

# 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 4.1.

## 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](#).

To support datastore capacity metrics Zabbix requires VMware configuration `vpxd.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.

The screenshot shows the configuration for a discovery rule named "Discover VMware hypervisors". The rule is of type "Simple check" and uses the key `vmware.hv.discovery[{$URL}]`. It includes fields for user name and password, an update interval of 3600 seconds, and a keep lost resources period of 30 days. A custom interval table is also present, showing a "Flexible Scheduling" interval of 50 seconds with a period of 1-7,00:00. The rule is enabled.

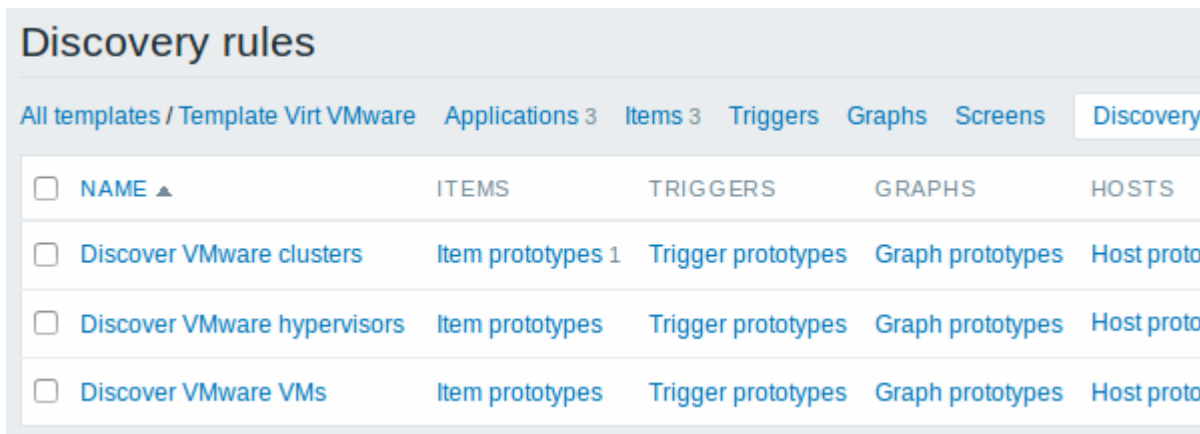
TYPE	INTERVAL	PERIOD
Flexible Scheduling	50	1-7,00:00

All mandatory input fields are marked with a red asterisk.

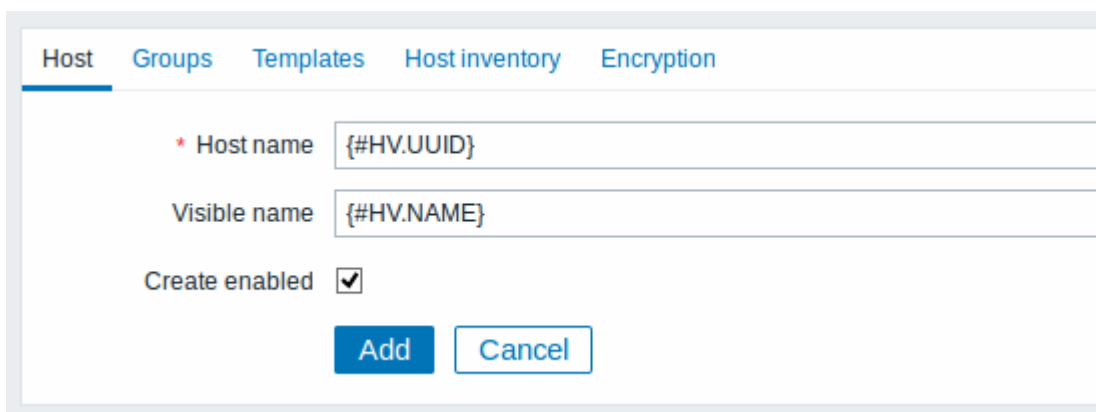
Discovery rule key in the above screenshot is `vmware.hv.discovery[{$URL}]`.

