IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI
Version 7.2 Fix Pack 2

User's Guide

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IBM
Note

Before using this information and the product it supports, read the information in “Notices” on page 419.
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Chapter 1. Overview of the agent

The IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI (product code VM) provides you with the capability to monitor VMware Virtual Center. You can also use the agent to take basic actions with the VMware Virtual Center.

IBM® Tivoli® Monitoring is the base software for the VMware VI agent. The VMware VI agent monitors the following functions:
- Resource
- Event log
- Historical data

IBM Tivoli Monitoring

IBM Tivoli Monitoring provides a way to monitor the availability and performance of all the systems in your enterprise from one or several designated workstations. It also provides useful historical data that you can use to track trends and to troubleshoot system problems.

You can use IBM Tivoli Monitoring to achieve the following tasks:
- Monitor for alerts on the systems that you are managing by using predefined situations or custom situations.
- Establish your own performance thresholds.
- Trace the causes leading to an alert.
- Gather comprehensive data about system conditions.
- Use policies to take actions, schedule work, and automate manual tasks.

The Tivoli Enterprise Portal is the interface for IBM Tivoli Monitoring products. You can use the consolidated view of your environment as seen in the Tivoli Enterprise Portal to monitor and resolve performance issues throughout the enterprise.

See the IBM Tivoli Monitoring publications listed in “Prerequisite publications” on page 417 for complete information about IBM Tivoli Monitoring and the Tivoli Enterprise Portal.

Functions of the monitoring agent

Resource monitoring
Collects monitoring information for memory, CPU, system, disk, and network usage for the VMware ESX server and the virtual machines. In addition, the agent collects monitoring information for power usage for the VMware ESX server.

Actions
Provides actions to start and stop the virtual machines installed on the VMware ESX server.

Integration
Uses additional IBM Tivoli Monitoring components to provide an in-depth view of the environment. Navigation links are provided to operating system agents that can be installed within virtual machines and the service console of ESX. Data views from the IBM Tivoli Monitoring for Virtual Environments Agent for NetApp Storage provide information for NAS data stores and detailed physical device metrics. The agent also integrates with IBM Systems Director V6.1.1.2, which provides additional management functions.
**Historical data**

Provides a history enablement file that provides the ability to generate reports for all metrics collected.

**Event monitoring**

Monitors events, tasks, and alarms generated by VMware Virtual Center and VMware ESX servers.

---

**New in this release**

For version 7.2 Fix Pack 2 of the VMware VI agent, the following enhancements were made since version 7.2.

- **Changes related to system requirements.** See the information about system requirements in [Software product compatibility reports](http://publib.boulder.ibm.com/infocenter/prodguid/v1r0/clarity/index.html).
- **New attribute groups:**
  - Distributed Virtual Switch Health
- **New or changed attributes in the following attribute groups:**
  - Clustered Datastores
  - Clustered Resource Pools
  - Clustered Servers
  - Clustered Virtual Machines
  - Clusters
  - Datastore Cluster
  - Datastores
  - Distributed Virtual Portgroups
  - Distributed Virtual Switches
  - Distributed Virtual Uplinks
  - Events
  - Networked Servers
  - Networked Virtual Machines
  - Networked Virtual Switches
  - Virtual Machines
  - Virtual Switches
  - VM Datastore Utilization
- **New or changed views:**
  - DVS Host Member Health
- **New or changed situations:**
  - KVM_Cluster_Bad_Status
  - KVM_Host_Server_Bad_Status
  - KVM_VM_Bad_Status
- **Added information about the cluster current EVC mode, host system current EVC mode, and max EVC mode.**
- **Added the feature of monitoring Datastore free space % at datastore cluster level.**
- **Added the feature of monitoring network health on hosts on the distributed virtual switch.**
- **Added feature of capturing FT_Machin_UUID and Instance_UUID of Fault Tolerant virtual machine.**
- **Added a cross-link in the Distributed Virtual Switch view of the Network workspace to go to the Distributed Virtual Switch Details workspace.**
• Added a cross-link in the Distributed Virtual Switch view of Network workspace to go to the Alarms workspace.

Components of the IBM Tivoli Monitoring environment

After you install and set up the VMware VI agent, you have an environment that contains the client, server, and monitoring agent implementation for Tivoli Monitoring.

This Tivoli Monitoring environment contains the following components:

**Tivoli Enterprise Portal client**
The portal has a user interface based on Java™ for viewing and monitoring your enterprise.

**Tivoli Enterprise Portal Server**
The portal server is placed between the client and the Tivoli Enterprise Monitoring Server and enables retrieval, manipulation, and analysis of data from the monitoring agents. The Tivoli Enterprise Portal Server is the central repository for all user data.

**Tivoli Enterprise Monitoring Server**
The monitoring server acts as a collection and control point for alerts received from the monitoring agents, and collects their performance and availability data. The Tivoli Enterprise Monitoring Server is also a repository for historical data.

**Tivoli Enterprise Monitoring Agent, VMware VI agent**
This monitoring agent collects data and distributes the data to the Tivoli Enterprise Monitoring Server, Tivoli Enterprise Portal Server, Tivoli Enterprise Portal, Tivoli Data Warehouse, and Tivoli Integrated Portal.

This agent can run on a separate system from the system where the VMware Virtual Center is running.

Multiple copies of this agent can run on the same system.

**IBM Tivoli Netcool/OMNIbus**
Tivoli Netcool/OMNIbus is an optional component and the recommended event management component. The Netcool/OMNIbus software is a service level management (SLM) system that delivers real-time, centralized monitoring of complex networks and IT domain events. Event information is tracked in a high-performance, in-memory database and presented to specific users through individually configurable filters and views. The software includes automation functions that you can use to perform intelligent processing on managed events. You can use this software to forward events for Tivoli Monitoring situations to Tivoli Netcool/OMNIbus.

**IBM Tivoli Enterprise Console**
The Tivoli Enterprise Console® is an optional component that acts as a central collection point for events from various sources, including events from other Tivoli software applications, Tivoli partner applications, custom applications, network management platforms, and relational database systems. You can view these events through the Tivoli Enterprise Portal (by using the event viewer), and you can forward events from Tivoli Monitoring situations to the Tivoli Enterprise Console component. If you do not already use Tivoli Enterprise Console and need an event management component, you can choose to use IBM Tivoli Netcool/OMNIbus.

**IBM Tivoli Common Reporting**
Tivoli Common Reporting is a separately installable feature available to users of Tivoli software that provides a consistent approach to generating and customizing reports. Some individual products provide reports that are designed for use with Tivoli Common Reporting and have a consistent look and feel. For IBM Tivoli Monitoring for Virtual Environments, you can use Tivoli Common Reporting as a separate installation or as part of the IBM Tivoli Monitoring for Virtual Environments Performance and Capacity Management Reports capability.
IBM Tivoli Monitoring for Virtual Environments Dashboard, reporting, and Capacity Planner capabilities

The dashboard capability provides a summary view of the health of the entire environment so you can quickly assess if a problem exists and take action to address the problem. Predefined performance and capacity management reports provide a complete assessment of the capacity (including forecast) of the virtual environment based on actual historical usage. With capacity planner analytics and reports you can create what-if planning scenarios that can be used to optimize and consolidate the virtual environment.

IBM Tivoli Application Dependency Discovery Manager (TADDM)

TADDM delivers automated discovery and configuration tracking capabilities to build application maps that provide real-time visibility into application complexity.

IBM Tivoli Business Service Manager

The Tivoli Business Service Manager component delivers real-time information to help you respond to alerts effectively based on business requirements. Optionally, you can use this component to meet service-level agreements (SLAs). Use the Tivoli Business Service Manager tools to help build a service model that you can integrate with Tivoli Netcool/OMNIbus alerts or optionally integrate with data from an SQL data source. Optional components provide access to data from other IBM Tivoli applications such as Tivoli Monitoring and TADDM.

IBM Dashboard Application Services Hub

The Dashboard Application Services Hub has a core set of components that provide such administrative essentials as network security and database management. This component replaces the Tivoli Integrated Portal component after version 2.2.

Tivoli Integrated Portal

Tivoli Integrated Portal helps the interaction and secure passing of data between Tivoli products through a common portal. You can launch from one application to another and within the same dashboard view research different aspects of your managed enterprise. This component is installed automatically with the first Tivoli product that uses the Tivoli Integrated Portal framework. Subsequent products can install updated versions of Tivoli Integrated Portal. After version 2.2, this component is replaced by the Dashboard Application Services Hub.

Agent Management Services

You can use IBM Tivoli Monitoring Agent Management Services to manage the VMware VI agent.

Agent Management Services is available for the following IBM Tivoli Monitoring OS agents: Windows, Linux, and UNIX. The services are designed to keep the VMware VI agent available, and to provide information about the status of the product to the Tivoli Enterprise Portal. IBM Tivoli Monitoring V6.2.2, Fix Pack 2 or later provides support for Agent Management Services. For more information about Agent Management Services, see Agent Management Services in the IBM Tivoli Monitoring Administrator’s Guide.

User interface options

Installation of the base IBM Tivoli Monitoring software and other integrated applications provides various interfaces that you can use to work with your resources and data.

The following interfaces are available:

Tivoli Enterprise Portal user interface

You can run the Tivoli Enterprise Portal as a desktop application or a browser application. The client interface is a graphical user interface (GUI) based on Java on a Windows or Linux workstation. The browser application is automatically installed with the Tivoli Enterprise Portal Server. The desktop application is installed by using the Tivoli Monitoring installation media or
with a Java Web Start application. To start the Tivoli Enterprise Portal browser client in your Internet browser, enter the URL for a specific Tivoli Enterprise Portal browser client installed on your Web server.

**Command-line interface**

You can use Tivoli Monitoring commands to manage the Tivoli Monitoring components and their configuration. You can also run commands at the Tivoli Enterprise Console event server or the Tivoli Netcool/OMNIbus ObjectServer to configure event synchronization for enterprise situations.

**Manage Tivoli Enterprise Monitoring Services window**

You can use the window for the Manage Tivoli Enterprise Monitoring Services utility to configure the agent and start Tivoli services not designated to start automatically.

**IBM Tivoli Netcool/OMNIbus event list**

You can use the Netcool/OMNIbus event list to monitor and manage events. An event is created when the Netcool/OMNIbus ObjectServer receives an event, alert, message, or data item. Each event is made up of columns (or fields) of information that are displayed in a row in the ObjectServer alerts.status table. The Tivoli Netcool/OMNIbus web GUI is also a web-based application that processes network events from one or more data sources and presents the event data in various graphical formats.

**IBM Tivoli Enterprise Console**

You can use the Tivoli Enterprise Console to help ensure the optimal availability of an IT service for an organization. The Tivoli Enterprise Console is an event management application that integrates system, network, database, and application management. If you do not already use Tivoli Enterprise Console and need an event management component, you can choose to use Tivoli Netcool/OMNIbus.

**IBM Tivoli Common Reporting**

Use the Tivoli Common Reporting web user interface for specifying report parameters and other report properties, generating formatted reports, scheduling reports, and viewing reports. This user interface is based on the Dashboard Application Services Hub for Tivoli Common Reporting 3.1 and on Tivoli Integrated Portal for earlier versions. Use the Tivoli Common Reporting web user interface when you installed Tivoli Common Reporting separately. In this interface, you specify report parameters and other report properties, generate formatted reports, schedule reports, and view reports. This user interface is based on the Dashboard Application Services Hub for Tivoli Common Reporting 3.1 and on Tivoli Integrated Portal for earlier versions.

**IBM Tivoli Monitoring for Virtual Environments Dashboard, reporting, and Capacity Planner capabilities**

This user interface is based on the Tivoli Integrated Portal. The Dashboard provides predefined contextual summary views of the health (availability, performance, and capacity) of the complete virtual environment. Performance and Capacity Management Reports provides predefined Cognos-based reports that contain historical data, and a data model with tools for creating ad hoc reports. Capacity Planner provides you with a tool to import data for analysis and observe trends and patterns that you use to generate recommendations and create reports in the dashboard.

**IBM Tivoli Application Dependency Discovery Manager**

The Discovery Management Console is the TADDM client user interface for managing discoveries.

**IBM Tivoli Business Service Manager**

The Tivoli Business Service Manager console provides a graphical user interface that you can use to logically link services and business requirements within the service model. The service model provides an operator with a second-by-second view of how an enterprise is performing at any moment in time or how the enterprise performed over a time period.

**IBM Dashboard Application Services Hub**

The Dashboard Application Services Hub provides an administrative console for applications that
use this framework. It is a web-based console that provides common task navigation for products, aggregation of data from multiple products into a single view, and the passing of messages between views from different products. This interface replaces the Tivoli Integrated Portal component after version 2.2.

**Tivoli Integrated Portal**

Web-based products that are built on the Tivoli Integrated Portal framework share a common user interface where you can launch applications and share information. After version 2.2, this interface is replaced by the Dashboard Application Services Hub.

**Data sources**

Monitoring agents collect data from specific data sources.

The VMware VI agent collects data from the following sources:

**Scripts**

The agent uses application-specific commands and interfaces to gather metrics.
Chapter 2. Agent installation and configuration

Agent installation and configuration requires the use of the IBM Tivoli Monitoring Installation and Setup Guide and agent-specific installation and configuration information.

To install and configure the VMware VI agent, use the “Installing monitoring agents” procedures in the IBM Tivoli Monitoring Installation and Setup Guide along with the agent-specific installation and configuration information.

If you are installing silently by using a response file, see Performing a silent installation of IBM Tivoli Monitoring in the IBM Tivoli Monitoring Installation and Setup Guide.

Requirements

Before installing and configuring the agent, make sure your environment meets the requirements for the IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI.

For information about system requirements, see the Software product compatibility reports (http://publib.boulder.ibm.com/infocenter/prodguid/v1r0/clarity/index.html). Search for the Tivoli Monitoring for Virtual Environments product.

For information about requirements, see the Prerequisites topic for the agent in the IBM Tivoli Monitoring for Virtual Environments Information Center (http://pic.dhe.ibm.com/infocenter/tivihelp/v61r1/topic/com.ibm.tivoli.itmvs.doc_7.2/welcome_ve72.htm).

Language pack installation

The steps for installing language packs depend on which operating system and mode of installation you are using.

To install a language pack for the agent support files on the Tivoli Enterprise Monitoring Server, the Tivoli Enterprise Monitoring Agent, and the Tivoli Enterprise Portal Server, make sure that you installed the product in the English language. Then use the steps for the operating system or mode of installation you are using:

• “Installing language packs on Windows systems”
• “Installing language packs on UNIX or Linux systems” on page 8
• “Silent installation of language packs on Windows, UNIX, or Linux systems” on page 8

Installing language packs on Windows systems

You can install the language packs on a Windows system.

