field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.SERIALNO.B<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> . |
| {INVENTORY.SITE.ADDRESS.A}        | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ Tag names and values<br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type Text in <b>Top hosts</b> widget | <i>Site address A field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.SITE.ADDRESS.A<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .  |
| {INVENTORY.SITE.ADDRESS.B}        | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ Tag names and values<br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type Text in <b>Top hosts</b> widget | <i>Site address B field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.SITE.ADDRESS.B<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .  |

| Macro                      | Supported in   | Description   |
|----------------------------|--|---|
| {INVENTORY.SITE.ADDRESS.C} | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <i>Top hosts</i> widget</li> </ul> | <p><i>Site address C field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.ADDRESS.C&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>  |
| {INVENTORY.SITE.CITY}      | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <i>Top hosts</i> widget</li> </ul> | <p><i>Site city field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.CITY&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>            |
| {INVENTORY.SITE.COUNTRY}   | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <i>Top hosts</i> widget</li> </ul> | <p><i>Site country field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.COUNTRY&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>      |
| {INVENTORY.SITE.NOTES}     | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <i>Top hosts</i> widget</li> </ul> | <p><i>Site notes field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.NOTES&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>          |
| {INVENTORY.SITE.RACK}      | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <i>Top hosts</i> widget</li> </ul> | <p><i>Site rack location field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.RACK&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>   |
| {INVENTORY.SITE.STATE}     | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <i>Top hosts</i> widget</li> </ul> | <p><i>Site state/province field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.STATE&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p> |
| {INVENTORY.SITE.ZIP}       | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <i>Top hosts</i> widget</li> </ul> | <p><i>Site ZIP/postal field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.SITE.ZIP&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>       |



| Macro                      | Supported in   | Description   |
|----------------------------|--|---|
| {INVENTORY.SOFTWARE.FIELD} | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>Software field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .<br><br>{PROFILE.SOFTWARE.<1-9>} is deprecated. |
| {INVENTORY.SOFTWARE.APP.A} | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>Software application A field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.APP.A.<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .                            |
| {INVENTORY.SOFTWARE.APP.B} | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>Software application B field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.APP.B.<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .                            |
| {INVENTORY.SOFTWARE.APP.C} | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>Software application C field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.APP.C.<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .                            |
| {INVENTORY.SOFTWARE.APP.D} | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>Software application D field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.APP.D.<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .                            |
| {INVENTORY.SOFTWARE.APP.E} | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>Software application E field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.APP.E.<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .                            |
| {INVENTORY.SOFTWARE.FULL}  | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Internal notifications<br>→ <b>Tag names and values</b><br>→ Map element labels, map URL names and values<br>→ Manual event action <b>scripts</b><br>→ Description of item value widget<br>→ Column of data type <b>Text</b> in <b>Top hosts</b> widget | <i>Software (Full details) field in host inventory.</i><br><br>This macro may be used with a numeric index e.g. {INVENTORY.SOFTWARE.FULL.<1-9>} to point to the first, second, third, etc. host in a trigger expression. See <b>indexed macros</b> .                            |

| Macro                 | Supported in  | Description  |
|-----------------------|---|--|
| {INVENTORY.TAG}       | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>Tag field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.TAG&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p> <p>{PROFILE.TAG&lt;1-9&gt;} is deprecated.</p>          |
| {INVENTORY.TYPE}      | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>Type field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.TYPE&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p> <p>{PROFILE.DEVICETYPE&lt;1-9&gt;} is deprecated.</p> |
| {INVENTORY.TYPE.FULL} | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>Type (Full details) field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.TYPE.FULL&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>                                   |
| {INVENTORY.URL.A}     | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>URL A field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.URL.A&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>   |
| {INVENTORY.URL.B}     | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>URL B field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.URL.B&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>   |
| {INVENTORY.URL.C}     | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>URL C field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.URL.C&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>   |
| {INVENTORY.VENDOR}    | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Map element labels, map URL names and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> <li>→ Column of data type <i>Text</i> in <a href="#">Top hosts</a> widget</li> </ul> | <p><i>Vendor field in host inventory.</i></p> <p>This macro may be used with a numeric index e.g. {INVENTORY.VENDOR&lt;1-9&gt;} to point to the first, second, third, etc. host in a trigger expression. See <a href="#">indexed macros</a>.</p>   |



| Macro                  | Supported in   | Description  |
|------------------------|--|--|
| {ITEM.DESCRPTION}      | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Manual event action <b>scripts</b></li> <li>→ Description of item value widget</li> </ul>  | <p><i>Description of the Nth item in the trigger expression that caused a notification.</i></p> <p>This macro may be used with a numeric index e.g. {ITEM.DESCRPTION&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <b>indexed macros</b>.</p>                                       |
| {ITEM.DESCRPTION.ORIG} | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Manual event action <b>scripts</b></li> <li>→ Description of item value widget</li> </ul>  | <p><i>Description (with macros unresolved) of the Nth item in the trigger expression that caused a notification.</i></p> <p>This macro may be used with a numeric index e.g. {ITEM.DESCRPTION.ORIG&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <b>indexed macros</b>.</p>         |
| {ITEM.ID}              | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Script type item, item prototype and discovery rule parameter names and values<sup>6</sup></li> <li>→ HTTP agent type item, item prototype and discovery rule fields:<br/>URL, Query fields, Request body, Headers, Proxy, SSL certificate file, SSL key file</li> <li>→ Manual event action <b>scripts</b></li> <li>→ Description of item value widget</li> </ul>             | <p>Supported since 5.2.0.</p> <p><i>Numeric ID of the Nth item in the trigger expression that caused a notification.</i></p> <p>This macro may be used with a numeric index e.g. {ITEM.ID&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <b>indexed macros</b>.</p>                  |
| {ITEM.KEY}             | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Script type item, item prototype and discovery rule parameter names and values<sup>6</sup></li> <li>→ HTTP agent type item, item prototype and discovery rule fields:<br/>URL, Query fields, Request body, Headers, Proxy, SSL certificate file, SSL key file</li> <li>→ Manual event action <b>scripts</b></li> <li>→ Description of item value widget</li> </ul>             | <p><i>Key of the Nth item in the trigger expression that caused a notification.</i></p> <p>This macro may be used with a numeric index e.g. {ITEM.KEY&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <b>indexed macros</b>.</p> <p>{TRIGGER.KEY} is deprecated.</p>                  |
| {ITEM.KEY.ORIG}        | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Script type item, item prototype and discovery rule parameter names and values<sup>6</sup></li> <li>→ HTTP agent type item, item prototype and discovery rule fields:<br/>URL, Query fields, Request body, Headers, Proxy, SSL certificate file, SSL key file<sup>6</sup></li> <li>→ Manual event action <b>scripts</b></li> <li>→ Description of item value widget</li> </ul> | <p><i>Original key (with macros not expanded) of the Nth item in the trigger expression that caused a notification<sup>4</sup>.</i></p> <p>This macro may be used with a numeric index e.g. {ITEM.KEY.ORIG&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <b>indexed macros</b>.</p> |

| Macro            | Supported in  | Description  |
|------------------|---|--|
| {ITEM.LASTVALUE} | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Trigger URLs</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> </ul> | <p><i>The latest value of the Nth item in the trigger expression that caused a notification.</i></p> <p>It will resolve to *UNKNOWN* in the frontend if the latest history value has been collected more than the <i>Max history display period</i> time ago (set in the <a href="#">Administration→General</a> menu section).</p> <p>When used in the problem name, the macro will not resolve to the latest item value when viewing problem events; instead, it will keep the item value from the time when the problem happened.</p> <p>When used in notifications, in some cases the macro might not resolve to the latest item value at the moment the trigger fired. For example, if an item quickly receives two values, "A" and "B", and the trigger fires for "A", notifications might show "B" as the latest value due to a slight processing delay - the latest item value changed between the time the trigger fired and when the notification was created. To avoid this, you can use the {ITEM.VALUE} macro, which resolves to the value at the moment the trigger fires, ensuring the correct value is used in the notification.</p> <p>It is alias to<br/> <code>last (/ {HOST.HOST} / {ITEM.KEY} ).</code></p> <p>The resolved value for text/log items is truncated to 20 characters by the frontend in the following locations:</p> <ul style="list-style-type: none"> <li>- Operational data;</li> <li>- Trigger description;</li> <li>- Trigger URLs;</li> <li>- Description of the item value widget.</li> </ul> <p>To resolve to a full value, you may use <a href="#">macro functions</a>. No values are truncated by the server.</p> <p><a href="#">Customizing</a> the macro value is supported for this macro; starting with Zabbix 3.2.0.</p> <p>This macro may be used with a numeric index e.g. {ITEM.LASTVALUE&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p> |
| {ITEM.LOG.AGE}   | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> </ul>                             | <p><i>Age of the log event, with precision down to a second.</i></p> <p>This macro may be used with a numeric index e.g. {ITEM.LOG.AGE&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p>  |
| {ITEM.LOG.DATE}  | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> </ul>                             | <p><i>Date when the log entry was written to the log.</i></p> <p>This macro may be used with a numeric index e.g. {ITEM.LOG.DATE&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p>  |

| Macro                | Supported in  | Description  |
|----------------------|---|--|
| {ITEM.LOG.EVENTID}   | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> </ul> | <p><i>ID of the event in the event log.</i></p> <p>For Windows event log monitoring only.</p> <p>This macro may be used with a numeric index e.g. {ITEM.LOG.EVENTID&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p>   |
| {ITEM.LOG.NSEVERITY} | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> </ul> | <p><i>Numeric severity of the event in the event log.</i></p> <p>For Windows event log monitoring only.</p> <p>This macro may be used with a numeric index e.g. {ITEM.LOG.NSEVERITY&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p>   |
| {ITEM.LOG.SEVERITY}  | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> </ul> | <p><i>Verbal severity of the event in the event log.</i></p> <p>For Windows event log monitoring only.</p> <p>This macro may be used with a numeric index e.g. {ITEM.LOG.SEVERITY&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p>   |
| {ITEM.LOG.SOURCE}    | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> </ul> | <p><i>Source of the event in the event log.</i></p> <p>For Windows event log monitoring only.</p> <p>This macro may be used with a numeric index e.g. {ITEM.LOG.SOURCE&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p>  |
| {ITEM.LOG.TIME}      | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, operational data and descriptions</li> <li>→ Trigger URLs</li> <li>→ Event tags and values</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> </ul> | <p><i>Time when the log entry was written to the log</i></p> <p>This macro may be used with a numeric index e.g. {ITEM.LOG.TIME&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p>   |
| {ITEM.NAME}          | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> </ul>  | <p><i>Name of the Nth item in the trigger expression that caused a notification.</i></p> <p>This macro may be used with a numeric index e.g. {ITEM.NAME&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p>   |
| {ITEM.NAME.ORIG}     | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> </ul>  | <p>This macros is deprecated since Zabbix 6.0. It used to resolve to the <i>original name (i.e. without macros resolved) of the item</i> in pre-6.0 Zabbix versions when user macros and positional macros were supported in the item name.</p> <p>This macro may be used with a numeric index e.g. {ITEM.NAME.ORIG&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p> |

