

VMware vCenter Operations Manager Enterprise Adapter Guide

vCenter Operations Manager Enterprise 1.0

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VMware vCenter Operations Manager Enterprise Adapter Guide

The *VMware vCenter Operations Manager Enterprise Adapter Guide* provides information about how vCenter Operations Manager Enterprise uses adapters to consume data from the enterprise. It also provides a summary of the currently available adapters.

Intended Audience

This information is intended for anyone who wants to install and configure adapters for vCenter Operations Manager Enterprise.

Updated Information

The *VMware vCenter Operations Manager Enterprise Adapter Guide* is updated with each release of the product or when necessary.

This table provides the update history of the *VMware vCenter Operations Manager Enterprise Adapter Guide*.

Revision	Description
EN-000930-01	Provided more detailed instructions in "Install an Adapter in vCenter Operations Manager Enterprise Standalone," on page 13 and "Install an Adapter in a vCenter Operations Manager Enterprise vApp," on page 14.
EN-000930-00	Initial release.

Understanding Adapters

A key feature of vCenter Operations Manager Enterprise is its ability to consume data from across the enterprise. vCenter Operations Manager Enterprise uses adapters to collect data from a variety of data sources, including specific third-party products.

This chapter includes the following topics:

- [“How Adapters Collect and Process Data,”](#) on page 9
- [“Types of Data that Adapters Collect,”](#) on page 10
- [“Adapter Architecture,”](#) on page 11

How Adapters Collect and Process Data

Adapters work with the vCenter Operations Manager Enterprise Collector to collect and process data.

The Collector acts as a gateway between vCenter Operations Manager Enterprise and its adapters. The adapters connect to and collect data from data sources, transform the data into a format that vCenter Operations Manager Enterprise can consume, and pass the data to the Collector for final processing.

Depending on the data source and the adapter implementation, an adapter might collect data by making API calls, using a command-line interface, or sending database queries. Some adapters collect data for each resource independently and other adapters extract data for all resources based on a specified time range.

vCenter Operations Manager Enterprise uses embedded adapters and external adapters. Embedded adapters are the most common type of adapter implementation.

Embedded Adapters

An embedded adapter is a Java component that runs as a plug-in in the Collector. Embedded adapters actively connect to a data source and pull values from it.

Advantages of embedded adapters include better maintainability, control, and visibility into the management of the adapter and the data that it collects. Embedded adapters also use common functions, such as job scheduling, that are already part of the Collector.

Embedded adapters create resources through manual or auto-discovery. A particular embedded adapter might support one or both resource creation methods.

Manual discovery You send a request to the data source to return all available resources and select the resources to add. This method is often referred to as discovering resources or the discovery process.

Auto-discovery The data collection process discovers new resources and creates the resources for you. You do not need to manually add new resources.

You configure and manage embedded adapters in the user interface.

External Adapters

External adapters push data from outside sources. The key advantage of an external adapter is flexibility in how the adapter is created and deployed.

External adapters use vCenter Operations Manager OpenAPI to send information. OpenAPI has a simple form, which accepts data through an HTTP request, and an advanced form, which uses Java RMI.

External adapters use auto-discovery to create resources. With auto-discovery, the data collection process discovers new resources and creates the resources for you. You do not need to manually add new resources.

You configure and manage external adapters outside of the user interface.

Types of Data that Adapters Collect

Adapters typically collect metrics, resource relationships, and change events from an external data source. Not all adapters can collect all types of data.

- A metric is an instance of an attribute for a particular resource. For each metric, vCenter Operations Manager Enterprise collects and stores multiple instances over time. Each piece of data is called a metric observation or value.
- Resource relationships describe how resources are related to each other. For example, one resource might be a child resource and another resource might be a parent resource.
- A change event is any change to the environment, such as a system reboot.