Before you begin

First, make sure that you installed the product in the English language.

Procedure

1. On the language pack CD, double-click the lpinstaller.bat file to start the installation program.
2. Select the language of the installer and click OK.
3. In the Introduction panel, click Next
4. Click Add/Update and click Next.
5. Select the folder where the National Language Support package (NLSPackage) files are located. Typically, the NLSPackage files are located in the nlspackage folder where the installer executable file is located.

6. Select the language support for the agent of your choice and click **Next**. To make multiple selections, press Ctrl and select the language that you want.

7. Select the languages that you want to install and click **Next**.

8. Examine the installation summary page and click **Next** to begin installation.

9. After installation completes, click **Finish** to exit the installer.

10. Restart the Tivoli Enterprise Portal, Tivoli Enterprise Portal Server, and Eclipse Help Server if any of these components are installed.

### Installing language packs on UNIX or Linux systems

You can install the language packs on a UNIX or Linux system.

**Before you begin**

First, make sure that you installed the product in the English language.

**Procedure**

1. Enter the `mkdir` command to create a temporary directory on the computer, for example, `mkdir dir_name`. Make sure that the full path of the directory does not contain any spaces.

2. Mount the language pack CD to the temporary directory that you created.

3. Enter the following command to start the installation program: `cd dir_name lpinstaller.sh -c install_dir` where `install_dir` is where you installed IBM Tivoli Monitoring. Typically, the directory name is `/opt/IBM/ITM` for UNIX and Linux systems.

4. Select the language of the installer and click **OK**.

5. In the Introduction panel, click **Next**.

6. Click **Add/Update** and click **Next**.

7. Select the folder where the National Language Support package (NLSPackage) files are located. Typically, the NLSPackage files are located in the nlspackage folder where the installer executable file is located.

8. Select the language support for the agent of your choice and click **Next**. To make multiple selections, press Ctrl and select the language that you want.

9. Select the languages that you want to install and click **Next**.

10. Examine the installation summary page and click **Next** to begin installation.

11. After installation completes, click **Finish** to exit the installer.

12. Restart the Tivoli Enterprise Portal, Tivoli Enterprise Portal Server, and Eclipse Help Server if any of these components are installed.

### Silent installation of language packs on Windows, UNIX, or Linux systems

You can use the silent-mode installation method to install the language packs. In silent mode, the installation process obtains the installation settings from a predefined response file. It does not prompt you for any information.

**Before you begin**

First, make sure that you installed the product in the English language.
Procedure

1. Copy and paste the ITM_Agent_LP_silent.rsp response file template as shown in “Response file example.”
2. Change the following parameter settings:

   **NLS_PACKAGE_FOLDER**
   Folder where the National Language Support package (NLSPackage) files are located. Typically, the NLSPackage files are located in the nlspackage folder, for example:
   
   NLS_PACKAGE_FOLDER = //tmp//LP//nlspackage.

   **PROD_SELECTION_PKG**
   Name of the language pack to install. Several product components can be included in one language package. You might want to install only some of the available components in a language pack.

   **BASE_AGENT_FOUND_PKG_LIST**
   Agent for which you are installing language support. This value is usually the same as PROD_SELECTION_PKG.

   **LANG_SELECTION_LIST**
   Language you want to install.

3. Enter the command to install the language pack with a response file (silent installation):
   - For Windows systems:
     lpinstaller.bat -f path_to_response_file
   - For UNIX or Linux systems:
     lpinstaller.sh -c candle_home -f path_to_response_file

   where *candle_home* is the IBM Tivoli Monitoring base directory.

Response file example

```
# IBM Tivoli Monitoring Agent Language Pack Silent Installation Operation
#
# This is a sample response file for silent installation mode for the IBM Tivoli
# Monitoring Common Language Pack Installer.
#
# This file uses the IBM Tivoli Monitoring Common Agent Language Pack with the
# install package as an example.
# Note:
# This response file is for the INSTALLATION of language packs only.
# This file does not support UNINSTALLATION of language packs in silent mode.
#-----------------------------------------------
#
# To successfully complete a silent installation of the the example of Common Agent
# localization pack, complete the following steps:
# 1. Copy ITM_AGENT_LP_silent.rsp to the directory where lpinstaller.bat or
#    lpinstaller.sh is located (IBM Tivoli Monitoring Agent Language Pack build
#    location).
# 2. Modify the response file so that it is customized correctly and completely for
#    your site.
# 3. After customizing the response file, invoke the silent installation using the
#    following command:
#    For Windows:
#      lpinstaller.bat -f <path_to_response_file>
#    For UNIX and Linux:
#      lpinstaller.sh -c <candle_home> -f <path_to_response_file>
# Note:<candle_home> is the IBM Tivoli Monitoring base directory.
```
Prerequisites checking

The prerequisite checker utility verifies whether all the prerequisites that are required for the agent installation are met. The prerequisite checker creates a log file that contains a report of all the prerequisites checks when the prerequisite checker was run.

For the VMware VI agent, the prerequisite checker verifies the following requirements:

- Memory
- Disk Space
- Operating systems

For detailed information about installation prerequisites, see the Prerequisites topic for the agent in the IBM Tivoli Monitoring for Virtual Environments Information Center. [Link](http://pic.dhe.ibm.com/infocenter/tivihelp/v61r1/topic/com.ibm.tivoli.itmvs.doc_7.2/prerequisites/ve72_systemreqs.html)

You can run the prerequisite checker in stand-alone mode or remotely. For more information about the prerequisite checker, see “Prerequisite Checking for IBM Tivoli Monitoring Agents” in the IBM Tivoli Monitoring Installation and Setup Guide.
Installing and configuring the monitoring agent

While completing the steps to install and configure the VMware VI agent as described in the IBM Tivoli Monitoring Installation and Setup Guide, “Installing monitoring agents,” use the agent-specific configuration information that is provided in this chapter.

Agent-specific information is provided for the following procedures:
- “Before you begin installation and configuration”
- “Local installation” on page 12
- “Local configuration” on page 14
- “Remote installation and configuration” on page 15

Before you begin installation and configuration

Complete the following tasks before you begin any installation or configuration steps:
1. Review the hardware and software prerequisites.
2. Review the installation and configuration information in Chapter 8, “Troubleshooting,” on page 323.
3. Create a user ID in your VMware Virtual Infrastructure.
   This user ID is used by the VMware VI agent to communicate with the VMware Virtual Center. The monitoring agent requires a user ID with System.View and System.Read privileges on all data source objects that are being monitored. To enable the PowerOnVM and PowerOffVM Take Action commands in the monitoring agent, the user ID must also have the following privileges:
   - Virtual Machine-Interaction-Power On
   - Virtual Machine-Interaction-Power Off
   For more information about how to create the user ID in your VMware Virtual Infrastructure, see the VMware documentation for details on managing users, groups, permissions, and roles.
4. If the VMware VI agent is configured to communicate with its VMware VI data sources using the SSL agent, it might be necessary to add the SSL certificate of the data source to the certificate truststore of the agent. For complete details, see “Enabling SSL communication with VMware VI data sources” on page 12.
5. The IBM Systems Director Server requires user ID and password authentication. By default, the Tivoli Enterprise Portal user ID and password is in the encoded URL properties, eliminating the need for you to enter a user ID and password manually. However, you can also manually configure by entering a user ID and password. In this case, the session stays authenticated until the Tivoli Enterprise Portal is closed, or the IBM Systems Director session times out because of inactivity, allowing you to complete subsequent launches without re-entering the user ID and password. In either case, the user ID and password information is protected using the HTTPS protocol between the Tivoli Enterprise Portal and the IBM Systems Director Server.
6. If you plan to use optional integration with the IBM Tivoli Monitoring for Virtual Servers Agent for NetApp Storage, determine the MSN for the agent using the following information:
   - The MSN is in the following form: instance name:system name:NU.
   - The instance name is the instance name that was chosen for the NetApp Storage agent when it was configured.
   - The system name is the name of the computer where the agent is running.
   - The instance name and system name are followed by a colon.
   - A single instance of the Netapp Storage agent is supported at this time.
   - The correct managed system name is listed in the Tivoli Enterprise Portal Server client.
   - Select the Enterprise navigation item. Then, right-click, select the workspace, and select Managed System Status. The resulting workspace lists all the managed systems. The Netapp Storage agent managed system name ends with the letters NU.
Keep the number of instances of the VMware VI agent that you configure for the same data source to a minimum, preferably one. Additional instances of this monitoring agent increase the load on the VMware server, and provide redundant information.

**Selecting an installation location**

The VMware VI agent can be installed on the same system as the vCenter, as long as it has sufficient capacity to do so.

Some advantages are as follows:

- No additional servers or administrative costs are required to manage your VMware environment.
- If network connectivity to the vCenter is lost, monitoring continues to run.
- Thresholds continue to be evaluated, automated corrective actions continue to run, and historical performance data continue to be gathered.
- Network traffic is reduced because of the monitoring of VMware.

If you plan to install the monitoring agent and the vCenter on the same system, ensure that there is sufficient capacity for both, including primary metrics of CPU, memory, disk space, disk I/O, and network bandwidth. The operating system level and patches for the system must meet the requirements of both the VMware VI agent and vCenter.

If you deploy an operating system cluster for the vCenter to achieve High Availability, then the monitoring agent can use clustering to achieve High Availability as well.

**Note:** Deploy the VMware VI agent on the same system as the vCenter if you have the available capacity.

If you do not have the required capacity on a vCenter system, be sure to select an appropriate server. To avoid installing and managing additional servers, find an existing server that has the capacity for the VMware VI agent.

If you have multiple vCenters, assign monitoring agents that monitor vCenters to a single server dedicated to monitoring VMware. Because monitoring is done remotely, choose a server close in proximity to your vCenter system to ensure higher availability for your data collection.

**Local installation**

After the VMware VI agent is installed, if the monitoring agent is to communicate with the VMware VI component using SSL, determine whether you must add Signer Certificates to the VMware VI agent certificate database.

For complete details, see “Enabling SSL communication with VMware VI data sources.”

**VMware VI application support**

All agents require that you install application support files that contain agent-specific information about the monitoring server, portal server, and portal desktop client.

See the *IBM Tivoli Monitoring Installation and Setup Guide*.

**Enabling SSL communication with VMware VI data sources**

The VMware VI agent can be configured to securely communicate with its VMware data sources using SSL. In this configuration, you must add a data source SSL certificate to the certificate truststore of the agent.
**Important**: The following information applies only if the agent is configured to validate SSL certificates. If SSL certificate validation is turned off, the VMware VI agent connects to VMware data sources even if their SSL certificates are expired, untrusted, or invalid. However, turning off SSL certificate validation is potentially not secure and must be done with care.

If a VMware data source uses an SSL certificate that is signed by a common Certificate Authority (for example, Verisign, Entrust, or Thawte), then it is not necessary to add certificates to the VMware VI agent certificate truststore. However, if the data source uses a certificate that is not signed by a common Certificate Authority, as is the case by default, the certificate must be added to the truststore to allow the agent to successfully connect and collect data.

To add a certificate, use the following procedure:

**Note:**
1. The default VMware certificate file is named `rui.crt`.
2. For a Virtual Center, the SSL certificate file is located by default in `C:\Documents and Settings\All Users\Application Data\VMware\VMware VirtualCenter\SSL`.
3. For an ESX server, the SSL certificate file is located by default in the `/etc/vmware/ssl` directory.

**Steps**
1. Copy the certificate file from your data source to the agent computer.
2. Place the certificate file in a directory of your choosing on the agent computer. Do not overlay certificate files. Use unique file names for each certificate. Use a unique label for each certificate that you add.
3. Use the keytool command to add the data source certificate to the certificate truststore of the agent:
   ```
   ```
   where:
   - **CertificateAlias**: A unique reference for each certificate added to the certificate truststore of the agent, for example, an appropriate alias for the certificate from `datasource.example.com` is `datasource`.
   - **CertificateFile**: The complete path and file name to the VMware data source certificate being added to the truststore.
   - **Truststore**: The complete path and file name to the VMware VI agent certificate database. Use the following path and file name:
     - Windows (32-bit): `install_dir\mtaitm6\kvm.truststore`
     - Windows (64-bit): `install_dir\mtaitm6_x64\kvm.truststore`
     - Linux (32-bit): `install_dir/1i6263/vm/etc/kvm.truststore`
     - Linux (64-bit): `install_dir/1x8266/vm/etc/kvm.truststore`
   - **TruststorePassword**: ITMVMWAREVI is the default password for the VMware VI agent truststore. To change this password, consult the Java Runtime documentation for information about the tools to use.

**Important**: To use the keytool command, the Java Runtime bin directory must be in your path. Use the following commands:
1. Windows (32-bit): `set PATH=%PATH%;install_dir\CNPSJ\java\bin`
2. Windows (64-bit): `set PATH=%PATH%;install_dir\CNPSJ\java\bin`
4. After all data source certificates have been added, you can start the monitoring agent.

Local configuration

Use the procedure in the IBM Tivoli Monitoring Installation and Setup Guide to configure the agent on a Windows or Linux system.

The configuration attributes define which VMware VI data sources are monitored. The attributes define a connection to either a VMware Virtual Center 4.0+ or directly to an individual VMware ESX Server 3.5+. Multiple data sources can be defined for each VMware VI agent instance. More than one instance of the monitoring agent can be configured on a remote monitoring host system. One instance can monitor all VMware Virtual Infrastructure, or separate instances can be defined to monitor specific groups of VMware Virtual Infrastructure.

Monitor the VMware Virtual Center that manages the VMware Virtual Infrastructure instead of managing individual ESX Servers.

Configuration values

For both local and remote configuration, provide the configuration values for the monitoring agent to operate. When configuring an agent, a panel is displayed so you can enter each value. When there is a default value, this value is pre-entered into the field. If a field represents a password, two entry fields are displayed. You must enter the same value in each field. The values that you type are not displayed to help maintain the security of these values.

The following fields are defined for this monitoring agent:

- On the Data Provider tab:
  
  **Instance Name**
  The name of the instance. The maximum length is 32 characters and is restricted to alphanumeric characters. No spaces, underscores, or other special characters are permitted. This name is the instance name that was entered previously.

  **Validate SSL Certificates**
  This value indicates whether the agent is to validate SSL certificates when using SSL to communicate over the network. Selecting No can lead to communications that are potentially not secure. Use caution when choosing not to validate SSL certificates. If No is selected, VMware data source certificates need not be added to the VMware VI agent truststore as described in "Enabling SSL communication with VMware VI data sources" on page 12

  **Maximum Number of Data Provider Log Files**
  The number of log files that the data provider produces before overwriting previous log files.