| Macro              | Supported in  | Description  |
|--------------------|---|--|
| {ITEM.STATE}       | <ul style="list-style-type: none"> <li>→ Item-based internal notifications</li> <li>→ Description of item value widget</li> </ul>   | <p><i>The latest state of the Nth item in the trigger expression that caused a notification.</i> Possible values: <b>Not supported</b> and <b>Normal</b>.</p> <p>This macro may be used with a numeric index e.g. {ITEM.STATE&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p>   |
| {ITEM.STATE.ERROR} | Item-based internal notifications   | <p><i>Error message with details why an item became unsupported.</i></p> <p>If an item goes into the unsupported state and then immediately gets supported again the error field can be empty.</p>   |
| {ITEM.VALUE}       | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Trigger names, event names, operational data and descriptions</li> <li>→ <a href="#">Tag names and values</a></li> <li>→ Trigger URLs</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> </ul> | <p>Resolved to either:</p> <ol style="list-style-type: none"> <li>1) the historical (at-the-time-of-event) value of the Nth item in the trigger expression, if used in the context of trigger status change, for example, when displaying events or sending notifications.</li> <li>2) the latest value of the Nth item in the trigger expression, if used without the context of trigger status change, for example, when displaying a list of triggers in a pop-up selection window. In this case works the same as {ITEM.LASTVALUE}</li> </ol> <p>In the first case it will resolve to *UNKNOWN* if the history value has already been deleted or has never been stored.</p> <p>In the second case, and in the frontend only, it will resolve to *UNKNOWN* if the latest history value has been collected more than the <i>Max history display period</i> time ago (set in the <a href="#">Administration→General</a> menu section).</p> <p>The resolved value for text/log items is truncated to 20 characters by the frontend in the following locations:</p> <ul style="list-style-type: none"> <li>- Operational data;</li> <li>- Trigger description;</li> <li>- Trigger URLs;</li> <li>- Description of the item value widget.</li> </ul> <p>To resolve to a full value, you may use <a href="#">macro functions</a>. No values are truncated by the server.</p> <p><a href="#">Customizing</a> the macro value is supported for this macro, starting with Zabbix 3.2.0.</p> <p>This macro may be used with a numeric index e.g. {ITEM.VALUE&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p> |
| {ITEM.VALUETYPE}   | <ul style="list-style-type: none"> <li>→ Trigger-based notifications and commands</li> <li>→ Problem update notifications and commands</li> <li>→ Internal notifications</li> <li>→ Manual event action <a href="#">scripts</a></li> <li>→ Description of item value widget</li> </ul>  | <p><i>Value type of the Nth item in the trigger expression that caused a notification.</i> Possible values: 0 - numeric float, 1 - character, 2 - log, 3 - numeric unsigned, 4 - text.</p> <p>This macro may be used with a numeric index e.g. {ITEM.VALUETYPE&lt;1-9&gt;} to point to the first, second, third, etc. item in a trigger expression. See <a href="#">indexed macros</a>.</p> <p>Supported since 5.4.0.</p>  |

| Macro                        | Supported in   | Description  |
|------------------------------|--|--|
| {LLDRULE.DESCRPTION}         | → LLD-rule based internal notifications  | <i>Description of the low-level discovery rule which caused a notification.</i>  |
| {LLDRULE.DESCRPTION.LLDRULE} | → LLD-rule based internal notifications  | <i>Description (with macros unresolved) of the low-level discovery rule which caused a notification.</i><br>Supported since 5.2.0.   |
| {LLDRULE.ID}                 | → LLD-rule based internal notifications  | <i>Numeric ID of the low-level discovery rule which caused a notification.</i>   |
| {LLDRULE.KEY}                | → LLD-rule based internal notifications  | <i>Key of the low-level discovery rule which caused a notification.</i>  |
| {LLDRULE.KEY.ORIG}           | → LLD-rule based internal notifications  | <i>Original key (with macros not expanded) of the low-level discovery rule which caused a notification.</i>  |
| {LLDRULE.NAME}               | → LLD-rule based internal notifications  | <i>Name of the low-level discovery rule (with macros resolved) that caused a notification.</i>   |
| {LLDRULE.NAME.ORIG}          | → LLD-rule based internal notifications  | <i>Original name (i.e. without macros resolved) of the low-level discovery rule that caused a notification.</i>  |
| {LLDRULE.STATE}              | → LLD-rule based internal notifications  | <i>The latest state of the low-level discovery rule.</i><br>Possible values: <b>Not supported</b> and <b>Normal</b> .  |
| {LLDRULE.STATE.ERROR}        | → LLD-rule based internal notifications  | <i>Error message with details why an LLD rule became unsupported.</i><br><br>If an LLD rule goes into the unsupported state and then immediately gets supported again the error field can be empty.  |
| {MAP.ID}                     | → Map element labels, map URL names and values   | <i>Network map ID.</i>   |
| {MAP.NAME}                   | → Map element labels, map URL names and values   | <i>Network map name.</i>   |
| {PROXY.DESCRPTION}           | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Discovery notifications and commands<br>→ Autoregistration notifications and commands<br>→ Internal notifications<br>→ Manual event action <i>scripts</i> | <i>Description of the proxy.</i> Resolves to either:<br>1) proxy of the Nth item in the trigger expression (in trigger-based notifications). You may use <i>indexed</i> macros here.<br>2) proxy, which executed discovery (in discovery notifications). Use {PROXY.DESCRPTION} here, without indexing.<br>3) proxy to which an active agent registered (in autoregistration notifications). Use {PROXY.DESCRPTION} here, without indexing.<br><br>This macro may be used with a numeric index e.g. {PROXY.DESCRPTION<1-9>} to point to the first, second, third, etc. item in a trigger expression. See <i>indexed macros</i> . |
| {PROXY.NAME}                 | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Discovery notifications and commands<br>→ Autoregistration notifications and commands<br>→ Internal notifications<br>→ Manual event action <i>scripts</i> | <i>Name of the proxy.</i> Resolves to either:<br>1) proxy of the Nth item in the trigger expression (in trigger-based notifications). You may use <i>indexed</i> macros here.<br>2) proxy, which executed discovery (in discovery notifications). Use {PROXY.NAME} here, without indexing.<br>3) proxy to which an active agent registered (in autoregistration notifications). Use {PROXY.NAME} here, without indexing.<br><br>This macro may be used with a numeric index e.g. {PROXY.NAME<1-9>} to point to the first, second, third, etc. item in a trigger expression. See <i>indexed macros</i> .                          |
| {SERVICE.DESCRPTION}         | → Service-based notifications and commands<br>→ Service update notifications and commands  | <i>Description of the service (with macros resolved).</i>  |

| Macro                                      | Supported in   | Description   |
|--|--|---|
| {SERVICE.NAME}                             | → Service-based notifications and commands<br>→ Service update notifications and commands  | <i>Name of the service (with macros resolved).</i>  |
| {SERVICE.ROOTCAUSE}                        | → Service-based notifications and commands<br>→ Service update notifications and commands  | <i>List of trigger problem events that caused a service to fail, sorted by severity and host name. Includes the following details: host name, event name, severity, age, service tags and values.</i>   |
| {SERVICE.TAGS}                             | → Service-based notifications and commands<br>→ Service update notifications and commands  | <i>A comma separated list of service event tags. Service event tags can be defined in the service configuration section Tags. Expanded to an empty string if no tags exist.</i>   |
| {SERVICE.TAGSJSON}                         | → Service-based notifications and commands<br>→ Service update notifications and commands  | <i>A JSON array containing service event tag objects. Service event tags can be defined in the service configuration section Tags. Expanded to an empty array if no tags exist.</i>   |
| {SERVICE.TAGS.<tag name>}                  | → Service-based notifications and commands<br>→ Service update notifications and commands  | <i>Service event tag value referenced by the tag name. Service event tags can be defined in the service configuration section Tags. A tag name containing non-alphanumeric characters (including non-English multibyte-UTF characters) should be double quoted. Quotes and backslashes inside a quoted tag name must be escaped with a backslash.</i> |
| {TIME}                                     | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Service-based notifications and commands<br>→ Service update notifications and commands<br>→ Discovery notifications and commands<br>→ Autoregistration notifications and commands<br>→ Internal notifications<br>→ Trigger event names<br>→ Manual event action <b>scripts</b> | <i>Current time in hh:mm:ss.</i>  |
| {TRIGGER.DESCRPTION}                       | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Trigger-based internal notifications<br>→ Manual event action <b>scripts</b>  | <i>Trigger description.</i><br>All macros supported in a trigger description will be expanded if {TRIGGER.DESCRPTION} is used in notification text.<br>{TRIGGER.COMMENT} is deprecated.   |
| {TRIGGER.EXPRESSION}                       | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Manual event action <b>scripts</b><br>→ Event names   | <i>Partially evaluated trigger expression.</i><br>Item-based functions are evaluated and replaced by the results at the time of event generation whereas all other functions are displayed as written in the expression. Can be used for debugging trigger expressions.   |
| {TRIGGER.EXPRESSION.RECOVER BY EVERYTHING} | → Problem update notifications and commands<br>→ Manual event action <b>scripts</b>  | <i>Partially evaluated trigger recovery expression.</i><br>Item-based functions are evaluated and replaced by the results at the time of event generation whereas all other functions are displayed as written in the expression. Can be used for debugging trigger recovery expressions.   |
| {TRIGGER.EVENTS.ACK}                       | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Map element labels<br>→ Manual event action <b>scripts</b>  | <i>Number of acknowledged events for a map element in maps, or for the trigger which generated current event in notifications.</i>  |
| {TRIGGER.EVENTS.PROBLEM.ACK}               | → Problem update notifications and commands<br>→ Problem update notifications and commands<br>→ Map element labels<br>→ Manual event action <b>scripts</b>   | <i>Number of acknowledged PROBLEM events for all triggers disregarding their state.</i>   |
| {TRIGGER.EVENTS.PROBLEM.UNACK}             | → Problem update notifications and commands<br>→ Problem update notifications and commands<br>→ Map element labels<br>→ Manual event action <b>scripts</b>   | <i>Number of unacknowledged PROBLEM events for all triggers disregarding their state.</i>   |

| Macro                                 | Supported in   | Description  |
|---------------------------------------|--|--|
| {TRIGGER.EVENTS.UNACK}                | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Map element labels<br>→ Manual event action <b>scripts</b>  | Number of unacknowledged events for a map element in maps, or for the trigger which generated current event in notifications.  |
| {TRIGGER.HOSTGROUPNAME}               | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Trigger-based internal notifications<br>→ Manual event action <b>scripts</b>  | A sorted (by SQL query), comma-space separated list of host groups in which the trigger is defined.  |
| {TRIGGER.PROBLEM.EVENTS.PROBLEMACK}   |  | Number of acknowledged PROBLEM events for triggers in PROBLEM state.   |
| {TRIGGER.PROBLEM.EVENTS.PROBLEMUNACK} |  | Number of unacknowledged PROBLEM events for triggers in PROBLEM state.   |
| {TRIGGER.EXPRESSION}                  | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Trigger-based internal notifications<br>→ Manual event action <b>scripts</b>  | Trigger expression.  |
| {TRIGGER.EXPRESSIONRECOVERY}          | Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Trigger-based internal notifications<br>→ Manual event action <b>scripts</b>  | Trigger recovery expression if OK event generation in <b>trigger configuration</b> is set to 'Recovery expression'; otherwise an empty string is returned.<br>Supported since 3.2.0.     |
| {TRIGGER.ID}                          | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Trigger-based internal notifications<br>→ Map element labels, map URL names and values<br>→ Trigger URLs<br>→ Trigger tag value<br>→ Manual event action <b>scripts</b> | Numeric trigger ID which triggered this action.<br>Supported in trigger tag values since 4.4.1.  |
| {TRIGGER.NAME}                        | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Trigger-based internal notifications<br>→ Manual event action <b>scripts</b>  | Name of the trigger (with macros resolved).<br>Note that since 4.0.0 {EVENT.NAME} can be used in actions to display the triggered event/problem name with macros resolved.               |
| {TRIGGER.NAME.ORIGINAL}               | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Trigger-based internal notifications<br>→ Manual event action <b>scripts</b>  | Original name of the trigger (i.e. without macros resolved).   |
| {TRIGGER.NSEVERITY}                   | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Trigger-based internal notifications<br>→ Manual event action <b>scripts</b>  | Numerical trigger severity. Possible values: 0 - Not classified, 1 - Information, 2 - Warning, 3 - Average, 4 - High, 5 - Disaster.  |
| {TRIGGER.SEVERITY}                    | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Trigger-based internal notifications<br>→ Manual event action <b>scripts</b>  | Trigger severity name. Can be defined in Administration → General → Trigger displaying options.  |
| {TRIGGER.STATE}                       | → Trigger-based internal notifications   | The latest state of the trigger. Possible values: <b>Unknown</b> and <b>Normal</b> .   |
| {TRIGGER.STATE.ERROR}                 | → Trigger-based internal notifications   | Error message with details why a trigger became unsupported.<br><br>If a trigger goes into the unsupported state and then immediately gets supported again the error field can be empty. |
| {TRIGGER.STATUS}                      | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Manual event action <b>scripts</b>  | Trigger value at the time of operation step execution. Can be either PROBLEM or OK.<br>{STATUS} is deprecated.   |
| {TRIGGER.TEMPLATE}                    | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Trigger-based internal notifications<br>→ Manual event action <b>scripts</b>  | A sorted (by SQL query), comma-space separated list of templates in which the trigger is defined, or *UNKNOWN* if the trigger is defined in a host.                                      |