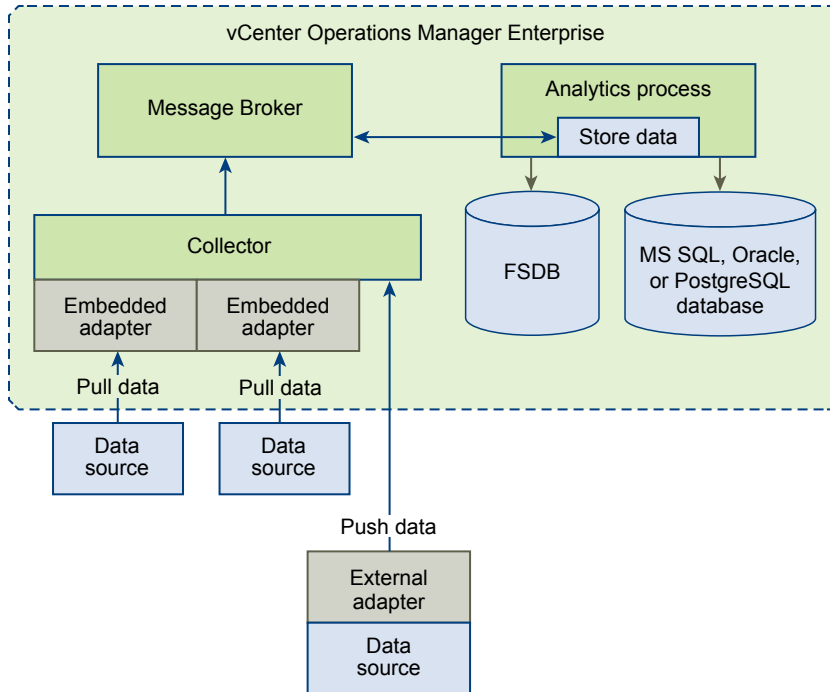
vCenter Operations Manager Enterprise stores metrics in the File System Database (FSDB).

vCenter Operations Manager Enterprise Standalone can store change events in a Microsoft SQL or Oracle database. The vCenter Operations Manager Enterprise vApp stores change events in a PostgreSQL database.

Adapter Architecture

Adapters work with certain vCenter Operations Manager Enterprise components to collect, process, and store collected data.

Figure 1-1. Adapter Architecture



Collector

Acts as a gateway between vCenter Operations Manager Enterprise and its adapters. Adapters pass collected data to the Collector for final processing.

In vCenter Operations Manager Enterprise Standalone, the Collector is installed in the primary server by default. In a vApp installation, the Collector runs on the Analytics virtual machine. You can also install collectors on one or more remote servers.

Message Broker

Passes metric information between vCenter Operations Manager Enterprise components.

Analytics process

Receives data gathered from monitored resources, analyzes the data, and creates statistical models to detect abnormal behavior.

vCenter Operations Manager Enterprise stores metrics in the FSDB. The standalone version can store change events in a Microsoft SQL or Oracle database. The vApp version stores change events in a PostgreSQL database.

Installing and Configuring Adapters

You install an adapter in vCenter Operations Manager Enterprise from a TAR file or PAK file, depending on whether you have a standalone or vApp installation. You must configure an adapter instance for embedded adapters. Most adapters also include configuration files that you can modify to tune adapter operation.

This chapter includes the following topics:

- “Install an Adapter in vCenter Operations Manager Enterprise Standalone,” on page 13
- “Install an Adapter in a vCenter Operations Manager Enterprise vApp,” on page 14
- “Add an Adapter Instance,” on page 15
- “Modifying Adapter Configuration Files,” on page 16

Install an Adapter in vCenter Operations Manager Enterprise Standalone

If you have a standalone installation, you install an adapter by extracting the adapter installation files from a TGZ file and running an installation utility. The installation utility places the adapter files in a folder under the `vcenter-ops/user/plugins/inbound` folder.

Prerequisites

- Download the adapter installation TGZ file. You can download most adapter installation files anonymously from <ftp://ftp.integrien.com/>. Work with VMware Global Support Services (GSS) to obtain adapter installation files that are not available on the FTP site.
- Make a note of the build number in the TGZ file. The build number appears after the adapter name, for example, `adaptername-buildnumber.tgz`.
- Read the adapter installation guide and release notes. The adapter documentation is included with the TGZ file on the FTP site.

Procedure

- 1 Open the TGZ file and extract the TAR file to a temporary folder on your vCenter Operations Manager Enterprise server.
- 2 In the temporary folder, open the TAR file and extract and run the installer for your operating system platform.
- 3 Log in to the Custom user interface as an administrator.
- 4 Select **Admin > Support**.

- 5 On the **Info** tab, find the Adapters Info pane and click the **Describe** icon (🔍).
The **Describe** icon is located at the top right of the Adapters Info pane.
- 6 Click **Yes** to start the describe process and click **OK**.
The Custom user interface finds the adapter files, gathers information about the abilities of the adapter, and updates the user interface with information about the adapter. If you have remote collectors, it installs the adapter on the remote collectors.
The describe process might take several minutes. When the describe process is finished, the adapter appears in the Adapters Info pane. The build number is in the Adapter Version column.
- 7 Verify that the build number in the Adapter Version column for the adapter matches the build number in the TGZ file that you downloaded.

Install an Adapter in a vCenter Operations Manager Enterprise vApp

If you have a vApp installation, you install an adapter from a PAK file. The installation process places the adapter files in a folder under the *vcenter-ops/user/plugins/inbound* folder.