  **Maximum Size in KB of Each Data Provider Log**
  The maximum amount of data (in KB) that the data provider writes to a single log file before creating a new log file.

  **Level of Detail in Data Provider Log**
  The amount of detail that the data provider includes in its log files. Log levels include the following log messages:
  - Off: No messages are logged.
  - Severe: Only errors are logged.
  - Warning: Everything that is logged at the Severe level and potential errors that may result in undesirable behavior.
  - Info: Everything that is logged at the Warning level and high-level informational messages that describe the state of the data provider as it executes.
- **Fine**: Everything that is logged at the Info level and low-level informational messages that describe the state of the data provider as it executes.
- **Finer**: Everything that is logged at the Fine level and plus highly-detailed informational messages, such as performance profiling information and debug data. Choosing this option may adversely affect the performance of the agent. This setting is intended only as a tool for problem determination in conjunction with IBM support staff.
- **Finest**: Everything that is logged at the Fine level and the most detailed informational purposes, including low-level programming messages and data. Choosing this option may adversely affect the performance of the agent. This setting is intended only as a tool for problem determination in conjunction with IBM support staff.
- **All**: All messages are logged.

**Optional:** On the **IBM Systems Director** tab:

**IBM Systems Director Server Host Name**
Host name or IP address of the IBM Systems Director Server managing the environment. This option represents the Web UI that the server launches.

**IBM Systems Director Server Port Number**
Port number for the IBM Systems Director Server. The default is 8422.

**Use credentials to authenticate to IBM Systems Director Server**
Indicates whether to authenticate to the IBM Systems Director Server using the User ID and password. If you are not required to authenticate, you are asked to log into the IBM Systems Director Server manually.

**On the **Storage Agent** tab:**

**ITM MSN of Storage Agent (KVM_STORAGE_AGENT_MSN)**
IBM Tivoli Monitoring managed system name of the IBM Tivoli Monitoring storage agent

**On the **Data Source** tab:**

**Data Source ID**
Unique identifier for this data source

**Data Source Host Name**
Data source where the agent collects monitoring data. This source can be a virtual center or an ESX host.

**Use SSL Connection to Data Source**
Restricted to Yes or No

**Data Source User ID**
User ID that you specify, that is known to the data source, and has sufficient privileges to collect monitoring data

**Data Source Password**
Password that you specify for the data source user ID

**Remote installation and configuration**

You can use IBM Tivoli Monitoring to deploy monitoring agents from a central location, which is the monitoring server. You can also use the remote agent deployment function to configure deployed agents and install maintenance on your agents.

For information, see the *IBM Tivoli Monitoring Installation and Setup Guide*. See the *IBM Tivoli Monitoring Command Reference* for commands that you can use to perform these tasks.

Before you can deploy any agents from a monitoring server, you must first populate the agent depot with bundles. For information about populating your agent depot, see the *IBM Tivoli Monitoring Installation and Setup Guide*.
Note: When the VMware VI agent is configured to securely communicate with its VMware data sources using SSL, it might be necessary to add some or all of its data sources' SSL certificates to the certificate truststore of the agent, which is located on the agent system. See “Enabling SSL communication with VMware VI data sources” on page 12 for detailed information about adding certificates to the certificate truststore of the agent.

Deploying through the portal
See the IBM Tivoli Monitoring Installation and Setup Guide for detailed information about deploying non-operating system agents.

Deploying through the command line
See the IBM Tivoli Monitoring Installation and Setup Guide for detailed information about deploying non-operating system agents.

To deploy the VMware VI agent from the command line, use the tacmd addSystem command. See the IBM Tivoli Monitoring Command Reference for the full syntax of this command.

The VMware VI agent requires the following command:
```
tacmd addSystem -t vm -n OS_Agent_ManagedSystemName \    -p INSTANCE=InstanceName \    DATA_PROVIDER.KVM_SSL_VALIDATE_CERTIFICATES=ValidateSSLCertificates \    DATA_PROVIDER.KVM_LOG_FILE_MAX_COUNT=MaxLogFileCount \    DATA_PROVIDER.KVM_LOG_FILE_MAX_SIZE=MaxLogFileSize \    DIRECTOR.KVM_DIRECTOR_AUTHENTICATION=DirectorAuthentication \    DIRECTOR.KVM_DIRECTOR_HOST_ADDRESS=DirectorHostAddress \    DIRECTOR.KVM_DIRECTOR_PORT_NUMBER=DirectorPortNumber \    STORAGE_AGENT.KVM_STORAGE_AGENT_MSN=StorageAgentMSN \    DATASOURCE:UniqueDataSourceID.HOST_ADDRESS=DataSourceHostAddress \    DATASOURCE:UniqueDataSourceID.USERNAME=DataSourceUserID \    DATASOURCE:UniqueDataSourceID.PASSWORD=DataSourcePassword \    DATASOURCE:UniqueDataSourceID.USES_SSL=DataSourceUsesSSL
```

For additional data sources, repeat the DATASOURCE Section Parameters with a new UniqueDataSourceID.

In this command, the fields are defined as follows. For more information, refer to “Configuration values” on page 14.

OS_Agent_ManagedSystemName
The managed system name of the operating system agent that is running on the system where the VMware agent is to be remotely deployed.

InstanceName
The name of the instance

ValidateSSLCertificates
Whether the agent validates SSL certificates when using SSL to communicate over the network. Valid values are Yes and No.

MaxLogFileCount
The maximum number of data provider log files. Valid values are positive integers.

MaxLogFileSize
The maximum size in KB of each data provider log. Valid values are positive integers.

LogLevel
The level of detail in data provider logs. Valid values are OFF, SEVERE, WARNING, INFO, FINE, FINER, FINEST, and ALL.
**DirectorAuthentication**
Whether to authenticate to the IBM Systems Director Server using the IBM Tivoli Monitoring Tivoli Enterprise Portal user ID and password. This configuration parameter is optional. Valid values are Yes and No.

**DirectorHostAddress**
The IBM Systems Director host name. This value is optional.

**DirectorPortNumber**
The IBM Systems Director port number. Valid values are valid TCP port numbers. This value is optional.

**StorageAgentMSN**
The managed system name (MSN) of the IBM Tivoli Monitoring storage agent that monitors the physical storage devices for the VMware environment. This managed system name must belong to a NetApp Storage agent instance.

**UniqueDataSourceID**
The data source ID

**DataSourceHostAddress**
The data source host name

**DataSourceUserName**
The data source user ID

**DataSourcePassword**
The data source password

**DataSourceUsesSSL**
Whether to use SSL to connect to the data source. Valid values are Yes and No.

To configure several data sources, repeat the DATASOURCE section parameters with a new UniqueDataSourceID.

**Increasing the Java heap size**
The default heap size for the Java data provider is 256 megabytes. In very large VMware environments, you might need to increase the heap size. If the Java data provider stops due to a javacore problem, and creates a file named javacore.date.time.number.txt in the CANDLEHOME\tmaitm6 directory, and this file contains the string java/lang/OutOfMemoryError, then increase the heap size for the Java data provider.

Use the heap size value -Xmx512m for environments with more than 100 ESX hosts and more than 1000 virtual machines. For environments with more than 150 hosts and more than 2000 virtual machines, use the value -Xmx1024m.

To increase the heap size for the Java data provider, complete the following steps:

- On a Windows system:
  1. Open the file %CANDLE_HOME%\TMAITM6\kvm_data_provider.bat.
  2. Add the following line before the line that starts with SET KVM_JVM_ARGS="$KVM_CUSTOM_JVM_ARGS...:
     ```
     SET KVM_CUSTOM_JVM_ARGS=-Xmx512m
     ```
  3. Restart the agent.

- On a Linux system:
  1. Open the file $CANDLEHOME/platform/vm/bin/kvm_data_provider.sh.
  2. Add the following line before the line that starts with KVM_JVM_ARGS="$KVM_CUSTOM_JVM_ARGS...:
     ```
     KVM_CUSTOM_JVM_ARGS=-Xmx512m
     ```
  3. Restart the agent.
Upgrade notes
See the IBM Tivoli Monitoring Installation and Setup Guide for more information about upgrading.

After version 6.1, the VMware VI agents changed the format in which VMware data source certificates are stored, because of changes in the underlying SSL implementation. Because of these changes, after upgrading you must add data source certificates to the certificate truststore of the agent, even if those certificates were in the certificate database of the previous agent. See “Enabling SSL communication with VMware VI data sources” on page 12.
Chapter 3. Workspaces reference

A workspace is the working area of the Tivoli Enterprise Portal application window. The Navigator tree contains a list of the workspaces provided by the agent.

About workspaces

Use the Navigator tree to select the workspace you want to see. As part of the application window, the status bar shows the Tivoli Enterprise Portal Server name and port number to which the displayed information applies and the ID of the current user.

When you select an item in the Navigator tree, a default workspace is displayed. When you right-click a Navigator item, a menu that includes a Workspace item is displayed. The Workspace item contains a list of workspaces for that Navigator item. Each workspace has at least one view. Some views have links to other workspaces. You can also use the Workspace Gallery tool as described in the Tivoli Enterprise Portal User’s Guide to open workspaces.

The workspaces in the Navigator are displayed in a Physical view that shows your enterprise as a physical mapping or a dynamically populated logical view that is agent-specific. You can also create a Logical view. The Physical view is the default view.

This monitoring agent provides predefined workspaces. You cannot modify or delete the predefined workspaces, but you can create new workspaces by editing them and saving the changes with a different name.

The IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI provides various default workspaces. These workspaces are displayed in the Navigator tree under the following nodes and subnodes for this monitoring agent:

**VMware VI**
- Corresponds to a VMware VI instance and contains agent instance-level workspaces.
- Each subnode is an ESX server.

When multiple instances of the monitoring agent are defined on a system, the top-level node becomes VMware VI. The VMware VI workspace is undefined at this node. A node for each instance is created called *Instance:*VM. A workspace that is called *Instance:*VM is associated with the instance node. This workspace is comparable to the VMware VI workspace.

Workspace views can be any combination of query-based views, event views, and special purpose views.

Additional information about workspaces

For more information about creating, customizing, and working with workspaces, see “Using workspaces” in the Tivoli Enterprise Portal User’s Guide.

For a list of the predefined workspaces for this monitoring agent and a description of each workspace, see predefined workspaces and the information about each individual workspace.

Some attribute groups for this monitoring agent might not be represented in the predefined workspaces or views for this agent. For a full list of the attribute groups, see “Attribute groups for the monitoring agent” on page 33.
If you are using remote management to navigate to your systems in the Tivoli Enterprise Portal, navigate from the host name of the computer where you installed the agent.

Predefined workspaces

The VMware VI agent provides predefined workspaces, which are organized by Navigator item.

Agent-level navigator items

- VMware VI Navigator item
  - VMware VI workspace
  - IBM Systems Director workspace
  - Virtual Enterprise workspace
- Clusters Navigator item
  - Cluster Detail workspace
  - Cluster Performance workspace
  - Cluster Summary workspace
  - Clusters workspace
  - Distributed Resource Scheduler workspace
  - Virtual App workspace
- Datastores Navigator item
  - Datastore and Volumes workspace
  - Datastore Detail - NAS workspace
  - Datastore Detail - VMFS workspace
  - Datastores workspace
  - Topology - Datastore workspace
  - Virtual Machines Topology workspace
  - VM Datastore Utilization workspace
  - VM Orphaned Disk workspace
- Events Navigator item
  - Events workspace
  - Triggered Alarms workspace
- Monitored Servers Navigator item
  - Monitored Servers workspace
  - Topology - Monitored Servers workspace
  - Virtual Machines - Monitored Servers workspace
- Networks Navigator item
  - Distributed Network Detail workspace
  - Distributed Virtual Switch Detail workspace
  - Network Detail workspace
  - Network NIC Detail workspace
  - Networks workspace

VMware VI (ESX) subnode

- VMware VI Navigator item
  - VMware VI workspace
  - All Orphaned Virtual Machines workspace
  - All Virtual Machines workspace
• CPU Navigator item
  – CPU workspace
• Disk Navigator item
  – Disk workspace
  – Server Disk Detail workspace
  – Server Disk Performance workspace
• ESX Server Navigator item
  – Agent Health workspace
  – ESX Server workspace
  – Server DataStore workspace
  – Server Health workspace
• Memory Navigator item
  – Memory workspace
• Network Navigator item
  – Network workspace
• Resource Pools Navigator item
  – Resource Pools workspace
• Virtual Machines Navigator item
  – Virtual Machines workspace

Workspace descriptions

Each workspace description provides information about the workspace such as the purpose and a list of views in the workspace.

Workspaces are listed under Navigator items. When the agent has subnodes, the Navigator items are listed under the subnode.

VMware VI Navigator item

The workspace descriptions are organized by the Navigator item to which the workspaces are relevant.

VMware VI workspace

This workspace provides a snapshot of the health of clusters and data stores. Key indicators show the status to aid in problem identification.

This workspace contains the following views:

Clusters
  This view contains key status and performance indicators for clusters. A link is provided to navigate to a workspace with more detailed information about this cluster.

Datastores
  This view contains key status and performance indicators for data stores. A link is provided to navigate to a workspace with more detailed information about the data store.

Networks
  This view displays all of the configured networks by data center and provides a summary of the health of the network. A link is provided to view the triggered alarms by network.

IBM Systems Director workspace

This workspace provides the IBM Systems Director Web UI to the Director Server this agent is configured to use. It is only available as a workspace link target.

This workspace contains the following view:

IBM Systems Director
  This view contains the IBM Systems Director Server Web interface.
Virtual Enterprise workspace
This workspace provides high-level views of the ESX servers that this agent is monitoring.

This workspace contains the following views:

**Virtual Center Events**
This view contains events that were generated by a monitoring data source. The events are typically specific to the data source.

**Monitored Servers**
This view shows the ESX servers that this agent is actively monitoring. Each entry in this view contains a link that provides navigation to the ESX Servers and IBM Systems Director workspaces. The IBM Systems Director workspaces require that an IBM Systems Director Server has been configured for the agent and shows the ESX Server in the IBM Systems Director Web UI.

Clusters Navigator item
The workspace descriptions are organized by the Navigator item to which the workspaces are relevant.

**Cluster Detail workspace**
This workspace contains views that are specific to one cluster. The metrics in the workspace are the detailed metrics of the cluster. The metrics include metrics that are configuration settings and metrics that represent a snapshot of some key performance metrics. Links to other workspaces provided by this agent are included in this workspace.