| Macro                    | Supported in   | Description   |
|--------------------------|--|---|
| {TRIGGER.URL}            | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Trigger-based internal notifications<br>→ Manual event action <b>scripts</b>  | <i>Trigger URL.</i>   |
| {TRIGGER.VALUE}          | → Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Trigger expressions<br>→ Manual event action <b>scripts</b>   | <i>Current trigger numeric value: 0 - trigger is in OK state, 1 - trigger is in PROBLEM state.</i>  |
| {TRIGGERS.UNACK}         | → Map element labels   | <i>Number of unacknowledged triggers for a map element, disregarding trigger state.<br/>A trigger is considered to be unacknowledged if at least one of its PROBLEM events is unacknowledged.</i> |
| {TRIGGERS.PROBLEM.UNACK} | → Map element labels   | <i>Number of unacknowledged PROBLEM triggers for a map element.<br/>A trigger is considered to be unacknowledged if at least one of its PROBLEM events is unacknowledged.</i>                     |
| {TRIGGERS.ACK}           | → Map element labels   | <i>Number of acknowledged triggers for a map element, disregarding trigger state.<br/>A trigger is considered to be acknowledged if all of its PROBLEM events are acknowledged.</i>               |
| {TRIGGERS.PROBLEM.ACK}   | → Map element labels   | <i>Number of acknowledged PROBLEM triggers for a map element.<br/>A trigger is considered to be acknowledged if all of its PROBLEM events are acknowledged.</i>                                   |
| {USER.FULLNAME}          | → Problem update notifications and commands<br>→ Manual host action <b>scripts</b> (including confirmation text)<br>→ Manual event action <b>scripts</b> (including confirmation text)   | <i>Name, surname and username of the user who added event acknowledgment or started the script.<br/>Supported for problem updates since 3.4.0, for global scripts since 5.0.2</i>                 |
| {USER.NAME}              | → Manual host action <b>scripts</b> (including confirmation text)<br>→ Manual event action <b>scripts</b> (including confirmation text)  | <i>Name of the user who started the script.<br/>Supported since 5.0.2.</i>  |
| {USER.SURNAME}           | → Manual host action <b>scripts</b> (including confirmation text)<br>→ Manual event action <b>scripts</b> (including confirmation text)  | <i>Surname of the user who started the script.<br/>Supported since 5.0.2.</i>   |
| {USER.USERNAME}          | → Manual host action <b>scripts</b> (including confirmation text)<br>→ Manual event action <b>scripts</b> (including confirmation text)  | <i>Username of the user who started the script.<br/>Supported since 5.0.2.</i>  |
| {\$MACRO}                | → See: <b>User macros supported by location</b>  | <i>{USER.ALIAS}, supported before Zabbix 5.4.0, is now deprecated.</i>  |
| {#MACRO}                 | → See: <b>Low-level discovery macros</b>   | <i>User-definable macros.<br/>Low-level discovery macros.</i>   |
|                          |  | <i>Customizing the macro value is supported for this macro, starting with Zabbix 4.0.0.</i>   |
| {?EXPRESSION}            | → Trigger event names<br>→ Trigger-based notifications and commands<br>→ Problem update notifications and commands<br>→ Script commands and their webhook parameters<br>→ Map element labels <sup>3</sup><br>→ Map shape labels <sup>3</sup><br>→ Link labels in maps <sup>3</sup><br>→ Graph names <sup>5</sup> | <i>See <b>expression macros</b>.<br/>Supported since 5.2.0.</i>   |
| \$1...\$9                | → Trigger <b>names</b><br>→ User parameter <b>commands</b>   | <i>Positional macros/references.</i>  |



<sup>1</sup> The {HOST.\*} macros supported in item key parameters will resolve to the interface that is selected for the item. When used in items without interfaces they will resolve to either the Zabbix agent, SNMP, JMX or IPMI interface of the host in this order of priority or to 'UNKNOWN' if the host does not have any interface.

<sup>2</sup> In global scripts, interface IP/DNS fields and web scenarios the macro will resolve to the main agent interface. If an agent interface is not defined, the main SNMP interface will be used. If an SNMP interface is also not defined, the main JMX interface will be used. If a JMX interface is not defined either, the main IPMI interface will be used. If the host does not have any interface, the macro resolves to 'UNKNOWN'.

<sup>3</sup> Only the **avg**, **last**, **max** and **min** functions, with seconds as parameter are supported in this macro in map labels.

<sup>4</sup> {HOST.\*} macros are supported in web scenario *Variables*, *Headers*, *SSL certificate file* and *SSL key file* fields and in scenario step *URL*, *Post*, *Headers* and *Required string* fields. Since Zabbix 5.2.2, {HOST.\*} macros are no longer supported in web scenario *Name* and web scenario step *Name* fields.

<sup>5</sup> Only the **avg**, **last**, **max** and **min** functions, with seconds as parameter are supported within this macro in graph names. The {HOST.HOST<1-9>} macro can be used as host within the macro. For example:

```
last(/Cisco switch/ifAlias[{#SNMPINDEX}])
last(/{HOST.HOST}/ifAlias[{#SNMPINDEX}])
```

<sup>6</sup> Supported since 5.2.5.

#### Indexed macros

The indexed macro syntax of {MACRO<1-9>} works only in the context of **trigger expressions**. It can be used to reference hosts or functions in the order in which they appear in the expression. Macros like {HOST.IP1}, {HOST.IP2}, {HOST.IP3} will resolve to the IP of the first, second, and third host in the trigger expression (providing the trigger expression contains those hosts). Macros like {FUNCTION.VALUE1}, {FUNCTION.VALUE2}, {FUNCTION.VALUE3} will resolve to the value of the first, second, and third item-based function in the trigger expression at the time of the event (providing the trigger expression contains those functions).

Additionally the {HOST.HOST<1-9>} macro is also supported within the {?func(/host/key,param)} expression macro in **graph names**. For example, {?func(/{HOST.HOST2}/key,param)} in the graph name will refer to the host of the second item in the graph.

#### Warning:

Indexed macros will not resolve in any other context, except the two cases mentioned here. For other contexts, use macros **without** index (i. e. {HOST.HOST}, {HOST.IP}, etc) instead.

## 2 User macros supported by location

### Overview

This section contains a list of locations, where **user-definable** macros are supported.

#### Note:

Only global-level user macros are supported for *Actions*, *Network discovery*, *Proxies* and all locations listed under *Other locations* section of this page. In the mentioned locations, host-level and template-level macros will not be resolved.

### Actions

In **actions**, user macros can be used in the following fields:

| Location                                 | Multiple macros/mix with text <sup>1</sup> |
|--|--|
| Trigger-based notifications and commands | yes  |
| Trigger-based internal notifications     | yes  |
| Problem update notifications             | yes  |
| Service-based notifications and commands | yes  |
| Service update notifications             | yes  |
| Time period condition                    | no   |
| <i>Operations</i>                        |  |
| Default operation step duration          | no   |
| Step duration                            | no   |

### Hosts/host prototypes

In a **host** and **host prototype** configuration, user macros can be used in the following fields:

| Location                  | Multiple macros/mix with text <sup>1</sup> |
|---------------------------|--|
| Interface IP/DNS          | DNS only                                   |
| Interface port            | no   |
| SNMP v1, v2               |  |
| SNMP community            | yes  |
| SNMP v3                   |  |
| Context name              | yes  |
| Security name             | yes  |
| Authentication passphrase | yes  |
| Privacy passphrase        | yes  |
| IPMI                      |  |
| Username                  | yes  |
| Password                  | yes  |
| Tags <sup>2</sup>         |  |
| Tag names                 | yes  |
| Tag values                | yes  |

#### Items / item prototypes

In an **item** or an **item prototype** configuration, user macros can be used in the following fields:

| Location   | Multiple macros/mix with text <sup>1</sup> |
|--|--|
| Item   | yes  |
| key  |  |
| pa-  |  |
| ram-   |  |
| e-   |  |
| ters   |  |
| Update   | no   |
| in-  |  |
| ter-   |  |
| val  |  |
| Custom   | no   |
| in-  |  |
| ter-   |  |
| vals   |  |
| History  | no   |
| stor-  |  |
| age  |  |
| pe-  |  |
| riod   |  |
| Trend  | no   |
| stor-  |  |
| age  |  |
| pe-  |  |
| riod   |  |
| Description  | yes  |
| Calculated/aggregate   |  |
| item   |  |
| Formula (expression constants and function parameters; item key parameters;<br>(aggregate item only) filter conditions (host group name and tag name)) | yes  |
| Database   |  |
| mon-   |  |
| i-   |  |
| tor  |  |
| Username   | yes  |
| Password   | yes  |
| SQL query  | yes  |

| Location                                   | Multiple macros/mix with text <sup>1</sup> |
|--|--|
| <i>HTTP</i>                                |  |
| <i>agent</i>                               |  |
| URL <sup>3</sup>                           | yes  |
| Query fields                               | yes  |
| Timeout                                    | no   |
| Request body                               | yes  |
| Headers (names and values)                 | yes  |
| Required status codes                      | yes  |
| HTTP proxy                                 | yes  |
| HTTP authentication username               | yes  |
| HTTP authentication password               | yes  |
| SSI certificate file                       | yes  |
| SSI key file                               | yes  |
| SSI key password                           | yes  |
| Allowed hosts                              | yes  |
| <i>JMX</i>                                 |  |
| <i>agent</i>                               |  |
| JMX endpoint                               | yes  |
| <i>Script</i>                              |  |
| <i>item</i>                                |  |
| Parameter names and values                 | yes  |
| <i>SNMP</i>                                |  |
| <i>agent</i>                               |  |
| SNMP OID                                   | yes  |
| <i>SSH</i>                                 |  |
| <i>agent</i>                               |  |
| Username                                   | yes  |
| Public key file                            | yes  |
| Private key file                           | yes  |
| Password                                   | yes  |
| Script                                     | yes  |
| <i>TELNET</i>                              |  |
| <i>agent</i>                               |  |
| Username                                   | yes  |
| Password                                   | yes  |
| Script                                     | yes  |
| <i>Zabbix</i>                              |  |
| <i>trap-</i>                               |  |
| <i>per</i>                                 |  |
| Allowed hosts                              | yes  |
| <i>Tags<sup>2</sup></i>                    |  |
| Tag names                                  | yes  |
| Tag values                                 | yes  |
| <i>Preprocessing</i>                       |  |
| Step parameters (including custom scripts) | yes  |

#### Low-level discovery

In a **low-level discovery rule**, user macros can be used in the following fields:

| Location                   | Multiple macros/mix with text <sup>1</sup> |
|----------------------------|--|
| Key parameters             | yes  |
| Update interval            | no   |
| Custom interval            | no   |
| Keep lost resources period | no   |
| Description                | yes  |
| <i>SNMP agent</i>          |  |
| SNMP OID                   | yes  |
| <i>SSH agent</i>           |  |
| Username                   | yes  |

| Location                |  | Multiple macros/mix with text <sup>1</sup> |
|-------------------------|--|--|
| <i>TELNET agent</i>     | Public key file  | yes  |
|                         | Private key file   | yes  |
|                         | Password   | yes  |
|                         | Script   | yes  |
| <i>Zabbix trapper</i>   | Username   | yes  |
|                         | Password   | yes  |
|                         | Script   | yes  |
| <i>Database monitor</i> | Allowed hosts  | yes  |
|                         | Username   | yes  |
|                         | Password   | yes  |
| <i>JMX agent</i>        | SQL query  | yes  |
|                         | JMX endpoint   | yes  |
| <i>HTTP agent</i>       | URL <sup>3</sup>   | yes  |
|                         | Query fields   | yes  |
|                         | Timeout  | no   |
|                         | Request body   | yes  |
|                         | Headers (names and values)                               | yes  |
|                         | Required status codes                                    | yes  |
|                         | HTTP authentication username                             | yes  |
|                         | HTTP authentication password                             | yes  |
| <i>Filters</i>          |  |  |
|                         | Regular expression                                       | yes  |
| <i>Overrides</i>        |  |  |
|                         | Filters: regular expression                              | yes  |
|                         | Operations: update interval (for item prototypes)        | no   |
|                         | Operations: history storage period (for item prototypes) | no   |
|                         | Operations: trend storage period (for item prototypes)   | no   |