Prerequisites

- Download the adapter installation PAK file. You can download most adapter installation files anonymously from <ftp://ftp.integrien.com/>. Work with VMware Global Support Services (GSS) to obtain adapter installation files that are not available on the FTP site.
- Make a note of the build number in the PAK file name. The build number appears after the adapter name, for example, *adaptername-buildnumber.pak*.
- Read the adapter installation guide and release notes. The adapter documentation is included with the PAK file on the FTP site.

Procedure

- 1 Save the PAK file in a temporary folder.
- 2 Log in to the Admin user interface as the admin user.
For example: `https://ipaddress/admin/`
- 3 On the **Update** tab, click **Browse** to locate the temporary folder and select the PAK file.
- 4 Click **Update** and click **OK** to confirm the update.
The Admin user interface uploads the PAK file. The upload might take several minutes.
- 5 Read and accept the EULA and click **OK**.
- 6 Click **OK** to confirm and start the update process.
The update might take several minutes. Status information appears on the **Update** tab when the update is finished.
- 7 Log in to the Custom user interface as an administrator.
For example: `https://ipaddress/vcops-custom/`
- 8 Select **Admin > Support**.
- 9 On the **Info** tab, find the Adapters Info pane and click the **Describe** icon (🔍).
The **Describe** icon is located at the top right of the Adapters Info pane.

- 10 Click **Yes** to start the describe process and click **OK**.

The Custom user interface finds the adapter files, gathers information about the abilities of the adapter, and updates the user interface with information about the adapter.

The describe process might take several minutes. When the describe process is finished, the adapter appears in the Adapters Info pane. The build number is in the Adapter Version column.

- 11 Verify that the build number in the Adapter Version column for the adapter matches the build number in the PAK file that you uploaded.

Add an Adapter Instance

An adapter instance defines the adapter type and specifies information that the adapter needs to access its data source. You define adapter instances only for embedded adapters.

Prerequisites

- Install the adapter.
- For configuration requirements, see the documentation provided with the adapter package.

Procedure

- 1 Log in to vCenter Operations Manager Enterprise as an administrator.
- 2 Select **Environment > Configuration > Adapter Instances**.
- 3 Select the collector to use from the **Collector** drop-down menu.

Unless you added additional collectors, the only available collector is **vCenter Operations Server**. You can change the name of this collector when you install the standalone version.

- 4 Select the adapter kind to add from the **Adapter kind** drop-down menu.
- 5 Click the **Add New Adapter Instance** icon.
- 6 Type a name for the adapter in the **Adapter Instance Name** text box.
- 7 Type or select additional information for the adapter instance.

The exact information depends on the adapter type. For example, if the adapter collects data from text files, you must specify the location of the folder that contains the text files. If the adapter connects to an external system, you must add credentials to access the external system.

- 8 (Optional) Click **Test** to test the adapter instance.
- 9 Click **OK** to save your configuration.

What to do next

Depending on the adapter type, you might need to start data collection for the adapter instance resource or manually discover resources. For specific instructions, see the documentation provided with the adapter package.

Modifying Adapter Configuration Files

Most adapters have one or more configuration files. Adapter configuration files typically contain advanced configuration properties that you can modify to tune adapter operation.

For example, the EMC Symmetrix adapter has instance-specific configuration files that contain properties that affect particular adapter instances and an adapter-level configuration file that contains properties that affect all adapter instances.

For complete information about configuring a particular adapter, see the documentation included with the adapter package.

Troubleshooting Adapters

Known troubleshooting information can help you diagnose and correct problems with an adapter instance. You can view detailed collection information for an adapter instance on the Environment Overview page. The collector and adapter log files also contain valuable information about adapter instance operation.

This chapter includes the following topics:

- [“General Troubleshooting Steps,”](#) on page 17
- [“View Collection Information,”](#) on page 17
- [“Viewing System Log Files,”](#) on page 19

General Troubleshooting Steps

Perform these general troubleshooting steps to diagnose and correct problems with an adapter instance.

- 1 If the adapter instance connects to an external system, verify that the external system is up and running and that you can log in to it with the credentials that you configured for the adapter instance.
- 2 If the adapter instance collects data from text files, verify that the adapter instance can access the folder that contains the text files.
- 3 View collection information for the adapter instance resource on the Environment Overview page. See [“View Collection Information,”](#) on page 17.
- 4 Check the adapter and Collector log files for errors. See [“Viewing System Log Files,”](#) on page 19.

For troubleshooting tips for a specific adapter type, see the documentation included with the adapter package.