This workspace contains the following views:

**Cluster name - Datacenter_Name**
This view contains a summary of memory and CPU usage for the selected cluster and an overall picture of the health of the cluster.

**CPU Utilization - Cluster_Name - Datacenter_Name**
This view contains a graph of the number of hosts operating within CPU usage ranges. This view allows a capacity planner or administrator to see how well the CPU resources of the cluster are being used across the entire cluster.

**Memory Utilization - Cluster_Name - Datacenter_Name**
This view contains a graph of the number of hosts operating within Memory usage ranges. This view allows a capacity planner or administrator to see how well the memory resources of the cluster are being used across the entire cluster.

**Navigator**
This view contains a navigation aid to quickly jump to views about the other known clusters.

Cluster Performance workspace
This workspace contains views that are specific to one cluster.

This workspace contains the following views:

**vMotions vs Powered On for Cluster - Cluster_Name - Datacenter_Name**
This view uses a line graph over time to show the number of virtual machines in the given cluster that are powered on. The view also shows the number of virtual machines that have migrated. Historical data collection must be enabled for this view to contain data. See the IBM Tivoli Monitoring Administrator's Guide for details about how to create historical collection. A collection must be created for the Clusters attribute group.

**CPU vs Memory Utilization for Cluster - Cluster_Name - Datacenter_Name**
This view uses a line graph over time to show the usage of cluster resources CPU and memory. Historical data collection must be enabled for this view to contain data. See the IBM Tivoli Monitoring Administrator's Guide for details about how to create a historical collection. A collection must be created for the Clusters attribute group.

**Navigator**
This view contains a navigation aid to quickly jump to views about the other known clusters.

Cluster Summary workspace
This workspace contains views that are specific to one cluster. The views in this workspace
provide a quick guide to all of the ESX servers, resource pools, and virtual machines that are contained within this cluster. Links are provided to quickly jump to a specific view.

This workspace contains the following views:

**ESX Servers - Cluster_Name - Datacenter_Name**
This view contains a list of the ESX servers that are members of this cluster. Basic performance data is shown for each server. By selecting the link within this view, you can quickly navigate to the ESX server view depicted in the row of data. The resulting workspace aids in providing additional detailed metrics regarding the ESX server. You can easily navigate back to this Cluster Summary workspace by selecting the appropriate icon.

**Resource Pools - Cluster_Name - Datacenter_Name**
This view contains a list of the resource pools that are the members of this cluster and shows the basic performance data for each resource pool. This view also provides a link to quickly navigate to the Virtual App workspace, and the link is available only if the Node Type is kvm.Virtual_App.

**Datastores - Cluster_Name - Datacenter_Name**
This view contains a list of the data stores that are members of this cluster. Basic performance data is shown for each data store.

**Virtual Machines - Cluster_Name - Datacenter_Name**
This view contains a list of the virtual machines that are members of this cluster. Basic performance data is shown for each virtual machine. By selecting the link within this view, you can quickly navigate to the virtual machine view specific to this virtual machine. The resulting workspace aids in providing additional detailed metrics regarding the virtual machine. You can easily navigate back to this Cluster Summary workspace by selecting the appropriate icon.

**Navigator**
This view contains a navigation aid to quickly jump to views about the other known clusters.

**Clusters workspace**
This workspace provides a snapshot of the defined clusters.

This workspace contains the following views:

**Clusters**
This view contains a list of all of the clusters and a summary of memory and CPU usage for each cluster. Each entry in this view contains a link that provides the ability to navigate to the Cluster Summary, Cluster Details, Distributed Resource Scheduler and IBM Systems Director workspaces. The latter requires that an IBM Systems Director Server has been configured for the agent and shows the Cluster in Topology Common view.

**Top 5 by CPU**
This view contains a list of the clusters that are ordered by CPU usage.

**Top 5 by Memory**
This view contains a list of the clusters that are ordered by memory usage.

**Bottom 5 by CPU**
This view contains a list of the clusters that are ordered by CPU usage.

**Bottom 5 by Memory**
This view contains a list of the clusters that are ordered by memory usage.

**Distributed Resource Scheduler workspace**
This workspace contains view that is specific to the Distributed Resource Scheduler (DRS) and Storage Distributed Resource Scheduler (SDRS) faults.

This workspace contains the following view:

**DRS Faults**
This view shows information about the DRS and SDRS faults that are associated with the clusters.
**Virtual App workspace**
This workspace contains views that are specific to the virtual application.

This workspace contains the following view:

**Virtual App**
This view shows information about the virtual machines and virtual applications that are associated with the virtual machines.

**Datastores Navigator item**
The workspace descriptions are organized by the Navigator item to which the workspaces are relevant.

**Datastore and Volumes workspace**
This workspace contains views that are specific to one data store. The metrics are supplied by both the IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI and the Agent for NetApp Storage. This workspace provides for both a virtual and a physical view of the data store. Use the Storage Agent tab on the configuration windows to set up the relationship between the agents.

This workspace contains the following views:

**Datstore Health**
This view shows configuration metrics from the virtualized environment. This view is primarily configuration data.

**Volume by Operations**
This view shows physical metrics about the I/O operations and is supplied by the Agent for NetApp Storage.

**Volume by Latency**
This view describes the latency of the data store on a physical volume.

**Volume by Transfer Rate**
This view describes the I/O transfer rates for this physical volume.

**Datastore Detail - NAS workspace**
This workspace contains views that are specific to one data store. The metrics in the workspace are the detailed metrics of the data store. The metrics include metrics that are configuration settings and metrics that represent a snapshot of some key performance metrics.

This workspace contains the following views:

**Utilization**
This view displays graphically the usage percentage of this data store.

**Connections**
This view shows the dependencies of other virtualization components on this data store.

**Percent Used - History**
This view shows percentage used of this data store over time. The time period is configurable. This data helps identify trends and spikes that occur at various points in time. Historical collection must be enabled for this view to populate.

**Datastore Detail**
This view contains the detailed configuration specifications of this data store and additional usage metrics.

**Volumes**
This view contains data when an additional IBM Tivoli Monitoring agent has been configured and the data store is located on a NetApp or IBM Series N storage device.

**Topology**
This view is a link to topology workspaces that have this data store as a node. The status of the data store is depicted by the icon.

**Datastore Detail - VMFS workspace**
This workspace contains views that are specific to one data store. The metrics in the workspace are the detailed metrics of the data store. The metrics include metrics that are configuration settings and metrics that represent a snapshot of some key performance metrics.

This workspace contains the following views:
Utilization
This view displays graphically the usage percentage of this data store.

Connections
This view shows the dependencies of other virtualization components on this data store.

Percent Used - History
This view shows percentage used of this data store over time. The time period is configurable. This data helps identify trends and spikes that occur at various points in time. Historical collection must be enabled for this view to populate.

Datastore Detail
This view contains the detailed configuration specifications of this data store and additional usage metrics.

Topology
This view is a link to topology workspaces that have this data store as a node. The status of the data store is depicted by the icon.

Datastores workspace
This workspace contains a list of all the data stores. This list might be used to identify problems with the data store. More detailed information about a specific data store can be obtained by using the link next to a row describing a data store.

This workspace contains the following views:

Datastore Health
This view shows all the data stores and basic health indicators for each one. In addition, information regarding how many other components are connected to the data store is shown. This information is helpful in providing insight about the impact of performance problems that the data store might be experiencing.

NAS Datastores
This view is specific to all data stores that are not of the VMFS type. This view is typically data stores backed by network-attached devices and defined on NFS or CIFS volumes. The link on each row enables navigation to a more detailed workspace specific to that data store.

VMFS Datastores
This view is specific to all data stores that are of the VMFS type. Data stores of type VMFS can be local to an ESX host or attached through a SAN device. The link on each row enables navigation to a more detailed workspace specific to that data store.

Datastore Clusters
This view shows all the data store clusters. The link in each row enables the navigation to a workspace that is specific to the data store cluster.

Topology - Datastore workspace
This workspace shows the relationship between data stores and ESX servers and clusters.

This workspace contains the following view:

Topology
This view displays graphically the logical connections of the data stores to ESX servers and clusters. The status of each entity is also depicted by each icon.

Virtual Machines Topology workspace
This workspace shows the relationship between virtual machines and other entities in the virtual enterprise such as data stores and clusters.

This workspace contains the following view:

Topology
This view displays graphically the logical connections of the virtual machines to ESX servers, data stores, and clusters. The status of each entity is also depicted by each icon.

VM Datastore Utilization workspace
This workspace contains views that are specific to one data store. These metrics provide insight about which virtual machines are allocated to this data store.

This workspace contains the following views:
VM Datastore Utilization
This view displays metrics that illustrate which virtual machines are allocated on this data store. These metrics show how much space is currently using and how much space the virtual machine is allowed to use as it grows.

VM IO Operations
This view displays the amount of data being read and written by the virtual machines on this datastore. These metrics show how busy the datastore is by virtual machine.

VM Datastore Provisioned Space
This view shows graphically how much of the total provisioned space that is given to the virtual machine is actually being used.

Total IO by VM
This view shows graphically how total data from both read and write operations is being done by each virtual machine.

VM Orphaned Disk workspace
This workspace displays details about the orphaned virtual machine disk.
This workspace contains the following view:
VM Orphaned Disk
This view shows the details about the space that is used by an orphaned virtual machine disk on the data store. In addition, this view shows the date and time when an orphaned virtual machine disk was last modified.

Events Navigator item
The workspace descriptions are organized by the Navigator item to which the workspaces are relevant.

Events workspace
This workspace contains a list of events that have occurred while the monitoring agent is running. The events that are listed are not specific to an ESX server, but they are specific to a configured data source.

This workspace contains the following views:
Virtual Center Events
This view contains a list of the events specific to the data source.

Triggered Alarms
This view contains a list of the alarms that are triggered by VMWare for various monitored entities such as data stores and ESX hosts.

Virtual Center Tasks
This view contains a list of the tasks that are triggered on the vCenter server, and the tasks that are completed or failed for various monitored entities, such as data stores and the ESX hosts.

Virtual Center Active Tasks
This view contains a list of the active tasks that are triggered on the vCenter server for various monitored entities, such as data stores and the ESX hosts.

Triggered Alarms workspace
This workspace contains a view that lists the alarms for a specific entity in order to be able to quickly identify the alarms that influence the alarms that have triggered on that object.

This workspace contains the following view:
Triggered Alarms
This view contains a list of the alarms that are triggered by VMWare for various monitored entities such as data stores and ESX hosts.

Monitored Servers Navigator item
The workspace descriptions are organized by the Navigator item to which the workspaces are relevant.

Monitored Servers workspace
This workspace contains a list of the monitored ESX servers.

This workspace contains the following views:
**Monitored Servers**
This view contains a list of the monitored ESX servers. Monitored servers are discovered from the agent data source, which can be a VMware Virtual Center or an ESX server. Each entry in this view contains a link that provides navigation to the ESX Servers and IBM Systems Director workspaces. The IBM Systems Director workspaces require that an IBM Systems Director Server has been configured for the agent and shows the ESX Server in the IBM System Director Web UI.

**Data Sources**
This view provides status information about the data sources that the agent uses to collect monitoring data.

**Agent Events**
This view provides status information about the agent that is helpful if there is a configuration issue or if there is a problem connecting to a vCenter or ESX server.

**Topology - Monitored Servers workspace**
This workspace provides insight into the logical connections between the major entities in the virtual enterprise.

This workspace contains the following view:

**Topology**
This view shows the relationship among virtual machines, ESX servers, clusters, resource pools, data centers, and the vCenter.

**Virtual Machines - Monitored Servers workspace**
This workspace shows the relationship between virtual machines and other entities in the virtual enterprise such as ESX servers and clusters.

This workspace contains the following view:

**Topology**
This view displays graphically the logical connections of the virtual machines to ESX servers, and clusters. The status of each entity is also depicted by each icon.

**Networks Navigator item**
The workspace descriptions are organized by the Navigator item to which the workspaces are relevant.

**Distributed Network Detail workspace**
This workspace provides detail of a selected network in the infrastructure.

This workspace contains the following views:

**Network - Network_Name**
This view displays the selected network status and configuration. A link is provided to view the triggered alarms by network.

**Networked Virtual Machines - Network_Name**
This view shows the networked Virtual Machines usage.

**Networked Servers - Network_Name**
This view shows the networked servers usage.

**Distributed Virtual Switches - Switch_Name**
This view shows the Distributed virtual switches usage.

**Distributed Virtual Switch Detail workspace**
This workspace provides detail of a selected Distributed Virtual switch in the infrastructure.

This workspace contains the following views:

**Distributed Virtual Switch - Switch_Name**
This view displays the selected Distributed Virtual switch in the virtual infrastructure.

**Distributed Virtual Uplinks - Switch_Name**
This view displays all the distributed virtual uplinks that are associated with the selected Distributed Virtual switch.

**Distributed Virtual Portgroups - Switch_Name**
This view displays all the distributed virtual port groups that are associated with the selected Distributed Virtual switch.
**DVS Host Member Health - Switch_Name**
This view displays health status of all the host associated with the selected Distributed Virtual switch.

**Network Detail workspace**
This workspace provides detail of a selected network in the infrastructure.

This workspace contains the following views:

- **Network - Network_Name**
  This view displays the selected network status and configuration. A link is provided to view the triggered alarms by network.

- **Networked Virtual Machines - Network_Name**
  This view shows the networked Virtual Machines usage.

- **Networked Servers - Network_Name**
  This view shows the networked servers usage.

- **Networked Virtual Switches - Network_Name**
  This view shows the networked virtual switches usage.

**Network NIC Detail workspace**
This workspace provides detail information about Network NIC in the infrastructure.

This workspace contains the following views:

- **Networked Virtual Machines - Switch_Name**
  This view displays the Networked Virtual Machines that are associated with the selected switch.

- **Distributed Virtual Uplinks - Switch_Name - Host_Name**
  This view displays all the distributed virtual uplinks that are associated with the selected Distributed Virtual switch.

- **Distributed Virtual Uplinks - Switch_Name - Portgroup_Name**
  This view displays all the distributed virtual port groups that are associated with the selected Distributed Virtual switch.

**Networks workspace**
This workspace displays a summary of all the networks that are configured within the data centers.

This workspace contains the following views:

- **Networks**
  This view displays all of the configured networks by data center and provides a summary of the health of the network. A link is provided to view the triggered alarms by network.

- **Standard Virtual Switches**
  This view displays all of the virtual standard switches in the virtual infrastructure.

- **Distributed Virtual Switches**
  This view displays all of the Distributed Virtual switches in the virtual infrastructure.

**VMware VI subnode**
The predefined workspace descriptions for the subnode are organized by the Navigator item to which the workspaces are relevant.