## Network discovery

In a **network discovery rule**, user macros can be used in the following fields:

| Location           |                           | Multiple macros/mix with text <sup>1</sup> |
|--------------------|---------------------------|--|
| Update interval    |                           | no   |
| <i>SNMP v1, v2</i> |                           |  |
|                    | SNMP community            | yes  |
| <i>SNMP v3</i>     | SNMP OID                  | yes  |
|                    |                           |  |
|                    | Context name              | yes  |
|                    | Security name             | yes  |
|                    | Authentication passphrase | yes  |
|                    | Privacy passphrase        | yes  |
|                    | SNMP OID                  | yes  |

## Proxies

In a **proxy** configuration, user macros can be used in the following field:

| Location                           | Multiple macros/mix with text <sup>1</sup> |
|------------------------------------|--|
| Interface port (for passive proxy) | no   |

## Templates

In a **template** configuration, user macros can be used in the following fields:

| Location                 | Multiple macros/mix with text <sup>1</sup> |  |
|--------------------------|--|--|
| <i>Tags</i> <sup>2</sup> |  |  |
| Tag names                | yes  |  |
| Tag values               | yes  |  |

## Triggers

In a **trigger** configuration, user macros can be used in the following fields:

| Location  | Multiple macros/mix with text <sup>1</sup> |  |
|---|--|--|
| Name  | yes  |  |
| Operational data  | yes  |  |
| Expression (only in constants and function parameters; secret macros are not supported) | yes  |  |
| Description   | yes  |  |
| URL <sup>3</sup>  | yes  |  |
| Tag for matching  | yes  |  |
| <i>Tags</i> <sup>2</sup>  |  |  |
| Tag names   | yes  |  |
| Tag values  | yes  |  |

## Web scenario

In a **web scenario** configuration, user macros can be used in the following fields:

| Location                   | Multiple macros/mix with text <sup>1</sup> |  |
|----------------------------|--|--|
| Name                       | yes  |  |
| Update interval            | no   |  |
| Agent                      | yes  |  |
| HTTP proxy                 | yes  |  |
| Variables (values only)    | yes  |  |
| Headers (names and values) | yes  |  |
| <i>Steps</i>               |  |  |
| Name                       | yes  |  |
| URL <sup>3</sup>           | yes  |  |
| Variables (values only)    | yes  |  |
| Headers (names and values) | yes  |  |
| Timeout                    | no   |  |
| Required string            | yes  |  |

| Location                |                       | Multiple macros/mix with text <sup>1</sup> |
|-------------------------|-----------------------|--|
| <i>Authentication</i>   | Required status codes | no   |
|                         | User                  | yes  |
|                         | Password              | yes  |
|                         | SSL certificate       | yes  |
|                         | SSL key file          | yes  |
|                         | SSL key password      | yes  |
| <i>Tags<sup>2</sup></i> | Tag names             | yes  |
|                         | Tag values            | yes  |

#### Other locations

In addition to the locations listed here, user macros can be used in the following fields:

| Location   | Multiple macros/mix with text <sup>1</sup> |
|--|--|
| Global scripts<br>(script, SSH, Telnet, IPMI), including confirmation text | yes  |
| Webhooks   |  |
| JavaScript script  | no   |
| JavaScript script parameter name   | no   |
| JavaScript script parameter value  | yes  |
| <i>Monitoring</i>  |  |
| →  |  |
| <i>Dashboards</i>  |  |
| Column of data type <i>Text</i> in <i>Top hosts</i> dashboard widget       | yes  |
| <i>Description</i> parameter in <i>Item value</i> dashboard widget         | yes  |
| <i>URL<sup>3</sup></i> parameter in <i>URL</i> dashboard widget            | yes  |
| <i>Administration</i>  |  |
| →  |  |
| <i>Users</i>   |  |
| →  |  |
| <i>Media</i>   |  |
| When active  | no   |
| <i>Administration</i>  |  |
| →  |  |
| <i>General</i>   |  |
| →  |  |
| <i>GUI</i>   |  |
| Working time   | no   |

| Location  | Multiple macros/mix with text <sup>1</sup> |
|---|--|
| <i>Administration</i>   |  |
| →   |  |
| <i>Me-</i>  |  |
| <i>dia</i>  |  |
| <i>types</i>  |  |
| →   |  |
| <i>Mes-</i>   |  |
| <i>sage</i>   |  |
| <i>tem-</i>   |  |
| <i>plates</i>   |  |
| Subject   | yes  |
| Message   | yes  |
| <i>Administration</i>   |  |
| →   |  |
| <i>Me-</i>  |  |
| <i>dia</i>  |  |
| <i>types</i>  |  |
| →   |  |
| <i>Me-</i>  |  |
| <i>dia</i>  |  |
| <i>type</i>   |  |
| Username and Password fields for the Email media type (when Authentication is set to "Username and password"; <b>secret macros</b> recommended) | yes  |

For a complete list of all macros supported in Zabbix, see **supported macros**.

#### Footnotes

- <sup>1</sup> If multiple macros in a field or macros mixed with text are not supported for the location, a single macro has to fill the whole field.
- <sup>2</sup> Macros used in tag names and values are resolved only during event generation process.
- <sup>3</sup> URLs that contain a **secret macro** will not work, as the macro in them will be resolved as "\*\*\*\*\*".

## 7 Unit symbols

### Overview

Having to use some large numbers, for example '86400' to represent the number of seconds in one day, is both difficult and error-prone. This is why you can use some appropriate unit symbols (or suffixes) to simplify Zabbix trigger expressions and item keys.

Instead of '86400' for the number of seconds you can simply enter '1d'. Suffixes function as multipliers.

### Time suffixes

For time you can use:

- **s** - seconds (when used, works the same as the raw value)
- **m** - minutes
- **h** - hours
- **d** - days
- **w** - weeks
- **M** - months (**trend functions** only)
- **y** - years (**trend functions** only)

Time suffixes support only integer numbers (so '1h' is supported, '1,5h' or '1.5h' are not; use '90m' instead).

Time suffixes are supported in:

- trigger **expression** constants and function parameters
- constants of **calculated item** formulas
- parameters of the **zabbix[queue,<from>,<to>]** **internal item**
- time period parameter of **aggregate calculations**

- item configuration ('Update interval', 'Custom intervals', 'History storage period' and 'Trend storage period' fields)
- item prototype configuration ('Update interval', 'Custom intervals', 'History storage period' and 'Trend storage period' fields)
- low-level discovery rule configuration ('Update interval', 'Custom intervals', 'Keep lost resources' fields)
- network discovery configuration ('Update interval' field)
- web scenario configuration ('Update interval', 'Timeout' fields)
- action operation configuration ('Default operation step duration', 'Step duration' fields)
- user profile settings ('Auto-logout', 'Refresh', 'Message timeout' fields)
- graph **widget** of *Monitoring* → *Dashboard* ('Time shift' field)
- *Administration* → *General* → *Housekeeping* (storage period fields)
- *Administration* → *General* → *Trigger displaying options* ('Display OK triggers for', 'On status change triggers blink for' fields)
- *Administration* → *General* → *Other* ('Login blocking interval' field and fields related to communication with Zabbix server)
- Zabbix server `ha_set_failover_delay=delay` **runtime control** option

## Memory suffixes

Memory size suffixes are supported in:

- trigger **expression** constants and function parameters
- constants of **calculated item** formulas

For memory size you can use:

- **K** - kilobyte
- **M** - megabyte
- **G** - gigabyte
- **T** - terabyte

## Other uses

Unit symbols are also used for a human-readable representation of data in the frontend.

In both Zabbix server and frontend these symbols are supported:

- **K** - kilo
- **M** - mega
- **G** - giga
- **T** - tera

When **configuring items**, such units as **B**, **Bps**, **s**, **uptime**, and **unixtime** are supported for human-readable conversion of received values.

When item values in B, Bps are displayed in the frontend, base 2 is applied (1K = 1024). Otherwise a base of 10 is used (1K = 1000).

Additionally the frontend also supports the display of:

- **P** - peta
- **E** - exa
- **Z** - zetta
- **Y** - yotta

## Usage examples

By using some appropriate suffixes you can write trigger expressions that are easier to understand and maintain, for example these expressions:

```
last(/host/system.uptime)<86400s
avg(/host/system.cpu.load,600s)<10
last(/host/vm.memory.size[available])<20971520
```

could be changed to:

```
last(/host/system.uptime)<1d
avg(/host/system.cpu.load,10m)<10
last(/host/vm.memory.size[available])<20M
```

## Preventing unit conversion

By default, specifying a unit for an item results in a multiplier prefix being added - for example, an incoming value '2048' with unit 'B' would be displayed as '2KB' by the frontend (for more details, see *Units* in **item configuration**).

To prevent a unit from conversion, use the **!** prefix, for example, **!B**. To better understand how the conversion works with and without the exclamation mark, see the following examples of values and units:



```
1024 !B → 1024 B
1024 B → 1 KB
61 !s → 61 s
61 s → 1m 1s
0 !uptime → 0 uptime
0 uptime → 00:00:00
0 !! → 0 !
0 ! → 0
```

**Note:**

Before Zabbix 4.0, there was a hardcoded unit stoplist consisting of `ms`, `rpm`, `RPM`, `%`. This stoplist has been deprecated, thus the correct way to prevent converting such units is `!ms`, `!rpm`, `!RPM`, `!%`.

## 8 Time period syntax

### Overview

To set a time period, the following format has to be used:

`d-d, hh:mm-hh:mm`

where the symbols stand for the following:

| Symbol    | Description  |
|-----------|--|
| <i>d</i>  | Day of the week: 1 - Monday, 2 - Tuesday ,... , 7 - Sunday |
| <i>hh</i> | Hours: 00-24   |
| <i>mm</i> | Minutes: 00-59   |

You can specify more than one time period using a semicolon (;) separator:

`d-d, hh:mm-hh:mm; d-d, hh:mm-hh:mm . . .`

Leaving the time period empty equals 1-7,00:00-24:00, which is the default value.

**Attention:**

The upper limit of a time period is not included. Thus, if you specify 09:00-18:00 the last second included in the time period is 17:59:59.

### Examples

Working hours. Monday - Friday from 9:00 till 18:00:

`1-5,09:00-18:00`

Working hours plus weekend. Monday - Friday from 9:00 till 18:00 and Saturday, Sunday from 10:00 till 16:00:

`1-5,09:00-18:00;6-7,10:00-16:00`

## 9 Command execution

Zabbix uses common functionality for external checks, user parameters, `system.run` items, custom alert scripts, remote commands and global scripts.

### Execution steps

**Note:**

By default, all scripts in Zabbix are executed using the `sh` shell, and it is not possible to modify the default shell. To utilize a different shell, you can employ a workaround: create a script file and invoke that script during command execution.

The command/script is executed similarly on both Unix and Windows platforms:

1. Zabbix (the parent process) creates a pipe for communication

2. Zabbix sets the pipe as the output for the to-be-created child process
3. Zabbix creates the child process (runs the command/script)
4. A new process group (in Unix) or a job (in Windows) is created for the child process
5. Zabbix reads from the pipe until timeout occurs or no one is writing to the other end (ALL handles/file descriptors have been closed). Note that the child process can create more processes and exit before they exit or close the handle/file descriptor.
6. If the timeout has not been reached, Zabbix waits until the initial child process exits or timeout occurs
7. If the initial child process exited and the timeout has not been reached, Zabbix checks exit code of the initial child process and compares it to 0 (non-zero value is considered as execution failure, only for custom alert scripts, remote commands and user scripts executed on Zabbix server and Zabbix proxy)
8. At this point it is assumed that everything is done and the whole process tree (i.e. the process group or the job) is terminated

**Attention:**

Zabbix assumes that a command/script has done processing when the initial child process has exited AND no other process is still keeping the output handle/file descriptor open. When processing is done, ALL created processes are terminated.