View Collection Information

You can view collection state and status information for a resource on the Environment Overview page in vCenter Operations Manager Enterprise. This information can help you diagnose and troubleshoot adapter problems.

If vCenter Operations Manager Enterprise collects metrics for a resource through more than one adapter instance, the resource has multiple collection state and collection status values.

Prerequisites

Become familiar with the adapter collection states and status values. See [“Collection States,”](#) on page 18 and [“Collection Status Values,”](#) on page 18.

Procedure

- 1 Log in to vCenter Operations Manager Enterprise as an administrator.

- 2 Select **Environment > Environment Overview**.
- 3 Find the resource on the **List** tab.
- 4 Point to the icon in the **Collection State** column to see whether vCenter Operations Manager Enterprise should be collecting data for the resource.

The collection state appears in a pop-up window.

- 5 Point to the icon in the **Collection Status** column to see whether vCenter Operations Manager Enterprise is receiving data for the resource.

The collection status value appears in a pop-up window. A collection status value appears only if the collection state is Collecting.

Some adapters write customized status messages. These messages typically provide more information about data collection problems.

Collection States

The resource collection state indicates whether vCenter Operations Manager should be collecting data for the resource.

The resource collection state appears in a pop-up window when you point to an icon in the Collection State column in the resource list on the Environment Overview page. If vCenter Operations Manager collects data for a resource through more than one adapter instance, a separate icon appears for each adapter instance.

Table 3-1. Collection States

State	Description
Collecting	Resource is set to collect data.
Not Collecting	Resource is set to not collect data.
Starting	Collection is starting.
Stopping	Collection is stopping.
Updating	Resource is being updated.
Failed	Resource configuration problem.
In Maintenance	Resource is in scheduled maintenance.
In Maintenance (Manual)	Resource is in manual maintenance.
Removing	Resource is being deleted.

Collection Status Values

The collection status value for a resource indicates whether vCenter Operations Manager is receiving data for the resource. Collection status values appear in a pop-up window when you point to an icon in the Collection Status column in the resource list on the Environment Overview page.

If vCenter Operations Manager collects metrics for a resource through more than one adapter instance, a separate icon appears for each adapter instance in the Collection Status column.

A resource has a status value only if its collection state is Collecting. For information about collection states, see [“Collection States,”](#) on page 18.

Table 3-2. Collection Status Values

Status	Description
Data Receiving	vCenter Operations Manager is receiving data for the resource.
Old Data Receiving	Data is not current. The most recent value is at least five monitoring cycles old.

Table 3-2. Collection Status Values (Continued)

Status	Description
No Data Receiving	Adapter instance is collecting data, but vCenter Operations Manager has not received data for the resource.
None	vCenter Operations Manager or collection was recently started and no data has been received for five monitoring cycles.
Error	An error occurred when vCenter Operations Manager attempted to collect data for the resource.
Unknown	Status of the resource is not known because the adapter instance cannot connect to the resource.
Resource Down	Resource is not operational.
No parent resource monitoring	Adapter instance resource is stopped.
Collection down	Collector or adapter instance is not operational.

NOTE Some adapter instances write customized status and messages. These messages typically provide more information about data collection problems.

Viewing System Log Files

vCenter Operations Manager Enterprise logs adapter errors in the adapter and Collector log files. You can view these log files in the vCenter Operations Manager Enterprise user interface or in an external log viewer.

View Collector and Adapter Log Files

You can view Collector and adapter log files in the vCenter Operations Manager Enterprise user interface. Log files are organized in log type folders.

Procedure

- 1 Select **Admin > Support** and click the **Logs** tab.

The log type folders appear in the Logs pane. Each installed Collector has a separate log type folder, which contains subfolders for each adapter. Each adapter folder contains a subfolder for each adapter instance. The instance folders contain the instance log files.

- 2 Perform these steps to view log files.

- a Double-click a folder to view the contents of the log files in that folder.
- b Double-click a log file to view the contents of the log file.
- c Type line numbers in the **Line Position** and **Row Limit** text boxes to view a specific part of the log file.

The line position value determines the starting line and the row limit value determines the maximum lines to show in the Log Content pane.

- 3 If the data source for any of your resources changes, click the **Recalculate Data Source** icon. vCenter Operations Manager Enterprise recalculates the data sources for all resources.
- 4 Click the **Reload Tree** icon to reload the log tree information and collapse all open log type folders.

Modify Logging Levels

You can modify logging levels for the vCenter Operations Web, vCenter Operations Analytics, and vCenter Operations Collector logs.

The available logging levels are ALL, DEBUG, ERROR, FATAL, INFO, OFF, and WARN. The logging level is set to ERROR by default. To troubleshoot problems, set the logging level to INFO. To view detailed messages, including micro steps, queries, and returned results, set the logging level to DEBUG.