**VMware VI Navigator item**

**VMware VI workspace**
This workspace provides views that show performance indicators for a single ESX server or host.

This workspace contains the following views:

- **Server CPU Utilization**
  This view shows CPU usage of the server or host by individual CPU.

- **Server Memory Utilization**
  This view shows the overall memory usage of the server.
Server Network
This view shows the network performance of the server by network interface.

All Orphaned Virtual Machines workspace
This workspace shows details about all the orphaned virtual machines.

This workspace contains the following view:
All Orphaned Virtual Machines
This view contains a list of the orphaned virtual machines of virtual environment.

All Virtual Machines workspace
This workspace shows the details of all the virtual machines.

This workspace contains the following views:
Virtual Machines
This view shows the details about status of the virtual machines. In addition, this view contains a list of the virtual machines.
Virtual Machines by CPU
This view contains a list of the virtual machines that are categorized by CPU.
Virtual Machines by Memory
This view contains a list of the virtual machines that are categorized by memory.

CPU Navigator item
CPU workspace
This workspace provides views of the CPU usage of the ESX server.

This workspace contains the following views:
Virtual Machine CPU
This view shows the CPU usage of the virtual machines on this ESX server that are powered on.
Utilization by Virtual Machine Name - CPU%
This view shows the CPU usage of each virtual machine, by CPU, that is powered on.
Percent Ready by Virtual Machine Name - CPU
This view shows the CPU Percent Ready attribute for each virtual machine that is powered on. Ideally, this value is low.
Server CPU Percent Usage
This view shows the CPU usage of the ESX server.
CPU Percent Use Per VM
This view shows the CPU usage of the Virtual Machine.

Disk Navigator item
Disk workspace
This workspace provides views of the disk usage of the ESX server.

This workspace contains the following views:
Server Disk
This view shows the ESX server disk usage.
Virtual Machine Partitions
This view shows the disk partitions within the virtual machines. Partition information is available only if the virtual machine has the VMware Tools package installed and running.
Virtual Machine Disks
This view shows the virtual disks defined for the virtual machine.
Virtual Machine Disks Performance
This view shows information about the performance of disks that are associated with the virtual machines.

Server Disk Detail workspace
This workspace contains views that are specific to one ESX host. The metrics are for disks from the ESX host point of view. This data includes local disks and data stores visible to this host.
This workspace contains the following views:

**Server Disk IO**
- This graphical view displays metrics for each disk. The metrics show the number of read and write operations on the disk. The metrics command and commands aborted show how well the disk is servicing the requests.

**Server Disk Total Latencies**
- This graphical view displays the total latency values of the disk requests categorized into device, kernel and queue.

**Server Disk Details**
- This view shows a summary of the performance metrics for this disk.

**Server Disk Average Latencies**
- This graphical view displays the average latency metrics for the server disk introduced by the device, kernel and queue.

**Server Disk Performance workspace**
- This workspace contains views that are specific to one ESX host. The metrics are for disks from the ESX host point of view. This data includes local disks and data stores that are visible to this host.

This workspace contains the following views:

**Virtual Machine Disks**
- This view shows the virtual hard disk drives that are configured for the virtual machines that are running on this host.

**Server Disk**
- This view shows performance metrics for the disks defined to this host. This data includes local disks and data stores. These metrics give an idea of the demand on the disk and how well the disk is servicing the requests.

**Server SAN**
- This view shows configuration information about SAN-attached disks on the ESX host.

**ESX Server Navigator item**

**Agent Health workspace**
- This workspace contains a list of the VMware data stores.

This workspace contains the following view:

**VMWare VI Agent Status**
- This view contains a list of the status of the agent data collection operations for the attribute groups.

**ESX Server workspace**
- This workspace provides views that describe the overall operating state of an ESX server. Links that enable quick navigation to other workspaces have been provided in this workspace. To fully take advantage of this feature, the Monitoring Agent for Linux must be installed on the ESX server.

This workspace contains the following views:

**Server Summary**
- This partial view of the ESX server shows the server status and basic information.

**Server Parameters**
- This partial view of the ESX server shows the server status and basic resource consumption.

**Events**
- This view contains a list of events that have recently occurred. VMware alarms and events pertaining to this server are displayed here.

**Overall CPU Utilization**
- This view shows the overall CPU usage of this server. The areas in color represent usage ranges that are noteworthy.
**Overall Memory Utilization**  
This view shows the overall memory usage of this server.

**Server DataStore workspace**  
This workspace contains a list of the VMware data stores.

This workspace contains the following views:
- **Server DataStore**  
  This view contains a list of the data stores that this server is configured to use.
- **Server DataStore Usage**  
  This view contains a list of the usage information for each data store.
- **Server HBAs**  
  This view contains the Host Bus Adaptors for the EXS server.

**Server Health workspace**  
This workspace contains a list of all hardware sensors.

This workspace contains the following view:
- **Sensors**  
  This view contains a list of all hardware sensors, their status, and their value.

**Memory Navigator item**  
**Memory workspace**  
This workspace provides views of the memory usage of the ESX server.

This workspace contains the following views:
- **Server Memory**  
  This view shows the memory usage of the ESX server.
- **Virtual Machine Memory**  
  This view shows the memory usage and configuration settings for the virtual machines configured on this ESX server.
- **Guest Memory Utilization**  
  This view depicts the amount of memory used by the virtual machine guest operating system.

**Network Navigator item**  
**Network workspace**  
This workspace provides views of the network usage of the ESX server.

This workspace contains the following views:
- **Server Network**  
  This view shows the network usage of the ESX server.
- **Virtual Machine Network**  
  This view shows the network usage of the virtual machines on this ESX server.
- **Server Virtual Switches**  
  This view shows the virtual switches on this ESX server.

**Resource Pools Navigator item**  
**Resource Pools workspace**  
This workspace provides views of the resource pools that are known to the ESX server.

This workspace contains the following views:
- **Resource Pools**  
  This view shows the general metrics for the resource pools.
- **Resource Pool CPU**  
  This view shows the CPU metrics for the resource pools.
- **Resource Pool Memory**  
  This view shows the memory metrics for the resource pools.
Virtual Machines Navigator item

Virtual Machines workspace

This workspace provides views of the virtual machines that are defined on this ESX server.

This workspace contains the following views:

- **Virtual Machines Configuration**
  This view shows the properties given to virtual machines at the time they were created.

- **Virtual Machines Status**
  This view shows some of the runtime metrics for the virtual machines. If the VMware Tools package is not running on the virtual machine or the virtual machine is powered off, then several metrics are not known.

- **Virtual Machines Snapshots**
  This view shows information about the snapshots for the virtual machines.
Chapter 4. Attributes reference

Attributes are the application properties that are being measured and reported by the IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI.

About attributes

Attributes are organized into attribute groups. Attributes in an attribute group relate to a single object such as an application, or to a single kind of data such as status information.

Attributes in a group can be used in queries, query-based views, situations, policy workflows, take action definitions, and launch application definitions. Chart or table views and situations are two examples of how attributes in a group can be used:

- Chart or table views

  Attributes are displayed in chart and table views. The chart and table views use queries to specify which attribute values to request from a monitoring agent. You use the Properties editor to apply filters and set styles to define the content and appearance of a view based on an existing query.

- Situations

  You use attributes to create situations that monitor the state of your operating system, database, or application. A situation describes a condition you want to test. When you start a situation, the values you assign to the situation attributes are compared with the values collected by the VMware VI agent and registers an event if the condition is met. You are alerted to events by indicator icons that are displayed in the Navigator.

Additional information about attributes

For more information about using attributes and attribute groups, see the Tivoli Enterprise Portal User’s Guide.

For a list of the attribute groups, a list of the attributes in each attribute group, and descriptions of the attributes for this monitoring agent, see “Attribute groups for the monitoring agent” and “Attributes in each attribute group” on page 37.

Attribute groups for the monitoring agent

The VMware VI agent contains the following attribute groups. The table name depends on the maximum table name limits of the target database being used for the Tivoli Data Warehouse. If the maximum name is 30 characters, any warehouse table name longer than 30 characters is shortened to 30 characters.

- Attribute group name: Active Tasks
  - Table name: KVMATASKS
  - Warehouse table name: KVM_ACTIVE_TASKS or KVMATASKS
- Attribute group name: Agent Events
  - Table name: KVMAEVENTS
  - Warehouse table name: KVM_AGENT_EVENTS or KVMAEVENTS
- Attribute group name: Cluster DRS Faults
  - Table name: KVMCLTDRSF
  - Warehouse table name: KVM_CLUSTER_DRS_FAULTS or KVMCLTDRSF
- Attribute group name: Clustered Datastores
  - Table name: KVMCLTRDST
• Attribute group name: Clustered Resource Pools
  – Table name: KVMCLTRRPS
  – Warehouse table name: KVM_CLUSTERED_Resource_Pools or KVMCLTRRPS
• Attribute group name: Clustered Servers
  – Table name: KVMCLTRSRV
  – Warehouse table name: KVM_CLUSTERED_Servers or KVMCLTRSRV
• Attribute group name: Clustered Virtual Apps
  – Table name: KVMCLTVAPS
  – Warehouse table name: KVM_CLUSTERED_Virtual_Apps or KVMCLTVAPS
• Attribute group name: Clustered Virtual Machines
  – Table name: KVMCLTRVMS
  – Warehouse table name: KVM_CLUSTERED_Virtual_Machines or KVMCLTRVMS
• Attribute group name: Clusters
  – Table name: KVMCLUSTRT
  – Warehouse table name: KVM_CLUSTERS or KVMCLUSTRT
• Attribute group name: Datacenters
  – Table name: KVMDCTRS
  – Warehouse table name: KVM_DATACENTERS or KVMDCTRS
• Attribute group name: Datastore Cluster
  – Table name: KVMDRCLUST
  – Warehouse table name: KVM_DATASTORE_CLUSTER or KVMDRCLUST
• Attribute group name: Datastore Host Disks
  – Table name: KVMDSHSD
  – Warehouse table name: KVM_DATASTORE_HOST_DISKS or KVMDSHSD
• Attribute group name: Datastore Topology
  – Table name: KVMSTOPO
  – Warehouse table name: KVM_DATASTORE_TOPOLOGY or KVMSTOPO
• Attribute group name: Datastores
  – Table name: KVMDSTORES
  – Warehouse table name: KVM_DATASTORES or KVMDSTORES
• Attribute group name: Director
  – Table name: KVMDIRE
  – Warehouse table name: KVM_DIRECTOR or KVMDIRE
• Attribute group name: Distributed Virtual Portgroups
  – Table name: KVMDVPGRPS
  – Warehouse table name: KVM_DISTRIBUTED_VIRTUAL_PORTGROUPS or KVMDVPGRPS
• Attribute group name: Distributed Virtual Switch Health
  – Table name: KVMDVSHLTH
  – Warehouse table name: KVM_DISTRIBUTED_VIRTUAL_SWITCH_HEALTH or KVMDVSHLTH
• Attribute group name: Distributed Virtual Switches
  – Table name: KVMDVSWTCH
  – Warehouse table name: KVM_DISTRIBUTED_VIRTUAL_SWITCHES or KVMDVSWTCH
• Attribute group name: Distributed Virtual Uplinks
  – Table name: KVMDVUPLNK
- Warehouse table name: KVM_DISTRIBUTED_VIRTUAL_UPLINKS or KVMDVUPLNK
- Attribute group name: ESX Performance Object Status
  - Table name: KVMESXPOS
  - Warehouse table name: KVM_ESX_PERFORMANCE_OBJECT_STATUS or KVMESXPOS
- Attribute group name: Events
  - Table name: KVMIRAEVNT
  - Warehouse table name: KVM_EVENTS or KVMIRAEVNT
- Attribute group name: Monitored Servers
  - Table name: KVMDAG
  - Warehouse table name: KVM_MONITORED_SERVERS or KVMDAG
- Attribute group name: Networked Servers
  - Table name: KVMNETSERV
  - Warehouse table name: KVM_NETWORKED_SERVERS or KVMNETSERV
- Attribute group name: Networked Virtual Machines
  - Table name: KVMNETVM
  - Warehouse table name: KVM_NETWORKED_VIRTUAL_MACHINES or KVMNETVM
- Attribute group name: Networked Virtual Switches
  - Table name: KVMNVSWITC
  - Warehouse table name: KVM_NETWORKED_VIRTUAL_SWITCHES or KVMNVSWITC
- Attribute group name: Networks
  - Table name: KVMDCNETS
  - Warehouse table name: KVM_NETWORKS or KVMDCNETS
- Attribute group name: Performance Object Status
  - Table name: KVMPOBJST
  - Warehouse table name: KVM_PERFORMANCE_OBJECT_STATUS or KVMPOBJST
- Attribute group name: Resource Pool CPU
  - Table name: KVMRSPOOLC
  - Warehouse table name: KVMRESOURCE_POOL_CPU or KVMRSPOOLC
- Attribute group name: Resource Pool General
  - Table name: KVMRSPOOLG
  - Warehouse table name: KVMRESOURCE_POOL_GENERAL or KVMRSPOOLG
- Attribute group name: Resource Pool Memory
  - Table name: KVMRSPOOLM
  - Warehouse table name: KVMRESOURCE_POOL_MEMORY or KVMRSPOOLM
- Attribute group name: Server
  - Table name: KVMSERVERG
  - Warehouse table name: KVM_SERVER or KVMSERVERG
- Attribute group name: Server CPU
  - Table name: KVMSERVERC
  - Warehouse table name: KVM_SERVER_CPU or KVMSERVERC
- Attribute group name: Server DataStore
  - Table name: KVMSERVRDS
  - Warehouse table name: KVM_SERVER_DATASTORE or KVMSERVRDS
- Attribute group name: Server Disk
  - Table name: KVMSERVERD
- Warehouse table name: KVM_SERVER_DISK or KVMSERVERD

- Attribute group name: Server HBA
  - Table name: KVMSRVHBAS
  - Warehouse table name: KVM_SERVER_HBA or KVMSRVHBAS

- Attribute group name: Server Health
  - Table name: KVMSVRHLTH
  - Warehouse table name: KVM_SERVER_HEALTH or KVMSVRHLTH

- Attribute group name: Server Memory
  - Table name: KVMSERVERM
  - Warehouse table name: KVM_SERVER_MEMORY or KVMSERVERM

- Attribute group name: Server Network
  - Table name: KVMSERVERN
  - Warehouse table name: KVM_SERVER_NETWORK or KVMSERVERN

- Attribute group name: Server SAN
  - Table name: KVMSRVRSAN
  - Warehouse table name: KVM_SERVER_SAN or KVMSRVRSAN