All double quotes and backslashes in the command are escaped with backslashes and the command is enclosed in double quotes.

Exit code checking

Exit code are checked with the following conditions:

- Only for custom alert scripts, remote commands and user scripts executed on Zabbix server and Zabbix proxy.
- Any exit code that is different from 0 is considered as execution failure.
- Contents of standard error and standard output for failed executions are collected and available in frontend (where execution result is displayed).
- Additional log entry may be created for remote commands executed on Zabbix agent/proxy by enabling the LogRemoteCommands parameter on **agent/proxy**.

Possible frontend messages and log entries for failed commands/scripts:

- Contents of standard error and standard output for failed executions (if any).
- "Process exited with code: N." (for empty output, and exit code not equal to 0).
- "Process killed by signal: N." (for process terminated by a signal, on Linux only).
- "Process terminated unexpectedly." (for process terminated for unknown reasons).

See also

- **External checks**
- **User parameters**
- **system.run** items
- **Custom alert scripts**
- **Remote commands**
- **Global scripts**

## 10 Version compatibility

Supported agents

To be compatible with Zabbix 6.0, Zabbix agent must not be older than version 1.4 and must not be newer than 6.0.

You may need to review the configuration of older agents as some parameters have changed, for example, parameters related to [logging](#) for versions before 3.0.

To take full advantage of the latest metrics, improved performance and reduced memory usage, use the latest supported agent.

### Notes for Windows XP

On Windows XP/Server 2003, do not use agent templates that are newer than Zabbix 4.0.x. The newer templates use English performance counters, which are only supported since Windows Vista/Server 2008.

Supported agents 2

Older Zabbix agents 2 from version 4.4 onwards are compatible with Zabbix 6.0; Zabbix agent 2 must not be newer than 6.0.

Note that when using Zabbix agent 2 versions 4.4 and 5.0, the default interval of 10 minutes is used for refreshing unsupported items.

To take full advantage of the latest metrics, improved performance and reduced memory usage, use the latest supported agent 2.

## Supported Zabbix proxies

To be compatible with Zabbix 6.0, the proxy must be of the same major version; thus only Zabbix 6.0.x proxies can work with Zabbix 6.0.x server.

### Attention:

It is no longer possible to start the upgraded server and have older and unupgraded proxies report data to a newer server. This approach, which was never recommended nor supported by Zabbix, now is officially disabled, as the server will ignore data from unupgraded proxies. See also the [upgrade procedure](#).

Warnings about using incompatible Zabbix daemon versions are logged.

## Supported XML files

XML files not older than version 1.8 are supported for import in Zabbix 6.0.

### Attention:

In the XML export format, trigger dependencies are stored by name only. If there are several triggers with the same name (for example, having different severities and expressions) that have a dependency defined between them, it is not possible to import them. Such dependencies must be manually removed from the XML file and re-added after import.

## 11 Database error handling

If Zabbix detects that the backend database is not accessible, it will send a notification message and continue the attempts to connect to the database. For some database engines, specific error codes are recognized.

### MySQL

- CR\_CONN\_HOST\_ERROR
- CR\_SERVER\_GONE\_ERROR
- CR\_CONNECTION\_ERROR
- CR\_SERVER\_LOST
- CR\_UNKNOWN\_HOST
- ER\_SERVER\_SHUTDOWN
- ER\_ACCESS\_DENIED\_ERROR
- ER\_ILLEGAL\_GRANT\_FOR\_TABLE
- ER\_TABLEACCESS\_DENIED\_ERROR
- ER\_UNKNOWN\_ERROR

## 12 Zabbix sender dynamic link library for Windows

### Overview

In a Windows environment applications can send data to Zabbix server/proxy by using the Zabbix sender dynamic link library (zabbix\_sender.dll) instead of having to launch an external process (zabbix\_sender.exe).

zabbix\_sender.h and zabbix\_sender.lib are required for compiling user applications with zabbix\_sender.dll.

### Getting it

There are two ways of getting zabbix\_sender.dll.

1. [Download](#) zabbix\_sender.h, zabbix\_sender.lib and zabbix\_sender.dll files as a ZIP archive.

When choosing download options make sure to select "No encryption" under *Encryption* and "Archive" under *Packaging*. Then download Zabbix agent (not Zabbix agent 2).

The zabbix\_sender.h, zabbix\_sender.lib and zabbix\_sender.dll files will be inside the downloaded ZIP archive in the bin\dev directory. Unzip the files where you need it.

See also [known issues](#).

2. Build zabbix\_sender.dll from source (see [instructions](#)).

The dynamic link library with the development files will be located in the `bin\winXX\dev` directory. To use it, include the `zabbix_sender.h` header file and link with the `zabbix_sender.lib` library.

See also

- [example](#) of a simple Zabbix sender utility implemented with Zabbix sender dynamic link library to illustrate the library usage;
- [zabbix\\_sender.h](#) file for the interface functions of the Zabbix sender dynamic link library. This file contains documentation explaining the purpose of each interface function, its arguments, and return value.

### 13 Python library for Zabbix API

Overview

[zabbix\\_utils](#) is a Python library for:

- working with Zabbix API;
- acting like Zabbix sender;
- acting like Zabbix get.

It is supported for Zabbix 5.0, 6.0, 6.4 and later.

### 14 Service monitoring upgrade

**Overview** In Zabbix 6.0, [service monitoring](#) functionality has been reworked significantly (see [What's new in Zabbix 6.0.0](#) for the list of changes).

This page describes how services and SLAs, defined in earlier Zabbix versions, are changed during an upgrade to Zabbix 6.0 or newer.

**Services** In older Zabbix versions, services had two types of dependencies: soft and hard. After an upgrade, all dependencies will become equal.

If a service "Child service" has been previously linked to "Parent service 1" via hard dependency and additionally "Parent service 2" via soft dependency, after an upgrade the "Child service" will have two parent services "Parent service 1" and "Parent service 2".

Trigger-based mapping between problems and services has been replaced by tag-based mapping. In Zabbix 6.0 and newer, service configuration form has a new parameter *Problem tags*, which allows specifying one or multiple tag name and value pairs for problem matching. Triggers that have been linked to a service will get a new tag `ServiceLink: <trigger ID>:<trigger name>` (tag value will be truncated to 32 characters). Linked services will get `ServiceLink problem tag` with the same value.

Status calculation rules

The 'Status calculation algorithm' will be upgraded using the following rules:

- Do not calculate → Set status to OK
- Problem, if at least one child has a problem → Most critical of child services
- Problem, if all children have problems → Most critical if all children have problems

**Note:**

If you have upgraded from Zabbix pre-6.0 to Zabbix 6.0.0, 6.0.1 or 6.0.2, see [Known issues](#) for Zabbix 6.0 documentation.

**SLAs** Previously, SLA targets had to be defined for each service separately. Since Zabbix 6.0, SLA has become a separate entity, which contains information about service schedule, expected service level objective (SLO) and downtime periods to exclude from the calculation. Once configured, an SLA can be assigned to multiple services through [service tags](#).

During an upgrade:

- Identical SLAs defined for each service will be grouped and one SLA per each group will be created.
- Each affected service will get a special tag `SLA:<ID>` and the same tag will be specified in the *Service tags* parameter of the corresponding SLA.
- Service creation time, a new metric in SLA reports, will be set to 01/01/2000 00:00 for existing services.

## 15 Other issues

### Login and systemd

We recommend **creating** a *zabbix* user as system user, that is, without ability to log in. Some users ignore this recommendation and use the same account to log in (e. g. using SSH) to host running Zabbix. This might crash Zabbix daemon on log out. In this case you will get something like the following in Zabbix server log:

```
zabbix_server [27730]: [file:'selfmon.c',line:375] lock failed: [22] Invalid argument
zabbix_server [27716]: [file:'dbconfig.c',line:5266] lock failed: [22] Invalid argument
zabbix_server [27706]: [file:'log.c',line:238] lock failed: [22] Invalid argument
```

and in Zabbix agent log:

```
zabbix_agentd [27796]: [file:'log.c',line:238] lock failed: [22] Invalid argument
```

This happens because of default systemd setting `RemoveIPC=yes` configured in `/etc/systemd/logind.conf`. When you log out of the system the semaphores created by Zabbix previously are removed which causes the crash.

A quote from systemd documentation:

`RemoveIPC=`

Controls whether System V and POSIX IPC objects belonging to the user shall be removed when the user fully logs out. Takes a boolean argument. If enabled, the user may not consume IPC resources after the last of the user's sessions terminated. This covers System V semaphores, shared memory and message queues, as well as POSIX shared memory and message queues. Note that IPC objects of the root user and other system users are excluded from the effect of this setting. Defaults to "yes".

There are 2 solutions to this problem:

1. (recommended) Stop using *zabbix* account for anything else than Zabbix processes, create a dedicated account for other things.
2. (not recommended) Set `RemoveIPC=no` in `/etc/systemd/logind.conf` and reboot the system. Note that `RemoveIPC` is a system-wide parameter, changing it will affect the whole system.

### Using Zabbix frontend behind proxy

If Zabbix frontend runs behind proxy server, the cookie path in the proxy configuration file needs to be rewritten in order to match the reverse-proxied path. See examples below. If the cookie path is not rewritten, users may experience authorization issues, when trying to login to Zabbix frontend.

Example configuration for nginx

```
# ..
location / {
# ..
proxy_cookie_path /zabbix /;
proxy_pass http://192.168.0.94/zabbix/;
# ..
```

Example configuration for Apache

```
# ..
ProxyPass "/" http://host/zabbix/
ProxyPassReverse "/" http://host/zabbix/
ProxyPassReverseCookiePath /zabbix /
ProxyPassReverseCookieDomain host zabbix.example.com
# ..
```

## 16 Agent vs agent 2 comparison

This section describes the differences between the Zabbix agent and the Zabbix agent 2.

| Parameter                           | Zabbix agent  | Zabbix agent 2  |
|-------------------------------------|---|---|
| Programming language                | C   | Go with some parts in C   |
| Daemonization                       | yes   | by systemd only (yes on Windows)  |
| Supported extensions                | Custom <b>loadable modules</b> in C.  | Custom <b>plugins</b> in Go.  |
| <i>Requirements</i>                 |   |   |
| Supported platforms                 | Linux, IBM AIX, FreeBSD, NetBSD, OpenBSD, HP-UX, Mac OS X, Solaris: 9, 10, 11, Windows: all desktop and server versions since XP  | Linux, Windows: all desktop and server versions, on which an up-to-date <b>supported Go version</b> can be installed.   |
| Supported crypto libraries          | GnuTLS 3.1.18 and newer<br>OpenSSL 1.0.1, 1.0.2, 1.1.0, 1.1.1, 3.0.x. Note that 3.0.x is supported since Zabbix 6.0.4.<br>LibreSSL - tested with versions 2.7.4, 2.8.2 (certain limitations apply, see the <b>Encryption</b> page for details). | Linux: OpenSSL 1.0.1 and later is supported since Zabbix 4.4.8.<br>MS Windows: OpenSSL 1.1.1 or later.<br>The OpenSSL library must have PSK support enabled. LibreSSL is not supported.   |
| Monitoring processes                |   |   |
| Processes                           | A separate active check process for each server/proxy record.   | Single process with automatically created threads. The maximum number of threads is determined by the GOMAXPROCS environment variable.  |
| Metrics                             | <b>UNIX:</b> see a list of supported <b>items</b> .<br><br><b>Windows:</b> see a list of additional Windows-specific <b>items</b> .   | <b>UNIX:</b> All metrics supported by Zabbix agent. Additionally, the agent 2 provides Zabbix-native monitoring solution for: Docker, Memcached, MySQL, PostgreSQL, Redis, systemd, and other monitoring targets - see a full list of agent 2 specific <b>items</b> .<br><br><b>Windows:</b> All metrics supported by Zabbix agent, and also net.tcp.service* checks of HTTPS, LDAP. Additionally, the agent 2 provides Zabbix-native monitoring solution for: PostgreSQL, Redis. Checks from different plugins or multiple checks within one plugin can be executed concurrently. Supported for passive and active checks. |
| Concurrency                         | Active checks for single server are executed sequentially.  |   |
| Scheduled/flexible intervals        | Supported for passive checks only.  |   |
| Third-party traps                   | no  | yes   |
| <i>Additional features</i>          |   |   |
| Persistent storage                  | no  | yes   |
| Persistent files for log*[] metrics | yes (only on Unix)  | no  |
| Log data upload                     | Can be performed during log gathering to free the buffer.   | Log gathering is stopped when the buffer is full, therefore the <b>BufferSize</b> parameter must be at least MaxLinesPerSecond x 2.   |
| Timeout settings                    | Defined on an agent level only.   | Plugin timeout can override the timeout defined on an agent level.  |
| Changes user at runtime             | yes (Unix-like systems only)  | no (controlled by systemd)  |
| User-configurable ciphersuites      | yes   | no  |

#### See also:

- *Zabbix processes description:* **Zabbix agent**, **Zabbix agent 2**
- *Configuration parameters:* Zabbix agent **UNIX / Windows**, Zabbix agent 2 **UNIX / Windows**

## 17 Escaping examples

### Overview

This page provides examples of using correct escaping when using regular expressions in various contexts.