NOTE If you set the logging level to DEBUG, log files can become large very quickly. Set the logging level to DEBUG only for short periods of time.

Procedure

- 1 Select **Admin > Support**.
- 2 On the **Logs** tab, select the log type folder and click the **Edit Properties** icon.

You can select vCenter Operations Web, vCenter Operations Analytics, or any vCenter Operations Collector folder.

- 3 Edit the logging level settings.

Option	Action
To set the root logging level	Select a level from the Root Logger Level drop-down menu.
To specify how long to keep log files	Type the number of days in the Maximum backup days text box.
To set the logging level for a component group	Click the component group and select a logging level from the Group Log Level drop-down menu.
To set the logging level for a specific component	Expand the component group, select the current logging level or Please Select for the component, and select a new logging level from the drop-down menu.

- 4 Click **OK** to save your configuration.

Available Adapters

Many adapters are currently available for vCenter Operations Manager Enterprise. Some adapters pull data from specific third-party products while other adapters connect to standard data sources. Certain adapters are installed by default.

For complete information about a particular adapter, see the documentation included with the adapter package.

NOTE Although this document is updated frequently, it might not describe all of the available adapters.

This chapter includes the following topics:

- [“Default Adapters,”](#) on page 21
- [“Product Adapters,”](#) on page 22
- [“Generic Adapters,”](#) on page 27
- [“Field Adapters,”](#) on page 29

Default Adapters

vCenter Operations Manager Enterprise includes several adapters by default. You do not need to manually install these adapters.

The standalone version includes the following default adapters.

Container adapter	Creates container resources.
HTTP Post adapter	Generic adapter that pushes data to vCenter Operations Manager Enterprise through HTTP.
vCenter Operations adapter	Monitors vCenter Operations Manager Enterprise. You can also use this adapter to monitor resource tags.

The vApp version includes the same default adapters as the standalone version and the following additional default adapters.

vCenter adapter	Integrates vCenter Operations Manager Enterprise and VMware vCenter Server. The vCenter adapter connects to and collects metrics and events from vCenter Server. This adapter is also referred to as the VMware adapter.
vCenter Configuration Manager (VCM) Adapter	Integrates vCenter Operations Manager Enterprise with VMware vCenter Configuration Manager. The VCM adapter collects performance data on virtual machines in your environment that vCenter Configuration Manager manages.
vCenter CapacityIQ (CIQ) adapter	Capacity analysis component of vCenter Operations Manager Enterprise. The CIQ adapter performs capacity analysis on real-time performance data and provides capacity planning information to vCenter Operations Manager Enterprise.

Product Adapters

Product adapters support specific third-party products and open source tools that are commercially available.

BMC PATROL Agent

VCOPS_PROPAGATOR is a custom Knowledge Module (KM) that is deployed on BMC PATROL agents.

The BMC PATROL KM has the following features and requirements.

- Connects to and collects data from BMC PATROL.
- Collects, filters, and transmits metrics to vCenter Operations Manager by using the HTTP Post interface.
- Collects metrics for the CPU, DISK, FILESYSTEM, MEMORY, PROCESS, SMP, and SWAP application classes.
- Uses auto-discovery to create resources.
- Supports UNIX and Windows operating system. For a complete list of the supported operating systems and versions, see the adapter documentation.
- Requires the correct VCOPS_PROPAGATOR distribution package for the UNIX or Windows operating system. VCOPS_PROPAGATOR distribution packages are available on the VMware FTP site.
- Requires adequate privileges to deploy the VCOPS_PROPAGATOR distribution package.
- Requires the vCenter Operations Manager Enterprise server location, port number, and credentials.

Compuware Gomez WS Adapter

The Gomez Web Services (WS) adapter is an embedded adapter that collects data from Gomez Backbone. Gomez Backbone is the Internet backbone measurement component of the Compuware Gomez Synthetic Monitoring system.

The Gomez WS adapter has the following features and requirements.

- Uses Web client stubs that Gomez provides to collect data from Gomez Backbone.
- Runs in real time and historical data collection modes.
- Uses manual discovery to create resources.
- Creates Gomez Site, Gomez Backbone Monitor, and Gomez Test resource kinds.
- Requires a Gomez account to connect to the Gomez service.

EMC Smarts Adapter

The EMC Smarts adapter is an embedded adapter that collects metrics, change events, and resource topology information from software and hardware resources that EMC Smarts monitors.

vCenter Operations Manager Enterprise can also send alerts to EMC Smarts.

The EMC Smarts adapter has the following features and requirements.