- Attribute group name: Server Virtual Switches
  - Table name: KVMSRVVSWI
  - Warehouse table name: KVM_SERVER_VIRTUAL_SWITCHES or KVMSRVVSWI

- Attribute group name: Server VM Datastore Utilization
  - Table name: KVMSVMDSUT
  - Warehouse table name: KVM_SERVER_VM_DATASTORE_UTILIZATION or KVMSVMDSUT

- Attribute group name: SubNode Events
  - Table name: KVMSERVERE
  - Warehouse table name: KVM_SUBNODE_EVENTS or KVMSERVERE

- Attribute group name: Tasks
  - Table name: KVMTASKS
  - Warehouse table name: KVM_TASKS

- Attribute group name: Thread Pool Status
  - Table name: KVMTHPLST
  - Warehouse table name: KVM_THREAD_POOL_STATUS or KVMTHPLST

- Attribute group name: Topological Events
  - Table name: KVMTOPEVNT
  - Warehouse table name: KVM_TOPOLOGICAL_EVENTS or KVMTOPEVNT

- Attribute group name: Topology
  - Table name: KVMTOPO
  - Warehouse table name: KVM_TOPOLOGY or KVMTOPO

- Attribute group name: Triggered Alarms
  - Table name: KVMALARMS
  - Warehouse table name: KVM_TRIGGERED_ALARMS or KVMALARMS

- Attribute group name: vCenters
  - Table name: KVMVCENTER
  - Warehouse table name: KVM_VCENTERS or KVMVCENTER

- Attribute group name: Virtual Machines
  - Table name: KVMVM_GEN
• Warehouse table name: KVM_VIRTUAL_MACHINES or KVMVM_GEN
  • Attribute group name: Virtual Switches
    • Table name: KVMVSWITCH
    • Warehouse table name: KVM_VIRTUAL_SWITCHES or KVMVSWITCH
  • Attribute group name: VM CPU
    • Table name: KVMVM_CPU
    • Warehouse table name: KVM_VM_CPU
  • Attribute group name: VM Datastore Utilization
    • Table name: KVMVMDSUTL
    • Warehouse table name: KVM_VM_DATASTORE_UTILIZATION or KVMVMDSUTL
  • Attribute group name: VM Disk
    • Table name: KVMVM_DISK
    • Warehouse table name: KVM_VM_DISK
  • Attribute group name: VM Disk Performance
    • Table name: KVMVMDKPRF
    • Warehouse table name: KVM_VM_DISK_PERFORMANCE or KVMVMDKPRF
  • Attribute group name: VM Memory
    • Table name: KVMVM_MEM
    • Warehouse table name: KVM_VM_MEMORY or KVMVM_MEM
  • Attribute group name: VM Network
    • Table name: KVMVM_NET
    • Warehouse table name: KVM_VM_NETWORK or KVMVM_NET
  • Attribute group name: VM Orphaned Disk
    • Table name: KVMVMORPDI
    • Warehouse table name: KVM_VM_ORPHANED_DISK or KVMVMORPDI
  • Attribute group name: VM Partition
    • Table name: KVMVM_PART
    • Warehouse table name: KVM_VM_PARTITION or KVMVM_PART
  • Attribute group name: VM Snapshot
    • Table name: KVMVMSNAP
  • Attribute group name: VM SnapshotFileLayout
    • Table name: KVMVMSNPFL
  • Attribute group name: VM Snapshots
    • Table name: KVMVMSNAPS
    • Warehouse table name: KVM_VM_SNAPSHOTS or KVMVMSNAPS

Attributes in each attribute group

Attributes in each VMware VI agent attribute group collect data that the agent uses for monitoring.

The descriptions of the attribute groups contain the following information:

**Historical group**

Whether the attribute group is a historical type that you can roll off to a data warehouse.

**Attribute descriptions**

Information such as description, type, source, and warehouse name, as applicable, for each attribute in the attribute group.
Some attributes are designated as key attributes. A key attribute is an attribute that is used in warehouse aggregation to identify rows of data that represent the same object.

The Source information sometimes uses C programming code syntax for if-then-else clauses to describe how an attribute is derived, for example:

```
(CPU_Pct < 0 ) || (Memory_Pct < 0 )? 0 : 1
```

This example means that if the CPU_Pct attribute is less than 0 or if the Memory_Pct attribute is less than 0, then the attribute is set to 0. Otherwise, the attribute is set to 1.

**Active Tasks attribute group**

This attribute group provides information about the active tasks that are running on the vCenter server.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**

The following list contains information about each attribute in the Active Tasks attribute group:

**Node attribute:** This attribute is a key attribute.

- **Description:** The managed system name of the agent.
- **Type:** String
- **Source:** The source for this attribute is the agent.
- **Warehouse name:** NODE

**Timestamp attribute**

- **Description:** The local time at the agent when the data was collected.
- **Type:** String
- **Source:** The source for this attribute is the agent.
- **Warehouse name:** TIMESTAMP

**Source Hostname attribute:** This attribute is a key attribute.

- **Description:** The host name of the data source that created the task.
- **Type:** String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (Unavailable)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
- **Warehouse name:** SOURCE_HOSTNAME or SH

**Name attribute:** This attribute is a key attribute.

- **Description:** The name of the task.
- **Type:** String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Target Entity attribute**

<table>
<thead>
<tr>
<th>Description</th>
<th>Target Entity attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>The name of the target managed entity for the task.</td>
<td>NAME</td>
</tr>
</tbody>
</table>

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

TARGET_ENTITY or TE

**Status attribute**

<table>
<thead>
<tr>
<th>Description</th>
<th>Status attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>The current status of the task. The valid values are queued and running.</td>
<td>STATUS</td>
</tr>
</tbody>
</table>

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

STATUS

**Initiated By attribute**

<table>
<thead>
<tr>
<th>Description</th>
<th>Initiated By attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>The type of the entity that created the task. The valid values are user name, another schedule task name, alarm name, and system.</td>
<td>INITIATED_BY or IB</td>
</tr>
</tbody>
</table>

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

INITIATED_BY or IB

**Cancelable attribute**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cancelable attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicates whether cancellation of the task is supported.</td>
<td></td>
</tr>
</tbody>
</table>

**Type**

Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Yes (1)
- No (0)
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
CANCELABLE

Queue Time attribute

Description
The date and time when the task was created.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
QUEUE_TIME

Start Time attribute

Description
The date and time when the task started running.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
START_TIME

Target Entity Type attribute

Description
The type of the target managed entity for the task.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TARGET_ENTITY_TYPE or TET

Agent Events attribute group

This attribute group receives messages from the agent about agent status.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Agent Events attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE
**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

**Source attribute**

**Description**
The source of this agent event.

**Type**
String

**Warehouse name**
SOURCE

**Managed System attribute**

**Description**
The managed system that is associated with this event.

**Type**
String

**Warehouse name**
MANAGED_SYSTEM or MS

**Subsystem attribute**

**Description**
The subsystem of the agent that generated this event.

**Type**
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Permission (2)
- General (2)
- Task (1)
- Connection (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SUBSYSTEM

**Severity attribute**

**Description**
The level of severity for this agent event.

**Type**
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Severe (2)
- Warning (1)
- Info (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SEVERITY

**Message attribute**

**Description**
The message of this event.
Type

Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Server performance API unavailable. (23)
- Connection failed: Incorrect WSDL Version (22)
- Insufficient Permissions (21)
- Insufficient Permissions: Missing Datastore.Browse (20)
- Insufficient Permissions: Missing System.Read (19)
- Insufficient Permissions: Missing System.View (18)
- Initial Property Collection Complete (15)
- Connection failed: http redirected (14)
- Connection failed: unsupported server version (13)
- Agent Stopped (12)
- Agent Started (11)
- Connection failed: unknown failure (10)
- VM Power On Task Succeeded (9)
- VM Power On Task Failed (8)
- VM Power Off Task Succeeded (7)
- VM Power Off Task Failed (6)
- Connection reset (5)
- Connection succeeded (4)
- Connection failed: username or password invalid (3)
- Connection failed: ssl negotiation failed (2)
- Connection failed: connection refused (1)
- Connection failed: address not found (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

MESSAGE

Cluster DRS Faults attribute group

This attribute group provides information about the Distributed Resource Scheduler (DRS) and Storage Distributed Resource Scheduler (SDRS) faults that are generated in the cluster.

Historical group

This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions

The following list contains information about each attribute in the Cluster DRS Faults attribute group:

Node attribute: This attribute is a key attribute.

- Description: The managed system name of the agent.
- Type: String
- Source: The source for this attribute is the agent.
- Warehouse name: NODE

Timestamp attribute

- Description: The local time at the agent when the data was collected.
- Type: String
Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Source attribute: This attribute is a key attribute.

Description
The host name of the data source.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SOURCE

DataCenter attribute: This attribute is a key attribute.

Description
The name of the data center that contains the cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATACENTER

Cluster attribute: This attribute is a key attribute.

Description
The name of the cluster where the fault is generated.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CLUSTER

Fault Name attribute

Description
The name of the fault that is generated in the cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
FAULT_NAME

Reason attribute
Description
The code that explains why DRS attempted to set recommendations for entities (such as Rule enforcement, Power management, and so on) when faults were generated.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
REASON

Fault Message attribute

Description
The message that is displayed corresponding to the fault.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
FAULT_MESSAGE or FM

Source Hostname attribute

Description
The name of the host system of a virtual machine. If this attribute value is Unavailable, the fault is not associated with a particular virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SOURCE_HOSTNAME or SH

Target Hostname attribute

Description
The name of the target host system that is selected for the migration of virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TARGET_HOSTNAME or TH

Virtual Machine attribute
**Description**

The name of the virtual machine that the DRS was trying to move when the fault was generated. If this attribute value is Unavailable, the fault is not associated with a particular virtual machine.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

VIRTUAL_MACHINE or VM

**FT Virtual Machine attribute**

**Description**

The name of the fault tolerance virtual machine. If this attribute value is Unavailable, the fault is not associated with a particular virtual machine.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

FT_VIRTUAL_MACHINE or FVM

**DRS Type attribute**

**Description**

The type of DRS. The valid values are DRS and SDRS.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

DRS_TYPE

**Clustered Datastores attribute group**

This attribute group describes the data stores that are used by a cluster.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**

The following list contains information about each attribute in the Clustered Datastores attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**

The managed system name of the agent.

**Type**

String

**Source**

The source for this attribute is the agent.
Warehouse name

**NODE**

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**

TIMESTAMP

**Datacenter attribute:** This attribute is a key attribute.

**Description**
The name of the data center that contains the cluster.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

DATACENTER

**Cluster attribute:** This attribute is a key attribute.

**Description**
The name of the cluster.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

CLUSTER

**Datastore attribute:** This attribute is a key attribute.

**Description**
The name of the data store.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

DATASTORE

**Overall Status attribute**

**Description**
The overall status for this data store.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

OVERALL_STATUS or OS

### Accessible attribute

**Description**

Whether the data store is accessible or not.

**Type**

Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Yes (1)
- No (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

ACCESSIBLE

### Capacity attribute

**Description**

The storage capacity in MB of the data store.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

CAPACITY

### Percent Used attribute

**Description**

The percentage of used space in the data store.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

PERCENT_USED or PU

### Type attribute

**Description**

The type for the data store.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
<table>
<thead>
<tr>
<th>Warehouse name</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Remote Host Address attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The remote host address for the data store.</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Unavailable (Unavailable)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
<tr>
<td><strong>Warehouse name</strong></td>
<td>REMOTE_HOST_ADDRESS or RHA</td>
</tr>
<tr>
<td><strong>Remote Path attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The remote path for the data store.</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Unavailable (Unavailable)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
<tr>
<td><strong>Warehouse name</strong></td>
<td>REMOTE_PATH or RP</td>
</tr>
<tr>
<td><strong>Managed System Name attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The managed system name of the storage monitoring agent that is associated with the data.</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Unavailable (Unavailable)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
<tr>
<td><strong>Warehouse name</strong></td>
<td>MSN</td>
</tr>
<tr>
<td><strong>NodeID attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>This attribute is only for IBM-internal use.</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>String</td>
</tr>
<tr>
<td><strong>Warehouse name</strong></td>
<td>NODEID</td>
</tr>
<tr>
<td><strong>Connected Hosts attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The number of hosts that are connected to the data store.</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Unavailable (-1)</td>
</tr>
</tbody>
</table>
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CONNECTED_HOSTS or CH

**Connected VMs attribute**

**Description**
The number of virtual machines that are connected to the data store.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CONNECTED_VMS or CV

**Include Data In Summarization 0 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (Capacity < 0) || (Percent_USED < 0) ? 0 : 1.

**Warehouse name**
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

### Clustered Resource Pools attribute group

This attribute group describes the resource pools that are members of a cluster.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the Clustered Resource Pools attribute group:

- **Node attribute:** This attribute is a key attribute.

  **Description**
The managed system name of the agent.

  **Type**
  String

  **Source**
The source for this attribute is the agent.

  **Warehouse name**
  NODE

- **Timestamp attribute**

  **Description**
The local time at the agent when the data was collected.
Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

DataCenter attribute: This attribute is a key attribute.

Description
The name of the data center that contains the cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATACENTER

Cluster Name attribute: This attribute is a key attribute.

Description
The name of the cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CLUSTER_NAME or CN

Pool Name attribute: This attribute is a key attribute.

Description
The name of this resource pool.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
POOL_NAME

Max CPU Usage attribute

Description
The current upper bound on CPU usage in MHz. This limit is based on the limit that is configured for the resource pool and the limits that are configured for all parent resource pools.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
<table>
<thead>
<tr>
<th>Warehouse name</th>
<th>MAX_CPU_USAGE or MCU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Usage attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The CPU usage in MHz of all running child virtual machines including virtual machines in child resource pools.</td>
</tr>
</tbody>
</table>
| **Type** | Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:  
  - Unavailable (-1)  
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal. |

<table>
<thead>
<tr>
<th>Warehouse name</th>
<th>CPU_USAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Max Memory Usage attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The current upper bound on memory usage in MB. This limit is based on the limit configured for this resource pool and the limits configured for all parent resource pools.</td>
</tr>
</tbody>
</table>
| **Type** | Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:  
  - Unavailable (-1)  
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal. |

<table>
<thead>
<tr>
<th>Warehouse name</th>
<th>MAX_MEMORY_USAGE or MMU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Memory Usage attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The memory usage in MB of all running child virtual machines including virtual machines in child resource pools.</td>
</tr>
</tbody>
</table>
| **Type** | Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:  
  - Unavailable (-1)  
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal. |

<table>
<thead>
<tr>
<th>Warehouse name</th>
<th>MEMORY_USAGE or MU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Percent CPU Usage attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The percentage of CPU resources being used relative to the maximum amount currently available to this resource pool.</td>
</tr>
</tbody>
</table>
| **Type** | Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:  
  - Unavailable (-1)  
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal. |
Warehouse name
PERCENT_CPU_USAGE or PCU

Percent Memory Usage attribute
Description
The percentage of memory resources being used relative to the maximum amount currently available to this resource pool.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PERCENT_MEMORY_USAGE or PMU

Overall Status attribute
Description
The overall status for this alarm.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OVERALL_STATUS or OS

NodeID attribute
Description
This attribute is only for IBM-internal use.