#### Note:

When using the trigger expression constructor, correct escaping in regular expressions is added automatically.

### Examples

#### User macro with context

Regular expression: `\.+\"[a-z]+<br>` User macro with context: `{${MACRO:regex:\".+\\\"[a-z]+\"}`

Notice:

- backslashes are **not escaped**;
- quotation marks are escaped.

#### Macro function inside item key parameter

Regular expression: `.+:(\\d+)$<br>` Item key: `net.tcp.service[tcp,,\"{{ITEM.VALUE}.regsub(\".+:(\\d+)$\",\\1)}\"]`

Notice:

- regular expression inside the `regsub` macro function is double-quoted (because of contains closing parenthesis);
- quotation marks around the regular expression are escaped (because the whole third item parameter is double-quoted);
- third item key parameter is double-quoted because it contains a comma.

#### LLD macro function

Regular expression: `\.+\"([a-z]+)<br>` LLD macro: `{{#MACRO}.iregsub(\".+\\\"([a-z]+)\", \\1)}`

Notice:

- backslashes are not escaped;
- quotation marks are escaped.

#### LLD macro function inside user macro context

Regular expression: `\.+\"([a-z]+)<br>` LLD macro: `{{#MACRO}.iregsub(\".+\\\"([a-z]+)\", \\1)}<br>` User macro with context: `{${MACRO: \"{{#MACRO}.iregsub(\".+\\\"([a-z]+)\", \\1)}\"}`

Notice:

- backslash escaping for LLD does not change;
- upon inserting the LLD macro into user macro context, we need to put it into string:
  1. Quotation marks are added around the macro expression;
  2. Quotation marks get escaped; in total, 3 new backslashes are introduced.

#### String parameter of non-history function

String content: `\.+\"[a-z]+<br>` Expression: `concat(\"abc\", \"\\.\\.\\.\\.\"[a-z]+\" )`

Notice:

- String parameters require escaping both for backslashes and quotation marks.

#### String parameter of history function

String content: `\.+\"[a-z]+<br>` Expression: `find(__ITEM_KEY__, \"regexp\", \".+\\\"[a-z]+\" )`

Notice:

- backslashes are not escaped;
- quotation marks are escaped.

#### LLD macro function inside string parameter of non-history function

Regular expression: `\.+\"([a-z]+)<br>` LLD macro: `{{#MACRO}.iregsub(\".+\\\"([a-z]+)\", \\1)}<br>` Expression: `concat(\"abc\", \"{{#MACRO}.iregsub(\".+\\\"([a-z]+)\", \\1)}\" )`

Notice:

- String parameters require escaping both for backslashes and quotation marks;
- Another layer of escaping is added, because the macro will be resolved only after string is unquoted;

#### LLD macro function inside string parameter of history function

Regular expression: `\.+\"([a-z]+)<br>` LLD macro: `{#{MACRO}.iregsub(\".+\"([a-z]+)\", \1)}<br>` Expression: `find(__ITEM_KEY__, "eq", "{#{MACRO}.iregsub(\".+\"([a-z]+)\", \1)}")`

Notice:

- backslashes are not escaped;
- quotation marks are escaped.

#### User macro with context inside string parameter of non-history function

Regular expression: `\.+\"[a-z]+<br>` User macro with context: `{${MACRO:regex:\".+\"[a-z]+}<br>` Expression: `concat("abc", "${MACRO:regex:\".+\"[a-z]+}")`

Notice:

- Same as in the previous example an additional layer of escaping is needed;
- Backslashes and quotation marks are escaped only for the top-level escaping (by virtue of it being a string parameter).

#### User macro with context inside string parameter of history function

Regular expression: `\.+\"[a-z]+<br>` User macro with context: `{${MACRO:regex:\".+\"[a-z]+}<br>` Expression: `find(__ITEM_KEY__, "eq", "{${MACRO:regex:\".+\"[a-z]+}")`

Notice:

- backslashes are not escaped;
- quotation marks are escaped.

#### LLD macro function inside user macro context inside non-history function

Regular expression: `\.+\"([a-z]+)<br>` LLD macro: `{#{MACRO}.iregsub(\".+\"([a-z]+)\", \1)}<br>` User macro with context: `{${MACRO: "{#{MACRO}.iregsub(\".+\"([a-z]+)\", \1)}"}<br>` Expression: `concat("abc", "${MACRO: "{#{MACRO}.iregsub(\".+\"([a-z]+)\", \1)}"}")`

Notice the three layers of escaping:

1. For LLD macro function, without escaping of backslashes;
2. For User macro with context, without escaping of backslashes;
3. For the string parameter of a function, with escaping of backslashes.

#### LLD macro function inside user macro context inside history function

Regular expression: `\.+\"([a-z]+)<br>` LLD macro: `{#{MACRO}.iregsub(\".+\"([a-z]+)\", \1)}<br>` User macro with context: `{${MACRO: "{#{MACRO}.iregsub(\".+\"([a-z]+)\", \1)}"}<br>` Expression: `find(__ITEM_KEY__, "eq", "${MACRO: "{#{MACRO}.iregsub(\".+\"([a-z]+)\", \1)}"}")`

Notice:

- backslashes are not escaped;
- quotation marks are escaped.

#### User macro with context just inside string

Regular expression: `\.+\"[a-z]+<br>` User macro with context: `{${MACRO:regex:\".+\"[a-z]+}<br>` Inside string of some expression, for example: `func(arg1, arg2, arg3)="${MACRO:regex:\".+\"[a-z]+}"`

Notice:

- Strings also require backslash escaping;
  - Strings also require quotation mark escaping;
  - Again a case with 2 levels of escaping:
1. Escaping for user macro context without backslash escaping;
  2. Escaping for it being a string with backslash escaping.

## Zabbix manpages

These are Zabbix manpages for Zabbix processes.



## zabbix\_agent2

Section: Maintenance Commands (8)

Updated: 2019-01-29

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---

### NAME

zabbix\_agent2 - Zabbix agent 2

### SYNOPSIS

```
zabbix_agent2 [-c config-file]  
zabbix_agent2 [-c config-file] [-v] -p  
zabbix_agent2 [-c config-file] [-v] -t item-key  
zabbix_agent2 [-c config-file] -R runtime-option  
zabbix_agent2 -h  
zabbix_agent2 -V
```

### DESCRIPTION

**zabbix\_agent2** is an application for monitoring parameters of various services.

### OPTIONS

**-c, --config** *config-file*

Use the alternate *config-file* instead of the default one.

**-R, --runtime-control** *runtime-option*

Perform administrative functions according to *runtime-option*.

#### Runtime control options: **userparameter\_reload**

Reload user parameters from the configuration file

#### **log\_level\_increase**

Increase log level

#### **log\_level\_decrease**

Decrease log level

#### **help**

List available runtime control options

#### **metrics**

List available metrics

#### **version**

Display version

#### **-p, --print**

Print known items and exit. For each item either generic defaults are used, or specific defaults for testing are supplied. These defaults are listed in square brackets as item key parameters. Returned values are enclosed in square brackets and prefixed with the type of the returned value, separated by a pipe character. For user parameters type is always **t**, as the agent can not determine

all possible return values. Items, displayed as working, are not guaranteed to work from the Zabbix server or `zabbix_get` when querying a running agent daemon as permissions or environment may be different. Returned value types are:

**d**

Number with a decimal part.

**m**

Not supported. This could be caused by querying an item that only works in the active mode like a log monitoring item or an item that requires multiple collected values. Permission issues or incorrect user parameters could also result in the not supported state.

**s**

Text. Maximum length not limited.

**t**

Text. Same as **s**.

**u**

Unsigned integer.

**-t, --test** *item-key*

Test single item and exit. See **--print** for output description.

**-v, --verbose**

Enable verbose output when test item or print known items.

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

## FILES

*/usr/local/etc/zabbix\_agent2.conf*

Default location of Zabbix agent 2 configuration file (if not modified during compile time).

## SEE ALSO

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agentd**(8), **zabbix\_get**(8), **zabbix\_js**(8), **zabbix\_proxy**(8), **zabbix\_sender**(8), **zabbix\_server**(8)

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This document was created on: 14:07:57 GMT, November 22, 2021

## zabbix\_agentd

Section: Maintenance Commands (8)

Updated: 2019-01-29

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---

### NAME

zabbix\_agentd - Zabbix agent daemon

### SYNOPSIS

```
zabbix_agentd [-c config-file]  
zabbix_agentd [-c config-file] -p  
zabbix_agentd [-c config-file] -t item-key  
zabbix_agentd [-c config-file] -R runtime-option  
zabbix_agentd -h  
zabbix_agentd -V
```

### DESCRIPTION

**zabbix\_agentd** is a daemon for monitoring various server parameters.

### OPTIONS

**-c, --config** *config-file*

Use the alternate *config-file* instead of the default one.

**-f, --foreground**

Run Zabbix agent in foreground.

**-R, --runtime-control** *runtime-option*

Perform administrative functions according to *runtime-option*.

Runtime control options

#### **userparameter\_reload**

Reload user parameters from the configuration file

**log\_level\_increase**[=*target*]

Increase log level, affects all processes if target is not specified

**log\_level\_decrease**[=*target*]

Decrease log level, affects all processes if target is not specified

Log level control targets

*process-type*

All processes of specified type (active checks, collector, listener)

*process-type,N*

Process type and number (e.g., listener,3)

*pid*

Process identifier, up to 65535. For larger values specify target as "process-type,N"

**-p, --print**

Print known items and exit. For each item either generic defaults are used, or specific defaults for testing are supplied. These defaults are listed in square brackets as item key parameters. Returned values are enclosed in square brackets and prefixed with the type of the returned value, separated by a pipe character. For user parameters type is always **t**, as the agent can not determine

all possible return values. Items, displayed as working, are not guaranteed to work from the Zabbix server or `zabbix_get` when querying a running agent daemon as permissions or environment may be different. Returned value types are:

**d**

Number with a decimal part.

**m**

Not supported. This could be caused by querying an item that only works in the active mode like a log monitoring item or an item that requires multiple collected values. Permission issues or incorrect user parameters could also result in the not supported state.

**s**

Text. Maximum length not limited.

**t**

Text. Same as **s**.

**u**

Unsigned integer.

**-t, --test** *item-key*

Test single item and exit. See **--print** for output description.

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

## FILES

*/usr/local/etc/zabbix\_agentd.conf*

Default location of Zabbix agent configuration file (if not modified during compile time).