- Connects to an EMC broker.
- Receives resources that EMC servers monitor in domains that you select.
- Receives the topology of container resources that EMC defines and metric values for attributes that EMC Smarts monitors.
- Generates change events when EMC detects that a resource is down and anomalies when EMC detects that a resource is unresponsive.
- Sends alerts to the EMC Smarts Global Console.
- Uses auto-discovery and manual discovery to create resources.
- Requires a valid EMC Smarts user name and password, the IP address and port number of the EMC broker, and the name of an EMC Smarts domain to which to attach.
- Supports EMC Smarts 7.x and 8.1.

EMC Symmetrix Adapter

The EMC Symmetrix adapter is an embedded adapter that collects performance data for Symmetrix storage arrays.

The EMC Symmetrix adapter has the following features and requirements.

- Collects performance data from TTP-formatted ASCII files. The EMC Solutions Enabler STP daemon (`storstpd`) exports the TTP data files to a main input folder. You can configure the metrics that the `storstpd` daemon exports.
- Requires access to the main input folder.
- Requires the user account that runs the Collector to have read and write permission to the main input folder.
- Supports EMC Solutions Enabler 7.2 or later. The adapter is tested with EMC Solutions Enabler V7.3.0.1 (Edit Level: 1214).
- Requires the standalone version of EMC Solutions Enabler. The EMC Solutions Enabler virtual appliance does not support TTP data file generation.

HP BAC Adapter

The HP BAC adapter is an embedded adapter that collects data from HP Business Availability Center (BAC). HP BAC contains components for monitoring and managing business services and applications.

The HP BAC adapter has the following features and requirements.

- Reads data from HP Real User Monitor (RUM), HP Business Process Monitor (BPM), and HP SiteScope.
- Runs data collection tasks to retrieve and parse data and relationship tasks to define parent-child resource relationships.
- Uses SOAP queries to the BAC Generic Data Engine API or SQL queries to the BAC database. The adapter can also read data from a text file. You define connection information for tasks in XML configuration files.

- Requires the URL of the BAC Web Service for a SOAP connection and a JDBC URL and user credentials for an SQL connection.
- Supports HP BAC 6, 7, 8, and 9. The adapter can read data from all HP RUM, HP BPM, and HP SiteScope versions that can write to these HP BAC versions.

HP SiteScope Adapter

The HP SiteScope adapter is an embedded adapter that collects data from log files that HP SiteScope generates.

The HP SiteScope adapter has the following features and requirements.

- Collects monitor classes, including the attribute and monitor groups for each monitor class, by reading log files that HP SiteScope generates.
- Uses group (.mg) files that HP SiteScope generates to map resource names to the corresponding monitor classes.
- Creates resources when it collects metric data.
- Requires access to the HP SiteScope log files and group files folders.
- Requires the user account that runs the Collector to have read and write permission to the HP SiteScope log files and group files folders.
- Supports HP SiteScope 10.12.

IBM Tivoli Monitoring Adapter

The IBM Tivoli Monitoring (ITM) adapter is an embedded adapter that retrieves performance metrics that ITM collects.

The ITM adapter has the following features and requirements.

- Uses a SOAP Web interface to retrieve metric data from ITM.
- Uses attribute (.atr) files from the Tivoli Enterprise Monitoring Server to determine the attribute groups to retrieve. The .atr files define the information to collect from each attribute group.
- Uses the describe process to determine the types of resources to import and the set of metrics data to collect from each type of resource.
- Uses auto-discovery and manual discovery to create resources.
- Requires a username, password, an IP address, and a port number to connect to the IBM Tivoli Monitoring Server.
- Tested with IBM Tivoli Monitoring 6.2.

Microsoft SCOM Adapter

The Microsoft SCOM adapter is an embedded adapter that collects resource metrics time series, resource availability, and resource relationship data from Microsoft System Center Operations Manager databases.

The Microsoft SCOM adapter has the following features and requirements.

- Uses SQL queries to retrieve data from the source database.
- Reads resource relationship data from the relationships table in the source database.
- Creates resources that represent SCOM entities.
- Uses auto-discovery and manual discovery to create resources.
- Requires the sqljdbc_auth.dll file to be present in the vCenter Operations Manager Enterprise Java library folder.

- Requires the Collector service to run under an impersonated user account.
- Requires user credentials that allow reading the database that contains the source data, the host name or IP address of the database host, the port to connect to the database, and the host name or IP address of a failover database server.
- Supports Microsoft System Center Operations Manager 2007 and 2007 R2.

NetApp Adapter

The NetApp adapter is an embedded adapter that collects data from NetApp DFM Server. NetApp DFM Server manages NetApp objects.