Type
String

Warehouse name
NODEID

NodeType attribute
Description
The type of node. The valid values are kvm.Resource_Pool and kvm.Virtual_App.

Type
String

Warehouse name
NODETYPE

Include Data In Summarization 0 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
The source for this attribute is derived: (Max_CPU_Usage < 0) || (Percent_CPU_Usage < 0) || (CPU_Usage < 0) ? 0 : 1.

Warehouse name
INCLUD_E_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in the Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Max_Memory_Usage < 0) || (Memory_Usage < 0) || (Percent_Memory_Usage < 0) ? 0 : 1.

Warehouse name
INCLUD_E_DATA_IN_SUMMARIZATION_1 or IDIS1

Clustered Servers attribute group

This attribute group describes the ESX servers that are members of a cluster.

Historical group
This attribute group is eligible for use with the Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Clustered Servers attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute

Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

DataCenter attribute: This attribute is a key attribute.

Description
The name of the data center that contains the cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal.
Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

DATACENTER

**Cluster Name attribute: This attribute is a key attribute.**

**Description**
The name of the cluster.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

CLUSTER_NAME or CN

**Server Hostname attribute: This attribute is a key attribute.**

**Description**
The host name of the ESX server that is a member of this cluster.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

SERVER_HOSTNAME or SH

**Server CPU Utilization attribute**

**Description**
The overall CPU usage of this ESX server.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

SERVER_CPU_UTILIZATION or SCU

**Server Memory Utilization attribute**

**Description**
The overall memory usage of this ESX server.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
### CPU Effective Contribution attribute

**Description**
The percentage of CPU resources that this server contributes to the effective CPU of the cluster.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

### CPU Total Contribution attribute

**Description**
The percentage of CPU resources that this server contributes to the total CPU of the cluster.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

### CPU Effective Utilization attribute

**Description**
The CPU usage of this server as a percentage of the effective CPU resources that are owned by this cluster.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

### CPU Total Utilization attribute

**Description**
The CPU usage of this server as a percentage of the total CPU resources that are owned by this cluster.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Mem Effective Contribution attribute

Description
The percentage of memory resources that this server contributes to the effective memory of the cluster.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MEM_EFFECTIVE_CONTRIBUTION or MEC

Mem Total Contribution attribute

Description
The percentage of memory resources that this server contributes to the total memory of the cluster.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MEM_TOTAL_CONTRIBUTION or MTC

Memory Effective Utilization attribute

Description
The memory usage of this server as a percentage of the effective memory resources that are owned by this cluster.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MEMORY_EFFECTIVE_UTILIZATION or MEU

Memory Total Utilization attribute

Description
The memory usage of this server as a percentage of the total memory resources that are owned by this cluster.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MEMORY_TOTAL_UTILIZATION or MTU

MSN Name attribute
Description
The managed system name that is associated with the data.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MSN_NAME

Overall Status attribute
Description
The overall status for this alarm.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OVERALL_STATUS or OS

NodeID attribute
Description
This attribute is only for IBM-internal use.

Type
String

Warehouse name
NODEID

Include Data In Summarization 0 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Server_CPU_Utilization < 0 ) ||
(CPU_Total_Utilization < 0 ) || (CPU_Effective_Utilization < 0 )? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).
Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source

The source for this attribute is derived: (Server_Memory_Utilization < 0) || (Memory_Total_Utilization < 0) || (Memory_Effective_Utilization < 0) ? 0 : 1.

Warehouse name

INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

Include Data In Summarization 2 attribute

Description

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source

The source for this attribute is derived: (CPU_Effective_Contribution < 0) || (CPU_Total_Contribution < 0) || (Mem_Effective_Contribution < 0) || (Mem_Total_Contribution < 0) ? 0 : 1.

Warehouse name

INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

Clustered Virtual Apps attribute group

This attribute group provides information about the virtual machines and virtual applications in the cluster.

Historical group

This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions

The following list contains information about each attribute in the Clustered Virtual Apps attribute group:

Node attribute: This attribute is a key attribute.

Description

The managed system name of the agent.

Type

String

Source

The source for this attribute is the agent.

Warehouse name

NODE

Timestamp attribute

Description

The local time at the agent when the data was collected.
Type
  String
Source
  The source for this attribute is the agent.
Warehouse name
  TIMESTAMP
Datacenter attribute: This attribute is a key attribute.
Description
  The name of the data center that contains the cluster.
Type
  String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  • Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
  DATACENTER
Cluster Name attribute: This attribute is a key attribute.
Description
  The name of the cluster.
Type
  String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  • Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
  CLUSTER_NAME or CN
Virtual App Name attribute: This attribute is a key attribute.
Description
  The name of the virtual application.
Type
  String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  • Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
  VIRTUAL_APP_NAME or VAN
Virtual Machine Name attribute
Description
  The name of the virtual machine.
Type
  String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  • Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
  VIRTUAL_MACHINE_NAME or VMN
Destroy With Parent attribute

Description
Indicates whether the virtual machine must be removed when the virtual application that is associated with the virtual machine is removed.

Type
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Yes (1)
- No (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DESTROY_WITH_PARENT or DWP

Waiting for Guest attribute

Description
Indicates whether the virtual machine must start after receiving a heartbeat from the guest operating system.

Type
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Yes (1)
- No (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
WAITING_FOR_GUEST or WFG

Start Action attribute

Description
Indicates the method by which the virtual machine starts. The valid values are none and powerOn.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
START_ACTION or SA

Stop Action attribute

Description
Indicates the method by which the virtual machine stops. The valid values are none, powerOff, guestShutdown, and suspend.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
STOP_ACTION or SA0
Start Delay attribute

Description
The amount of time (in seconds) that the subsequent virtual machine was delayed to start in a sequence of virtual machines.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
START_DELAY or SD

Stop Delay attribute

Description
The amount of time (in seconds) that the subsequent virtual machine was delayed to stop in a sequence of virtual machines.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
STOP_DELAY

Start Order attribute

Description
Indicates the order in which the virtual machine starts.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
START_ORDER or SO

VM MORRef attribute

Description
The internal managed object reference name of the virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MOREF

NodeID attribute

Description
This attribute is only for IBM-internal use.
Clustering Virtual Machines attribute group

This attribute group describes the virtual machines that are members of a cluster.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Clustered Virtual Machines attribute group:

Node attribute: This attribute is a key attribute.
Description
The managed system name of the agent.
Type
String
Source
The source for this attribute is the agent.
Warehouse name
NODE

Timestamp attribute
Description
The local time at the agent when the data was collected.
Type
String
Source
The source for this attribute is the agent.
Warehouse name
TIMESTAMP

DataCenter attribute: This attribute is a key attribute.
Description
The name of the data center that contains the cluster.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
DATACENTER

Cluster Name attribute: This attribute is a key attribute.
Description
The name of the cluster.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
CLUSTER_NAME or CN
**VM Name attribute:** This attribute is a key attribute.

**Description**
The user-defined display name of this virtual machine.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
VM_NAME

**CPU Utilization attribute**

**Description**
The overall CPU usage of this virtual machine during the collection interval.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CPU_UTILIZATION or CU

**Memory Utilization attribute**

**Description**
The overall memory usage of this virtual machine during the collection interval.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
MEMORY_UTILIZATION or MU

**MSN Name attribute**

**Description**
The managed system name that is associated with the data.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
MSN_NAME

**Overall Status attribute**

**Description**
The overall status for this alarm.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal.
Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
OVERALL_STATUS or OS

**NodeID attribute**

**Description**
This attribute is only for IBM-internal use.

**Type**
String

**Warehouse name**
NODEID

**Include Data In Summarization 0 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (CPU_Utilization < 0 ) ||
(Memory_Utilization < 0 ) ? 0 : 1.

**Warehouse name**
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

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**Clusters attribute group**

This attribute group contains metrics that describe the configuration and performance of a cluster.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the Clusters attribute group:

**Node attribute**
This attribute is a key attribute.

**Description**
The managed system name of the agent.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
NODE

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String
Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

DataCenter attribute: This attribute is a key attribute.

Description
The name of the data center that contains the cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATACENTER

Cluster Name attribute: This attribute is a key attribute.

Description
The name of the cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CLUSTER_NAME or CN

DRS Enabled attribute

Description
Indicates whether the VMware Dynamic Resource Scheduling facility is enabled for this cluster.

Type
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Yes (1)
• No (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DRS_ENABLED or DE

HA Enabled attribute

Description
Indicates whether the VMware High Availability feature is enabled for this cluster.

Type
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Yes (1)
• No (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
**Number Servers attribute**

**Description**
The number of ESX servers that are members of this cluster.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Effective Servers attribute**

**Description**
The number of ESX servers that are available to run virtual machines. Hosts that are unresponsive or in VMware maintenance mode are not counted.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Number CPUs attribute**

**Description**
The number of physical CPU cores across the cluster.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Total Memory attribute**

**Description**
The total memory capacity in GB over all of the member servers in the cluster.

**Type**
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Effective Memory attribute**
Description
The amount of memory in GB that is available to run virtual machines.

Type
Real number (32-bit gauge) with three decimal places of precision with
enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The
warehouse and queries return the values that are shown in parentheses. The
following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
EFFECTIVE_MEMORY or EM

Total CPU attribute
Description
The total amount of CPU resources in GHz over all of the member servers in the
cluster.

Type
Real number (32-bit gauge) with three decimal places of precision with
enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The
warehouse and queries return the values that are shown in parentheses. The
following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
TOTAL_CPU

Effective CPU attribute
Description
The amount of CPU in GHz that is available to run virtual machines. This is an
aggregation from all servers that are running normally. The amount of CPU used
by the service consoles on each server is not included in the total.

Type
Real number (32-bit gauge) with three decimal places of precision with
enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The
warehouse and queries return the values that are shown in parentheses. The
following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
EFFECTIVE_CPU or EC

Number vMotions attribute
Description
The total number of migrations that have occurred within this cluster.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
NUMBER_VMOTIONS or NV

Overall Status attribute
Description
The overall operational status of the cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OVERALL_STATUS or OS

CPU Utilization attribute

Description
The total number of CPU resources being used by the member servers divided by the total CPU of the cluster, excluding any members in maintenance mode.

Type
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CPU_UTILIZATION or CU

Memory Utilization attribute

Description
The total amount of memory resources being used by the member servers divided by the total memory of the cluster, excluding any members in maintenance mode.

Type
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MEMORYUTILIZATION or MU

CPU 00 10 attribute

Description
The number of servers in this cluster whose CPU usage is 0 - 10 percent.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CPU_00_10

CPU 10 20 attribute
Description
The number of servers in this cluster whose CPU usage is 11 - 20 percent.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CPU_10_20

CPU 20 30 attribute

Description
The number of servers in this cluster whose CPU usage is 21 - 30 percent.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CPU_20_30

CPU 30 40 attribute

Description
The number of servers in this cluster whose CPU usage is 31 - 40 percent.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CPU_30_40

CPU 40 50 attribute

Description
The number of servers in this cluster whose CPU usage is 41 - 50 percent.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CPU_40_50

CPU 50 60 attribute

Description
The number of servers in this cluster whose CPU usage is 51 - 60 percent.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CPU_50_60

**CPU 60 70 attribute**

**Description**
The number of servers in this cluster whose CPU usage is 61 - 70 percent.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CPU_60_70

**CPU 70 80 attribute**

**Description**
The number of servers in this cluster whose CPU usage is 71 - 80 percent.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CPU_70_80

**CPU 80 90 attribute**

**Description**
The number of servers in this cluster whose CPU usage is 81 - 90 percent.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CPU_80_90

**CPU 90 100 attribute**

**Description**
The number of servers in this cluster whose CPU usage is 91 - 100 percent.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CPU_90_100
Memory 00 10 attribute
Description
The number of servers in this cluster whose memory usage is 0 - 10 percent.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
MEMORY_00_10 or M01

Memory 10 20 attribute
Description
The number of servers in this cluster whose memory usage is 11 - 20 percent.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
MEMORY_10_20 or M12

Memory 20 30 attribute
Description
The number of servers in this cluster whose memory usage is 21 - 30 percent.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailability (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
MEMORY_20_30 or M23

Memory 30 40 attribute
Description
The number of servers in this cluster whose memory usage is 31 - 40 percent.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
MEMORY_30_40 or M34

Memory 40 50 attribute
Description
The number of servers in this cluster whose memory usage is 41 - 50 percent.
Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable (-1)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
MEMORY_40_50 or M45

**Memory 50 60 attribute**

**Description**
The number of servers in this cluster whose memory usage is 51 - 60 percent.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable (-1)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
MEMORY_50_60 or M56

**Memory 60 70 attribute**

**Description**
The number of servers in this cluster whose memory usage is 61 - 70 percent.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable (-1)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
MEMORY_60_70 or M67

**Memory 70 80 attribute**

**Description**
The number of servers in this cluster whose memory usage is 71 - 80 percent.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable (-1)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
MEMORY_70_80 or M78

**Memory 80 90 attribute**

**Description**
The number of servers in this cluster whose memory usage is 81 - 90 percent.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable (-1)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
 MEMORY_80_90 or M89
Memory 90 100 attribute
Description
The number of servers in this cluster whose memory usage is 91 - 100 percent.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
 MEMORY_90_100 or M91
Percent Effective Servers attribute
Description
The percentage of servers defined to the cluster that are available to run virtual machines.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
 PERCENT_EFFECTIVE_SERVERS or PES
Percent Effective CPU attribute
Description
The percentage of CPU for the cluster that is available to run virtual machines.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
 PERCENT_EFFECTIVE_CPU or PEC
Percent Effective Memory attribute
Description
The percentage of memory for the cluster that is available to run virtual machines.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
 PERCENT_EFFECTIVE_MEMORY or PEM
Number VMs attribute
Description
The number of virtual machines that are configured within this cluster.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NUMBER_VMS

Number VMs On attribute
Description
The number of virtual machines that are configured within this cluster that are powered on.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NUMBER_VMS_ON or NVO

Datacenter MORef attribute
Description
The internal managed object reference name of the data center for this cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATACENTER_MOREF or DM

Cluster MORef attribute
Description
The internal managed object reference name of this cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CLUSTER_MOREF or CM

Datastores Total Space attribute
Description
The total space of all data stores connected to this cluster in MB.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DATASTORES_TOTAL_SPACE or DTS

**Datastores Total Free Space attribute**

**Description**
The total free space of all data stores connected to this cluster in MB.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DATASTORES_TOTAL_FREE_SPACE or DTFS

**NodeID attribute**

**Description**
This attribute is only for IBM-internal use.

**Type**
String

**Warehouse name**
NODEID

**Servers In Maintenance Mode attribute**

**Description**
The number of ESX servers that are in maintenance mode.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SERVERS_IN_MAINTENANCE_MODE or SIMM

**Total VM Configured Memory attribute**

**Description**
The total amount of memory in GB configured for all VMs in the cluster.

**Type**
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TOTAL_VM_CONFIGURED_MEMORY or TVCM

**Total VM Provisioned Space attribute**
Description
The total amount of space in GB that is provisioned for use by VMs in this cluster.