## SEE ALSO

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agent2**(8), **zabbix\_get**(1), **zabbix\_js**(1), **zabbix\_proxy**(8), **zabbix\_sender**(1), **zabbix\_server**(8)

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## zabbix\_get

Section: User Commands (1)

Updated: 2021-06-01

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---

## NAME

zabbix\_get - Zabbix get utility

## SYNOPSIS

```
zabbix_get -s host-name-or-IP [-p port-number] [-I IP-address] [-t timeout] -k item-key  
zabbix_get -s host-name-or-IP [-p port-number] [-I IP-address] [-t timeout] --tls-connect cert --tls-ca-file CA-file [--tls-crl-file CRL-file] [--tls-agent-cert-issuer cert-issuer] [--tls-agent-cert-subject cert-subject] --tls-cert-file cert-file --tls-key-file key-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] -k item-key  
zabbix_get -s host-name-or-IP [-p port-number] [-I IP-address] [-t timeout] --tls-connect psk --tls-psk-identity PSK-identity --tls-psk-file PSK-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] -k item-key  
zabbix_get -h  
zabbix_get -V
```

## DESCRIPTION

**zabbix\_get** is a command line utility for getting data from Zabbix agent.

## OPTIONS

**-s, --host** *host-name-or-IP*

Specify host name or IP address of a host.

**-p, --port** *port-number*

Specify port number of agent running on the host. Default is 10050.

**-I, --source-address** *IP-address*

Specify source IP address.

**-t, --timeout** *seconds*

Specify timeout. Valid range: 1-30 seconds (default: 30)

**-k, --key** *item-key*

Specify key of item to retrieve value for.

**--tls-connect** *value*

How to connect to agent. Values:

### **unencrypted**

connect without encryption (default)

### **psk**

connect using TLS and a pre-shared key

### **cert**

connect using TLS and a certificate

**--tls-ca-file** *CA-file*

Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification.

**--tls-crl-file** *CRL-file*

Full pathname of a file containing revoked certificates.

**--tls-agent-cert-issuer** *cert-issuer*

Allowed agent certificate issuer.

**--tls-agent-cert-subject** *cert-subject*

Allowed agent certificate subject.

**--tls-cert-file** *cert-file*

Full pathname of a file containing the certificate or certificate chain.

**--tls-key-file** *key-file*

Full pathname of a file containing the private key.

**--tls-psk-identity** *PSK-identity*

PSK-identity string.

**--tls-psk-file** *PSK-file*

Full pathname of a file containing the pre-shared key.

**--tls-cipher13** *cipher-string*

Cipher string for OpenSSL 1.1.1 or newer for TLS 1.3. Override the default ciphersuite selection criteria. This option is not available if OpenSSL version is less than 1.1.1.

**--tls-cipher** *cipher-string*

GnuTLS priority string (for TLS 1.2 and up) or OpenSSL cipher string (only for TLS 1.2). Override the default ciphersuite selection criteria.

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

**EXAMPLES**

```
zabbix_get -s 127.0.0.1 -p 10050 -k "system.cpu.load[all,avg1]"
```

```
zabbix_get -s 127.0.0.1 -p 10050 -k "system.cpu.load[all,avg1]" --tls-connect cert --tls-ca-file /home/zabbix/zabbix_ca_file  
--tls-agent-cert-issuer "CN=Signing CA,OU=IT operations,O=Example Corp,DC=example,DC=com" --tls-agent-cert-  
subject "CN=server1,OU=IT operations,O=Example Corp,DC=example,DC=com" --tls-cert-file /home/zabbix/zabbix_get.crt  
--tls-key-file /home/zabbix/zabbix_get.key
```

```
zabbix_get -s 127.0.0.1 -p 10050 -k "system.cpu.load[all,avg1]" --tls-connect psk --tls-psk-identity "PSK ID Zabbix  
agentd" --tls-psk-file /home/zabbix/zabbix_agentd.psk
```

**SEE ALSO**

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agentd**(8), **zabbix\_proxy**(8), **zabbix\_sender**(1), **zabbix\_server**(8), **zabbix\_js**(1), **zabbix\_agent2**(8), **zabbix\_web\_service**(8)

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This document was created on: 08:42:29 GMT, June 11, 2021

**zabbix\_js**

Section: User Commands (1)

Updated: 2019-01-29

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**NAME**

zabbix\_js - Zabbix JS utility

## SYNOPSIS

```
zabbix_js -s script-file -p input-param [-l log-level] [-t timeout]  
zabbix_js -s script-file -i input-file [-l log-level] [-t timeout]  
zabbix_js -h  
zabbix_js -V
```

## DESCRIPTION

**zabbix\_js** is a command line utility that can be used for embedded script testing.

## OPTIONS

**-s, --script** *script-file*

Specify the file name of the script to execute. If '-' is specified as file name, the script will be read from stdin.

**-p, --param** *input-param*

Specify the input parameter.

**-i, --input** *input-file*

Specify the file name of the input parameter. If '-' is specified as file name, the input will be read from stdin.

**-l, --loglevel** *log-level*

Specify the log level.

**-t, --timeout** *timeout*

Specify the timeout in seconds. Valid range: 1-60 seconds (default: 10)

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

## EXAMPLES

```
zabbix_js -s script-file.js -p example
```

## SEE ALSO

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agent2**(8), **zabbix\_agentd**(8), **zabbix\_get**(1), **zabbix\_proxy**(8), **zabbix\_sender**(1), **zabbix\_server**(8)

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## zabbix\_proxy

Section: Maintenance Commands (8)

Updated: 2020-09-04

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### NAME

zabbix\_proxy - Zabbix proxy daemon

### SYNOPSIS

**zabbix\_proxy** [-c *config-file*]

**zabbix\_proxy** [-c *config-file*] -R *runtime-option*

**zabbix\_proxy** -h

**zabbix\_proxy** -V

### DESCRIPTION

**zabbix\_proxy** is a daemon that collects monitoring data from devices and sends it to Zabbix server.

### OPTIONS

**-c, --config** *config-file*

Use the alternate *config-file* instead of the default one.

**-f, --foreground**

Run Zabbix proxy in foreground.

**-R, --runtime-control** *runtime-option*

Perform administrative functions according to *runtime-option*.

Runtime control options

#### **config\_cache\_reload**

Reload configuration cache. Ignored if cache is being currently loaded. Active Zabbix proxy will connect to the Zabbix server and request configuration data. Default configuration file (unless **-c** option is specified) will be used to find PID file and signal will be sent to process, listed in PID file.

#### **snmp\_cache\_reload**

Reload SNMP cache.

#### **housekeeper\_execute**

Execute the housekeeper. Ignored if housekeeper is being currently executed.

#### **diaginfo**[=*section*]

Log internal diagnostic information of the specified section. Section can be *historycache*, *preprocessing*, *locks*. By default diagnostic information of all sections is logged.

#### **log\_level\_increase**[=*target*]

Increase log level, affects all processes if target is not specified.

#### **log\_level\_decrease**[=*target*]

Decrease log level, affects all processes if target is not specified.

Log level control targets

*process-type*

All processes of specified type (configuration syncer, data sender, discoverer, heartbeat sender, history syncer, housekeeper, http



poller, icmp pinger, ipmi manager, ipmi poller, java poller, poller, preprocessing manager, preprocessing worker, self-monitoring, snmp trapper, task manager, trapper, unreachable poller, vmware collector, history poller, availability manager, odbc poller)

*process-type,N*

Process type and number (e.g., poller,3)

*pid*

Process identifier, up to 65535. For larger values specify target as "process-type,N"

Profiling control targets

*process-type*

All processes of specified type (configuration syncer, data sender, discoverer, heartbeat sender, history syncer, housekeeper, http poller, icmp pinger, ipmi manager, ipmi poller, java poller, poller, preprocessing manager, preprocessing worker, self-monitoring, snmp trapper, task manager, trapper, unreachable poller, vmware collector, history poller, availability manager, odbc poller)

*process-type,N*

Process type and number (e.g., history syncer,1)

*pid*

Process identifier, up to 65535. For larger values specify target as "process-type,N"

*scope*

Profiling scope (rwlock, mutex, processing) can be used with process type (e.g., history syncer,1,processing)

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

## FILES

*/usr/local/etc/zabbix\_proxy.conf*

Default location of Zabbix proxy configuration file (if not modified during compile time).

## SEE ALSO

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agentd**(8), **zabbix\_get**(1), **zabbix\_sender**(1), **zabbix\_server**(8), **zabbix\_js**(1), **zabbix\_agent2**(8)

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## zabbix\_sender

Section: User Commands (1)

Updated: 2021-06-01

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## NAME

zabbix\_sender - Zabbix sender utility

## SYNOPSIS

```
zabbix_sender [-v] -z server [-p port] [-I IP-address] [-t timeout] -s host -k key -o value
zabbix_sender [-v] -z server [-p port] [-I IP-address] [-t timeout] [-s host] [-T] [-N] [-r] -i input-file
zabbix_sender [-v] -c config-file [-z server] [-p port] [-I IP-address] [-t timeout] [-s host] -k key -o value
zabbix_sender [-v] -c config-file [-z server] [-p port] [-I IP-address] [-t timeout] [-s host] [-T] [-N] [-r] -i input-file
zabbix_sender [-v] -z server [-p port] [-I IP-address] [-t timeout] -s host --tls-connect cert --tls-ca-file CA-file [--tls-crl-file CRL-file] [--tls-server-cert-issuer cert-issuer] [--tls-server-cert-subject cert-subject] --tls-cert-file cert-file --tls-key-file key-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] -k key -o value
zabbix_sender [-v] -z server [-p port] [-I IP-address] [-t timeout] [-s host] --tls-connect cert --tls-ca-file CA-file [--tls-crl-file CRL-file] [--tls-server-cert-issuer cert-issuer] [--tls-server-cert-subject cert-subject] --tls-cert-file cert-file --tls-key-file key-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] [-T] [-N] [-r] -i input-file
zabbix_sender [-v] -c config-file [-z server] [-p port] [-I IP-address] [-t timeout] [-s host] --tls-connect cert --tls-ca-file CA-file [--tls-crl-file CRL-file] [--tls-server-cert-issuer cert-issuer] [--tls-server-cert-subject cert-subject] --tls-cert-file cert-file --tls-key-file key-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] -k key -o value
zabbix_sender [-v] -c config-file [-z server] [-p port] [-I IP-address] [-t timeout] [-s host] --tls-connect cert --tls-ca-file CA-file [--tls-crl-file CRL-file] [--tls-server-cert-issuer cert-issuer] [--tls-server-cert-subject cert-subject] --tls-cert-file cert-file --tls-key-file key-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] [-T] [-N] [-r] -i input-file
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zabbix_sender [-v] -z server [-p port] [-I IP-address] [-t timeout] [-s host] --tls-connect psk --tls-psk-identity PSK-identity --tls-psk-file PSK-file [--tls-cipher13 cipher-string] [--tls-cipher cipher-string] [-T] [-N] [-r] -i input-file
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zabbix_sender -h
zabbix_sender -V
```

## DESCRIPTION

**zabbix\_sender** is a command line utility for sending monitoring data to Zabbix server or proxy. On the Zabbix server an item of type **Zabbix trapper** should be created with corresponding key. Note that incoming values will only be accepted from hosts specified in **Allowed hosts** field for this item.

## OPTIONS

**-c, --config** *config-file*

Use *config-file*. **Zabbix sender** reads server details from the agentd configuration file. By default **Zabbix sender** does not read any configuration file. Only parameters **Hostname**, **ServerActive**, **SourceIP**, **TLSCConnect**, **TLSCAFile**, **TLSCRLFile**, **TLSServerCertIssuer**, **TLSServerCertSubject**, **TLSCertFile**, **TLSKeyFile**, **TLSPSKIdentity** and **TLSPSKFile** are supported. Hostname defined through **Hostnameltem** parameter will not be picked up, in this case the hostname should be specified via command line (see **-s** option). All addresses defined in the agent **ServerActive** configuration parameter are used for sending data. If sending of batch data fails to one address, the following batches are not sent to this address.

**-z, --zabbix-server** *server*

Hostname or IP address of Zabbix server. If a host is monitored by a proxy, proxy hostname or IP address should be used instead. When used together with **--config**, overrides the entries of **ServerActive** parameter specified in agentd configuration file.

**-p, --port** *port*

Specify port number of Zabbix server trapper running on the server. Default is 10051. When used together with **--config**, overrides the port entries of **ServerActive** parameter specified in agentd configuration file.

**-I, --source-address** *IP-address*

Specify source IP address. When used together with **--config**, overrides **SourceIP** parameter specified in agentd configuration file.