The NetApp adapter has the following features and requirements.

- Collects performance data, relationship data, and change event information for NetApp storage objects.
- Imports metrics for the System, vFiler, Volume, and LUN objects.
- Creates resource kinds dynamically according to platform types and server types in NetApp DFM Server.
- Uses both auto-discovery and manual discovery to create resources.
- Requires you to configure the NetApp and DFM servers to collect metrics.
- Requires access to the DFM server. You must provide the host name or IP address of the DFM server during adapter instance configuration. Certain ports must be open on the DFM server for the adapter connection.
- Supports NetApp DFM Server 3.8, 4.0.1, and 5.0.

Oracle Enterprise Manager Adapter

The Oracle Enterprise Manager adapter is an embedded adapter that collects data from Oracle Enterprise Manager database management tables.

The Oracle Enterprise Manager adapter has the following features and requirements.

- Retrieves resource kinds. You can specify the resource kinds to collect in a configuration file. The adapter creates metrics when it retrieves resource kinds.
- Uses auto-discovery and manual discovery to create resources.
- Requires a JDBC connection to the Oracle Enterprise Manager database and a credential to sign on to the database. You must open an Oracle JDBC port on the firewall and have a valid Oracle JDBC connection URL.
- Requires the user account that the adapter uses to connect to the Oracle Enterprise Manager database to have read access to the MGMT\$AVAILABILITY, MGMT\$METRIC_CURRENT, MGMT\$METRIC_DETAILS, and MGMT\$TARGET SYSMAN database views.
- Requires the user account that the adapter uses to connect to the Oracle Enterprise Manager database to have rights to run the Discovery, Realtime Collect, Historical Collect, Availability Check, and Timezone Check queries.
- Supports Oracle Enterprise Manager 10, 11, and 12c.

TeamQuest Adapter

The TeamQuest adapter is an embedded adapter that collects data from resources that TeamQuest monitors.

The TeamQuest adapter has the following features and requirements.

- Uses the TeamQuest Harvest command-line interface (tqharvc) to collect data from local TeamQuest Manager (TQM) data stores.

- Retrieves a single dataset definition that includes Windows operating system, Solaris operating system, Oracle database, and WebSphere metrics.
- Collects data only for metrics described in the `describe.xml` file. You cannot modify the `describe.xml` file.
- Uses XML file-based manual discovery to create resources. With XML file-based manual discovery, you declare resources in an XML file and specify the path to the XML file when you perform manual discovery. You can also add resources individually.
- Requires TQM to be installed on the vCenter Operations Manager server or on a remote collector.
- Supports TQM 10.1 and 10.2.

VMware Hyperic Adapter

The VMware Hyperic adapter is an embedded adapter that collects data from Hyperic HQ.

The Hyperic adapter has the following features and requirements.

- Runs SQL queries and uses standard JDBC access to retrieve data from the Hyperic HQ database. The adapter supports MySQL, Oracle, and PostgreSQL databases.
- Collects metrics for Hyperic platforms, servers, and services.
- Creates resource kinds dynamically according to platform types and server types in Hyperic. Resources represent Hyperic platforms and servers.
- Creates relationships based on associations in Hyperic HQ.
- Uses auto-discovery and manual discovery to create resources.
- Requires port connections for the supported databases, a JDBC connection URL to connect to data sources, and privileges to run SELECT queries from the Hyperic HQ tables and views.
- Supports Hyperic HQ 4.x.

VMware vCenter Adapter

The VMware vCenter adapter is an embedded adapter that collects metrics and events from vCenter Server.

The vCenter adapter has the following features and requirements.

- Retrieves metric values, events, and relationships from vCenter Server.
- Collects statistics from Datacenter, Cluster, Resource Pools, Host, Virtual Machine, Datastore, and Folder objects.
- Collects data based on your vCenter Server privileges. The user account that you use for collecting data determines the scope and visibility of the monitoring data.
- Uses auto-discovery and manual discovery to create resources.
- Supports VMware vSphere 2.5, 3.0, 3.5, 4.0 update 2, and 4.1.

VMware vCenter Configuration Manager Adapter

The VMware vCenter Configuration Manager (VCM) adapter is an embedded adapter that collects performance data about virtual machines that VCM manages.

The VCM adapter has the following features and requirements.

- Collects system-level change events that VCM identifies and displays the events in performance charts.
- Requires you to configure the vCenter adapter before you configure the VCM adapter. vCenter Operations Manager Enterprise plots event data retrieved from the VCM adapter on resource graphs that the vCenter adapter connection generates.