## Host prototypes

Host prototypes can be created with the low-level discovery rule. When virtual machines are discovered, these prototypes become real hosts. Prototypes, before becoming discovered, cannot have their own items and triggers, other than those from the linked templates. Discovered hosts will belong to an existing host and will take the IP of the existing host for the host configuration.



In a host prototype configuration, LLD macros are used for the host name, visible name and host group prototype fields. Linkage to existing host groups, template linkage and encryption are other options that can be set.



If *Create enabled* is checked, the host will be added in an enabled state. If unchecked, the host will be added, but in disabled state.

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. Discovered hosts cannot have host prototypes of their own.

## 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.

Note that “*Template Virt VMware*” template should be used for VMware vCenter and ESX hypervisor monitoring. The “*Template Virt VMware Hypervisor*” and “*Template Virt VMware Guest*” templates are used by discovery and normally should not be manually linked to a host.

Templates						
<input type="checkbox"/> TEMPLATES ▼	APPLICATIONS	ITEMS	TRIGGERS	GRAPHS	SCREENS	DISCOVERIES
<input type="checkbox"/> Template Virt VMware Hypervisor	Applications 6	Items 19	Triggers	Graphs	Screens	Discoveries
<input type="checkbox"/> Template Virt VMware Guest	Applications 8	Items 17	Triggers	Graphs	Screens	Discoveries
<input type="checkbox"/> Template Virt VMware	Applications 3	Items 3	Triggers	Graphs	Screens	Discoveries

If your server has been upgraded from a pre-2.2 version and has no such templates, you can import them manually, downloading from the community page with [official templates](#). However, these templates have dependencies from the *VMware VirtualMachinePowerState* and *VMware status* value maps, so it is necessary to create these value maps first (using an [SQL script](#), manually or importing from an XML) before importing the templates.

### Host configuration

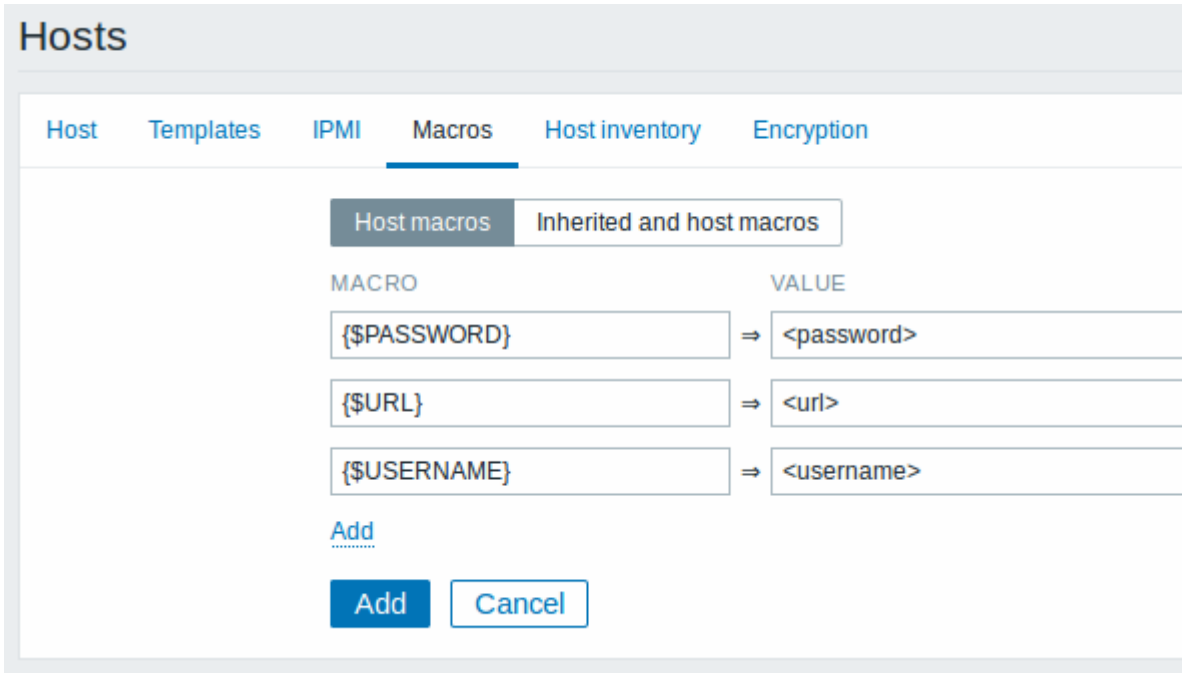
To use VMware simple checks the host must have the following user macros defined:

- **{ \$URL }** - VMware service (vCenter or ESX hypervisor) SDK URL (<https://servername/sdk>)
- **{ \$USERNAME }** - VMware service user name
- **{ \$PASSWORD }** - VMware service { \$USERNAME } user password

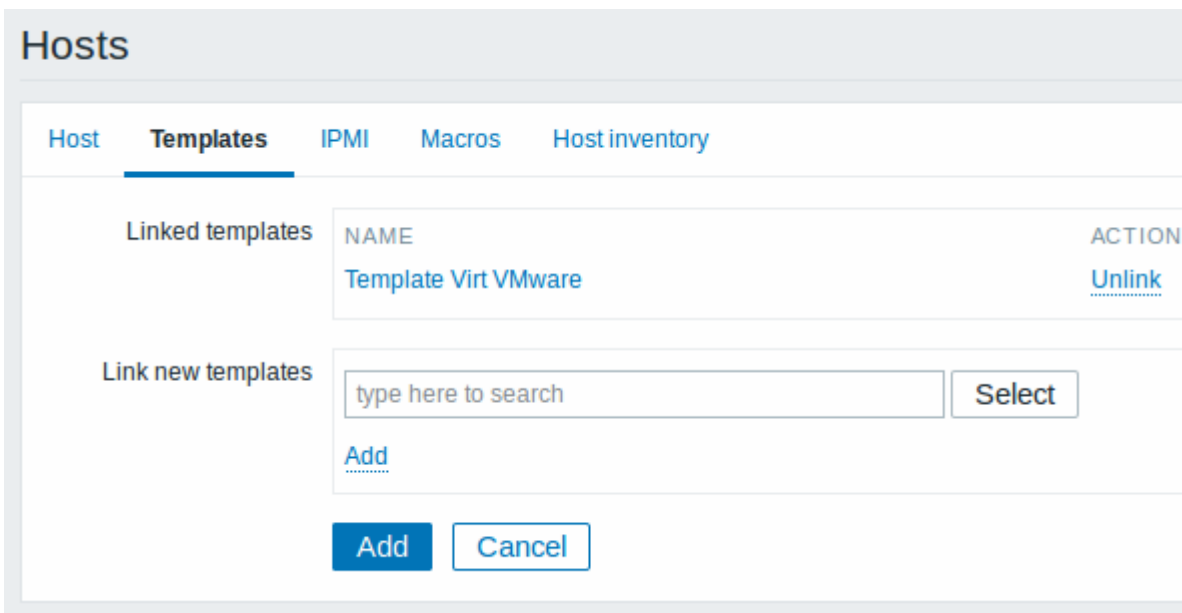
### Example

The following example demonstrates how to quickly setup VMware monitoring on Zabbix:

- compile zabbix server with required options (`--with-libxml2` and `--with-libcurl`)
- set the `StartVMwareCollectors` option in Zabbix server configuration file to 1 or more
- create a new host
- set the host macros required for VMware authentication:



- Link the host to the VMware service template:



- 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:
shell> zabbix_server -R log_level_increase="vmware collector"
```

```
Increase log level of second vmware collector:
```

```
shell> 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.

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