**-t, --timeout** *seconds*

Specify timeout. Valid range: 1-300 seconds (default: 60)

**-s, --host** *host*

Specify host name the item belongs to (as registered in Zabbix frontend). Host IP address and DNS name will not work. When used together with **--config**, overrides **Hostname** parameter specified in agentd configuration file.

**-k, --key** *key*

Specify item key to send value to.

**-o, --value** *value*

Specify item value.

**-i, --input-file** *input-file*

Load values from input file. Specify - as **<input-file>** to read values from standard input. Each line of file contains whitespace delimited: **<hostname> <key> <value>**. Each value must be specified on its own line. Each line must contain 3 whitespace delimited entries: **<hostname> <key> <value>**, where "hostname" is the name of monitored host as registered in Zabbix frontend, "key" is target item key and "value" - the value to send. Specify - as **<hostname>** to use hostname from agent configuration file or from **--host** argument.

An example of a line of an input file:

**"Linux DB3" db.connections 43**

The value type must be correctly set in item configuration of Zabbix frontend. Zabbix sender will send up to 250 values in one connection. **Size limit** for sending values from an input file depends on the size described in Zabbix communication protocol. Contents of the input file must be in the UTF-8 encoding. All values from the input file are sent in a sequential order top-down. Entries must be formatted using the following rules:

- Quoted and non-quoted entries are supported.
- Double-quote is the quoting character.
- Entries with whitespace must be quoted.
- Double-quote and backslash characters inside quoted entry must be escaped with a backslash.
- Escaping is not supported in non-quoted entries.
- Linefeed escape sequences (\n) are supported in quoted strings.
- Linefeed escape sequences are trimmed from the end of an entry.

**-T, --with-timestamps**

This option can be only used with **--input-file** option.

Each line of the input file must contain 4 whitespace delimited entries: **<hostname> <key> <timestamp> <value>**. Timestamp should be specified in Unix timestamp format. If target item has triggers referencing it, all timestamps must be in an increasing order, otherwise event calculation will not be correct.

An example of a line of the input file:

**"Linux DB3" db.connections 1429533600 43**

For more details please see option **--input-file**.

If a timestamped value is sent for a host that is in a "no data" maintenance type then this value will be dropped; however, it is possible to send a timestamped value in for an expired maintenance period and it will be accepted.

**-N, --with-ns**

This option can be only used with **--with-timestamps** option.

Each line of the input file must contain 5 whitespace delimited entries: **<hostname> <key> <timestamp> <ns> <value>**.

An example of a line of the input file:

**"Linux DB3" db.connections 1429533600 7402561 43**

For more details please see option **--input-file**.

**-r, --real-time**

Send values one by one as soon as they are received. This can be used when reading from standard input.

**--tls-connect** *value*

How to connect to server or proxy. Values:

**unencrypted**

connect without encryption (default)

**psk**

connect using TLS and a pre-shared key

## **cert**

connect using TLS and a certificate

**--tls-ca-file** *CA-file*

Full pathname of a file containing the top-level CA(s) certificates for peer certificate verification.

**--tls-crl-file** *CRL-file*

Full pathname of a file containing revoked certificates.

**--tls-server-cert-issuer** *cert-issuer*

Allowed server certificate issuer.

**--tls-server-cert-subject** *cert-subject*

Allowed server certificate subject.

**--tls-cert-file** *cert-file*

Full pathname of a file containing the certificate or certificate chain.

**--tls-key-file** *key-file*

Full pathname of a file containing the private key.

**--tls-psk-identity** *PSK-identity*

PSK-identity string.

**--tls-psk-file** *PSK-file*

Full pathname of a file containing the pre-shared key.

**--tls-cipher13** *cipher-string*

Cipher string for OpenSSL 1.1.1 or newer for TLS 1.3. Override the default ciphersuite selection criteria. This option is not available if OpenSSL version is less than 1.1.1.

**--tls-cipher** *cipher-string*

GnuTLS priority string (for TLS 1.2 and up) or OpenSSL cipher string (only for TLS 1.2). Override the default ciphersuite selection criteria.

**-v, --verbose**

Verbose mode, **-vv** for more details.

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

## **EXIT STATUS**

The exit status is 0 if the values were sent and all of them were successfully processed by server. If data was sent, but processing of at least one of the values failed, the exit status is 2. If data sending failed, the exit status is 1.

## **EXAMPLES**

**zabbix\_sender -c /etc/zabbix/zabbix\_agentd.conf -k mysql.queries -o 342.45**

Send **342.45** as the value for **mysql.queries** item of monitored host. Use monitored host and Zabbix server defined in agent configuration file.

**zabbix\_sender -c /etc/zabbix/zabbix\_agentd.conf -s "Monitored Host" -k mysql.queries -o 342.45**

Send **342.45** as the value for **mysql.queries** item of **Monitored Host** host using Zabbix server defined in agent configuration file.

**zabbix\_sender -z 192.168.1.113 -i data\_values.txt**

Send values from file **data\_values.txt** to Zabbix server with IP **192.168.1.113**. Host names and keys are defined in the file.

```
echo "- hw.serial.number 1287872261 SQ4321ASDF" | zabbix_sender -c /usr/local/etc/zabbix_agentd.conf -T -i -
```

Send a timestamped value from the commandline to Zabbix server, specified in the agent configuration file. Dash in the input data indicates that hostname also should be used from the same configuration file.

```
echo "'Zabbix server' trapper.item ''" | zabbix_sender -z 192.168.1.113 -p 10000 -i -
```

Send empty value of an item to the Zabbix server with IP address **192.168.1.113** on port **10000** from the commandline. Empty values must be indicated by empty double quotes.

```
zabbix_sender -z 192.168.1.113 -s "Monitored Host" -k mysql.queries -o 342.45 --tls-connect cert --tls-ca-file /home/zabbix/zabbix_ca_file --tls-cert-file /home/zabbix/zabbix_agentd.crt --tls-key-file /home/zabbix/zabbix_agentd.key
```

Send **342.45** as the value for **mysql.queries** item in **Monitored Host** host to server with IP **192.168.1.113** using TLS with certificate.

```
zabbix_sender -z 192.168.1.113 -s "Monitored Host" -k mysql.queries -o 342.45 --tls-connect psk --tls-psk-identity "PSK ID Zabbix agentd" --tls-psk-file /home/zabbix/zabbix_agentd.psk
```

Send **342.45** as the value for **mysql.queries** item in **Monitored Host** host to server with IP **192.168.1.113** using TLS with pre-shared key (PSK).

## SEE ALSO

Documentation <https://www.zabbix.com/manuals>

[zabbix\\_agentd\(8\)](#), [zabbix\\_get\(1\)](#), [zabbix\\_proxy\(8\)](#), [zabbix\\_server\(8\)](#), [zabbix\\_js\(1\)](#), [zabbix\\_agent2\(8\)](#), [zabbix\\_web\\_service\(8\)](#)

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## zabbix\_server

Section: Maintenance Commands (8)

Updated: 2020-09-04

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## NAME

zabbix\_server - Zabbix server daemon

## SYNOPSIS

```
zabbix_server [-c config-file]  
zabbix_server [-c config-file] -R runtime-option  
zabbix_server -h  
zabbix_server -V
```

## DESCRIPTION

**zabbix\_server** is the core daemon of Zabbix software.

## OPTIONS

**-c, --config** *config-file*

Use the alternate *config-file* instead of the default one.

**-f, --foreground**

Run Zabbix server in foreground.

**-R, --runtime-control** *runtime-option*

Perform administrative functions according to *runtime-option*.

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

Examples of running Zabbix server with command line parameters:

```
zabbix_server -c /usr/local/etc/zabbix_server.conf  
zabbix_server --help  
zabbix_server -V
```

## RUNTIME CONTROL

Runtime control options:

### **config\_cache\_reload**

Reload configuration cache. Ignored if cache is being currently loaded. Default configuration file (unless **-c** option is specified) will be used to find PID file and signal will be sent to process, listed in PID file.

### **snmp\_cache\_reload**

Reload SNMP cache, clear the SNMP properties (engine time, engine boots, engine id, credentials) for all hosts.

### **housekeeper\_execute**

Execute the housekeeper. Ignored if housekeeper is being currently executed.

### **trigger\_housekeeper\_execute**

Execute the trigger housekeeper (remove problems for deleted triggers). Ignored if trigger housekeeper for services is being currently executed.

### **diaginfo**[=*section*]

Log internal diagnostic information of the specified section. Section can be *historycache*, *preprocessing*, *alerting*, *lld*, *valuecache*, *locks*. By default diagnostic information of all sections is logged.

### **ha\_status**

Log high availability (HA) cluster status.

### **ha\_remove\_node**[=*target*]

Remove the high availability (HA) node specified by its name or ID. Note that active/standby nodes cannot be removed.

### **ha\_set\_failover\_delay**[=*delay*]

Set high availability (HA) failover delay. Time suffixes are supported, e.g. 10s, 1m.

### **secrets\_reload**

Reload secrets from Vault.

### **service\_cache\_reload**

Reload the service manager cache.

**prof\_enable**[=*target*]

Enable profiling. Affects all processes if target is not specified. Enabled profiling provides details of all rwlocks/mutexes by function name. Supported since Zabbix 6.0.13.

**prof\_disable**[=*target*]

Disable profiling. Affects all processes if target is not specified. Supported since Zabbix 6.0.13.

**log\_level\_increase**[=*target*]

Increase log level, affects all processes if target is not specified

**log\_level\_decrease**[=*target*]

Decrease log level, affects all processes if target is not specified

Log level control targets

*process-type*

All processes of specified type (alerter, alert manager, configuration syncer, discoverer, escalator, ha manager, history syncer, housekeeper, http poller, icmp pinger, ipmi manager, ipmi poller, java poller, lld manager, lld worker, poller, preprocessing manager, preprocessing worker, proxy poller, self-monitoring, snmp trapper, task manager, timer, trapper, unreachable poller, vmware collector, history poller, availability manager, service manager, odbc poller)

*process-type,N*

Process type and number (e.g., poller,3)

*pid*

Process identifier, up to 65535. For larger values specify target as "process-type,N"

Profiling control targets

*process-type*

All processes of specified type (alerter, alert manager, configuration syncer, discoverer, escalator, history syncer, housekeeper, http poller, icmp pinger, ipmi manager, ipmi poller, java poller, lld manager, lld worker, poller, preprocessing manager, preprocessing worker, proxy poller, self-monitoring, snmp trapper, task manager, timer, trapper, unreachable poller, vmware collector, history poller, availability manager, service manager, odbc poller)

*process-type,N*

Process type and number (e.g., history syncer,1)

*pid*

Process identifier, up to 65535. For larger values specify target as "process-type,N"

*scope*

Profiling scope (rwlock, mutex, processing) can be used with process type (e.g., history syncer,1,processing)

## FILES

*/usr/local/etc/zabbix\_server.conf*

Default location of Zabbix server configuration file (if not modified during compile time).

## SEE ALSO

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agentd**(8), **zabbix\_get**(1), **zabbix\_proxy**(8), **zabbix\_sender**(1), **zabbix\_js**(1), **zabbix\_agent2**(8)

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## zabbix\_web\_service

Section: Maintenance Commands (8)

Updated: 2019-01-29

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### NAME

zabbix\_web\_service - Zabbix web service

### SYNOPSIS

**zabbix\_web\_service** [-c *config-file*]

**zabbix\_web\_service -h**

**zabbix\_web\_service -V**

### DESCRIPTION

**zabbix\_web\_service** is an application for providing web services to Zabbix components.

### OPTIONS

**-c, --config** *config-file*

Use the alternate *config-file* instead of the default one.

**-h, --help**

Display this help and exit.

**-V, --version**

Output version information and exit.

### FILES

*/usr/local/etc/zabbix\_web\_service.conf*

Default location of Zabbix web service configuration file (if not modified during compile time).

### SEE ALSO

Documentation <https://www.zabbix.com/manuals>

**zabbix\_agentd**(8), **zabbix\_get**(1), **zabbix\_proxy**(8), **zabbix\_sender**(1), **zabbix\_server**(8), **zabbix\_js**(1), **zabbix\_agent2**(8)

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