- Requires VCM to be installed and configured to collect data from vCenter Server, virtual machines, and ESX hosts.
- Requires the hostname or IP address of the host where the VCM database resides, the port number for connecting to the VCM database, and database credentials to access VCM.
- Supports VCM 5.4.1 and later.

VMware vCloud Director Adapter

The VMware vCloud Director adapter is an embedded adapter that collects data for entities of VMware vCloud Director.

The vCloud Director adapter has the following features and requirements.

- Collects resource relationships and change events for Provider vDC, Organization, Organization vDC, and vApp entities. The adapter does not collect metrics.
- Uses auto-discovery to create resources. The adapter does not support manual discovery.
- Requires the vCloud Director host name and the credentials of the Administrator of the System organization. The adapter logs in to vCloud Director as Administrator of the System organization.
- Supports vCloud Director 1.5.0 and vCenter Server 4.0 U2, 4.1, and 5.0.

Generic Adapters

Generic adapters are designed to connect to standard data sources. They typically require field customization to accommodate site-specific environments.

Relationships Adapter

The Relationships adapter is an embedded adapter that updates resource relationships in vCenter Operations Manager Enterprise. The Relationships adapter does not collect data.

The Relationships adapter has the following features and requirements.

- Updates resource relationships based on information that you store in an external database. You define parent-child relationships in this database.
- Uses JDBC drivers to access the source relationships table.
- Requires a JDBC URL and user credentials that allow reading the database that contains the source relationships data.
- Supports SQL Server, Oracle, PostgreSQL, Sybase, and MySQL databases. The supported database versions depend on the version of the JDBC driver included with the adapter. You can find the JDBC driver version for each database in the `vcenter-ops/user/plugins/inbound/general_sql_adapter3/lib` folder.

SNMP Adapter

The SNMP adapter is an embedded adapter that collects metrics from devices that support the Simple Network Management Protocol (SNMP). These devices typically include routers, switches, servers, workstations, and printers.

The SNMP adapter has the following features and requirements.

- Uses Management Information Base (MIB) files to determine the metrics to collect from a particular device.
- Includes a set of standard MIB files. MIB files appear as resource kinds in the user interface. You can import additional MIB files for the adapter to use.

- Includes the Predefined MIB Statistics resource kind, which consists of common device-level and interface-level variables selected from RFC1213-MIB.mib.
- Uses manual discovery to create resources. You can also create resources individually.
- Requires an SNMP community string. The community string authenticates messages sent between the SNMP management station and managed devices.
- Supports SNMPv1 and SNMPv2c.

SQL Loader Adapter

The SQL Loader adapter is an embedded adapter that reads data from an external database.

The SQL Loader adapter has the following features and requirements.

- Uses JDBC drivers and SQL queries to retrieve data from the source database. The adapter can retrieve data from multiple tables residing in multiple databases.
- Reads resource metrics time series and resource relationship data from the source database.
- Maps resources from source database fields to files in the FSDB by using resource definitions in an SQL query file.
- Retrieves change events from the source database by using an SQL query file. An adapter instance can collect either metrics data or events data. You must create separate adapter instances to process metrics and events.
- Uses auto-discovery and manual discovery to create resources.
- Requires the host name or IP address of the database host, the port to be used to connect to the database, and the name of the database that contains the information to extract. For SQL Server, the adapter requires a named instance.
- Supports SQL Server, Oracle, PostgreSQL, Sybase, and MySQL databases. The supported database versions depend on the version of the JDBC driver included with the adapter. You can find the JDBC driver version for each database in the `vcenter-ops/user/plugins/inbound/general_sql_adapter3/lib` folder.

Text File Adapter

The Text File adapter is an embedded adapter that collects performance data from delimited text files.

The Text File adapter has the following features and requirements.

- Collects data from files that an external process exports to a main input folder. You specify the location of the main input folder during adapter instance configuration.
- Uses a configuration file to convert data files to a standard comma-separated value (CSV) format that the adapter can read. You define the basic resource properties, such as adapter kind and resource kind, and how to extract values from data files, in this configuration file.
- Uses metadata files to define relationships between resources. The external process exports metadata files to the main input folder.
- Requires data files and metadata files to use certain file naming and formatting conventions.
- Requires access to the main input folder.
- Requires the user account that runs the Collector service to have read and write permission to the main input folder.

Field Adapters

A field adapter is a framework for an adapter. Field adapters are typically dependent on a certain level of field customization to accommodate site-specific environments.

For example, the RRD Framework adapter is a flexible script-based field adapter that is designed to minimize the effort required to extract time-series metric data from a set of RRD files in a defined directory structure.

You can work with VMware Professional Services to develop a field adapter that meets your needs. For more information, contact your VMware sales representative or go to www.vmware.com/services.

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