Type
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TOTAL_VM_PROVISIONED_SPACE or TVPS

Physical NICs attribute
Description
The total number of physical network interface cards in the cluster.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PHYSICAL_NICS or PN

Physical NICs Down attribute
Description
The total number of physical network interface cards in the cluster with a link status of down.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PHYSICAL_NICS_DOWN or PND

Current EVC Mode attribute
Description
The current Enhanced VMotion Compatibility (EVC) mode of the cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CURRENT_EVC_MODE or CEM

Include Data In Summarization 0 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Number_Servers < 0) || (Number_CPUs < 0) || (Effective_Servers < 0) || (Percent_Effective_Servers < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Total_Memory < 0) || (Effective_Memory < 0) || (Percent_Effective_Memory < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

Include Data In Summarization 2 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Total_CPU < 0) || (Effective_CPU < 0) || (Percent_Effective_CPU < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2
Include Data In Summarization 3 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (CPU_Utilization < 0 ) || (Memory_Utilization < 0 )? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_3 or IDIS3

Include Data In Summarization 4 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (CPU_00_10 < 0 ) || (CPU_10_20 < 0 ) || (CPU_20_30 < 0 ) || (CPU_30_40 < 0 ) || (CPU_40_50 < 0 ) || (CPU_50_60 < 0 ) || (CPU_60_70 < 0 ) || (CPU_70_80 < 0 ) || (CPU_80_90 < 0 ) || (CPU_90_100 < 0 ) || (Memory_00_10 < 0 ) || (Memory_10_20 < 0 ) || (Memory_20_30 < 0 ) || (Memory_30_40 < 0 ) || (Memory_40_50 < 0 ) || (Memory_50_60 < 0 ) || (Memory_60_70 < 0 ) || (Memory_70_80 < 0 ) || (Memory_80_90 < 0 ) || (Memory_90_100 < 0 )? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_4 or IDIS4

Include Data In Summarization 5 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Source
The source for this attribute is derived: (Number_VMs < 0) ||
(Number_VMs_On < 0) || (Number_vMotions < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_5 or IDIS5

Include Data In Summarization 6 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Datastores_Total_Space < 0) ||
(Datastores_Total_Free_Space < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_6 or IDIS6

Include Data In Summarization 7 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Physical_NICs < 0) ||
(Physical_NICs_Down < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_7 or IDIS7

Include Data In Summarization 8 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Datacenters attribute group
This attribute group contains information about the data centers in the virtual infrastructure.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Datacenters attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.
**Warehouse name**

**NODE**

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

**Datacenter attribute**: This attribute is a key attribute.

**Description**
The name of this data center.

**Type**
String

**Warehouse name**
DATACENTER

**Total Servers attribute**

**Description**
The total numbers of servers that are members of this data center.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TOTAL_SERVERS or TS

**Effective Servers attribute**

**Description**
The total number of effective servers that are members of this data center.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
EFFECTIVE_SERVERS or ES

**Percent Effective Servers attribute**

**Description**
The percent of servers that are effective for this data center.

**Type**
Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
PERCENT_EFFECTIVE_SERVERS or PES

**Total Memory attribute**

- **Description**: The total amount of memory of this data center in MB.
- **Type**: Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (-1)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TOTAL_MEMORY or TM

**Effective Memory attribute**

- **Description**: The total amount of effective memory of this data center in MB.
- **Type**: Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (-1)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
EFFECTIVE_MEMORY or EM

**Memory Utilization attribute**

- **Description**: The percent of available memory being used in this data center.
- **Type**: Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (-1)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MEMORY_UTILIZATION or MU

**Total CPU attribute**

- **Description**: The total amount of CPU of this data center in MHz.
- **Type**: Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (-1)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TOTAL_CPU

**Effective CPU attribute**

- **Description**: The total amount of effective CPU of this data center in MHz.
Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

EFFECTIVE_CPU or EC

CPU Utilization attribute

Description
The percent of available CPU being used in this data center.

Type
Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

CPU_UTILIZATION or CU

Overall Status attribute

Description
The overall status for this alarm.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

OVERALL_STATUS or OS

NodeID attribute

Description
This attribute is only for IBM-internal use.

Type
String

Warehouse name

NODEID

Include Data In Summarization 0 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Source
The source for this attribute is derived: (Total_Servers < 0) || (Effective_Servers < 0) || (Percent_Effective_Servers < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Total_Memory < 0) || (Effective_Memory < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

Include Data In Summarization 2 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Total_CPU < 0) || (Effective_CPU < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

Include Data In Summarization 3 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Source
The source for this attribute is derived: (Memory_Utilization < 0) || (CPU_Utilization < 0) ? 0 : 1.

Warehouse name
INCLUD_DATA_IN_SUMMARIZATION_3 or IDIS3

Datastore Cluster attribute group
This attribute group contains attributes that provide information about the data store cluster (StoragePod).

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Datastore Cluster attribute group:

Node attribute: This attribute is a key attribute.
Description
The managed system name of the agent.
Type
String
Source
The source for this attribute is the agent.
Warehouse name
NODE

Timestamp attribute
Description
The local time at the agent when the data was collected.
Type
String
Source
The source for this attribute is the agent.
Warehouse name
TIMESTAMP

DataCenter attribute: This attribute is a key attribute.
Description
The name of the data center that the data store cluster belongs to.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
DATACENTER

Datastore Cluster attribute: This attribute is a key attribute.
Description
The name of the data store cluster.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
<table>
<thead>
<tr>
<th>Warehouse name</th>
<th>DATASTORE_CLUSTER or DC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Config Status attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The configuration status of the data store cluster. If a problem is detected in the configuration of the data store cluster, the value is displayed as red; and if a problem is about to occur or a transient condition has occurred, the value is displayed as yellow.</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Unavailable (Unavailable)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
<tr>
<td><strong>Warehouse name</strong></td>
<td>CONFIG_STATUS or CS</td>
</tr>
<tr>
<td><strong>Overall Status attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The overall alarm status of the data store cluster. If an alarm is triggered for the data store cluster, the value is displayed as red or yellow.</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Unavailable (Unavailable)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
<tr>
<td><strong>Warehouse name</strong></td>
<td>OVERALL_STATUS or OS</td>
</tr>
<tr>
<td><strong>Default IntraVm Affinity attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Indicates whether, by default, each virtual machine must have a virtual disk on the same data store in the data store cluster. The valid values are True and False.</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• True (1)</td>
</tr>
<tr>
<td></td>
<td>• False (0)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
<tr>
<td><strong>Warehouse name</strong></td>
<td>DEFAULT_INTRAVM_AFFINITY or DIA</td>
</tr>
<tr>
<td><strong>IO Load Balance Enabled attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Indicates whether the data store cluster considers the Storage I/O workload while creating load balancing and initial placement recommendations.</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• True (1)</td>
</tr>
<tr>
<td></td>
<td>• False (0)</td>
</tr>
</tbody>
</table>
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

IO_LOAD_BALANCE_ENABLED or ILBE

**Load Balance Interval attribute**

**Description**
The interval (in minutes) that the Storage Distributed Resource Scheduler (DRS) runs to load balance among data stores within the data store cluster.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
LOAD_BALANCE_INTERVAL or LBI

**Datastore Count attribute**

**Description**
The number of data stores in the data store cluster.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DATASTORE_COUNT or DC0

**Total Capacity attribute**

**Description**
The storage capacity in GB of this data store cluster.

**Type**
Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CAPACITY

**Capacity Used attribute**

**Description**
The amount of allocated storage in GB for the data store cluster.

**Type**
Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
<table>
<thead>
<tr>
<th>Warehouse name</th>
<th>CAPACITY_USED or CU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Percent Capacity Free attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The percentage of unused capacity in the data store cluster.</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Unavailable (-1)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
<tr>
<td>Warehouse name</td>
<td>PERCENT_CAPACITY_FREE or PCF</td>
</tr>
<tr>
<td><strong>Include Data In Summarization 0 attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Value Exceeds Maximum (2147483647)</td>
</tr>
<tr>
<td></td>
<td>• Value Exceeds Minimum (-2147483648)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
<tr>
<td><strong>Source</strong></td>
<td>The source for this attribute is derived: (Capacity &lt; 0 )</td>
</tr>
<tr>
<td>Warehouse name</td>
<td>INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0</td>
</tr>
<tr>
<td><strong>Include Data In Summarization 1 attribute</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Value Exceeds Maximum (2147483647)</td>
</tr>
<tr>
<td></td>
<td>• Value Exceeds Minimum (-2147483648)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
<tr>
<td><strong>Source</strong></td>
<td>The source for this attribute is derived: (Percent_Capacity_Free &lt; 0)? 0 : 1.</td>
</tr>
<tr>
<td>Warehouse name</td>
<td>INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1</td>
</tr>
</tbody>
</table>

**Datastore Host Disks attribute group**

This attribute group contains a mapping from a data store to a host disk.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.
Attribute descriptions

The following list contains information about each attribute in the Datastore Host Disks attribute group:

**Node attribute: This attribute is a key attribute.**

- **Description**
  - The managed system name of the agent.
- **Type**
  - String
- **Source**
  - The source for this attribute is the agent.
- **Warehouse name**
  - NODE

**Timestamp attribute**

- **Description**
  - The local time at the agent when the data was collected.
- **Type**
  - String
- **Source**
  - The source for this attribute is the agent.
- **Warehouse name**
  - TIMESTAMP

**DataCenter attribute: This attribute is a key attribute.**

- **Description**
  - The name of the data center that contains this disk.
- **Type**
  - String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (Unavailable)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
- **Warehouse name**
  - DATACENTER

**Host attribute: This attribute is a key attribute.**

- **Description**
  - The name of the host system for this disk.
- **Type**
  - String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (Unavailable)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
- **Warehouse name**
  - HOST

**Datastore attribute**

- **Description**
  - The name of the data store on this disk.
- **Type**
  - String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DATASTORE

**Disk attribute:** This attribute is a key attribute.

**Description**
The name of the disk.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DISK

**NodeID attribute:** This attribute is a key attribute.

**Description**
This attribute is only for IBM-internal use.

**Type**
String

**Warehouse name**
NODEID

---

**Datastore Topology attribute group**

This attribute group contains information about the storage topology of the virtual infrastructure.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the Datastore Topology attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**
The managed system name of the agent.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
NODE

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

**NodeName attribute**

**Description**
The name of this node in the tree.

**Type**
String
Warehouse name
   NODENAME

NodeID attribute: This attribute is a key attribute.
Description
   The identifier for this node in the topology.
Type
   String

Warehouse name
   NODEID

NodeType attribute
Description
   The kind of node in the tree.
Type
   String

Warehouse name
   NODETYPE

NodeStatus attribute
Description
   The status of this node.
Type
   String

Warehouse name
   NODESTATUS

ConnectToNode attribute: This attribute is a key attribute.
Description
   Indicates a connection from the NodeID to the node specified here.
Type
   String

Warehouse name
   CONNECTTONODE or C

ConnectionType attribute
Description
   The connection type from this node to the parent of this node.
Type
   String

Warehouse name
   CONNECTIONTYPE or C0

Managed System Name attribute
Description
   The managed system name that is associated with the data.
Type
   String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
   • Unavailable (Unavailable)

   Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
   MSN

Datacenter attribute: This attribute is a key attribute.
Description
   The name of this data center.
Type
   String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal.
Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

DATACENTER

**Datastores attribute group**

This attribute group displays general information about data stores.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**

The following list contains information about each attribute in the Datastores attribute group:

- **Node attribute:** This attribute is a key attribute.
  
  **Description**
  
  The managed system name of the agent.

  **Type**
  
  String

  **Source**
  
  The source for this attribute is the agent.

  **Warehouse name**
  
  NODE

- **Timestamp attribute**
  
  **Description**
  
  The local time at the agent when the data was collected.

  **Type**
  
  String

  **Source**
  
  The source for this attribute is the agent.

  **Warehouse name**
  
  TIMESTAMP

- **Name attribute:** This attribute is a key attribute.
  
  **Description**
  
  The name of the data store.

  **Type**
  
  String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  
  - Unavailable (Unavailable)

  Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

  **Warehouse name**
  
  NAME

- **Datacenter attribute:** This attribute is a key attribute.
  
  **Description**
  
  The name of the data center for the data store.

  **Type**
  
  String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  
  - Unavailable (Unavailable)

  Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
DATACENTER

**Type attribute**

**Description**
The type for the data store.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TYPE

**Overall Status attribute**

**Description**
The overall status for the data store.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OVERALL_STATUS or OS

**Accessible attribute**

**Description**
Whether the data store is accessible or not.

**Type**
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Yes (1)
- No (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
ACCESSIBLE

**Remote Host Address attribute**

**Description**
The remote host address for the data store.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
REMOTE_HOST_ADDRESS or RHA

**Remote Path attribute**

**Description**
The remote path for the data store.
| Type | String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:  
|      | • Unavailable (Unavailable)  
|      | Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal. |

**Warehouse name**  
REMOTE_PATH or RP

### URL attribute

<table>
<thead>
<tr>
<th>Description</th>
<th>The remote URL for the data store.</th>
</tr>
</thead>
</table>

| Type | String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:  
|      | • Unavailable (Unavailable)  
|      | Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal. |

**Warehouse name**  
URL

### Capacity attribute

<table>
<thead>
<tr>
<th>Description</th>
<th>The storage capacity in MB of the data store.</th>
</tr>
</thead>
</table>

| Type | Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:  
|      | • Unavailable (-1)  
|      | Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal. |

**Warehouse name**  
CAPACITY

### Used Space attribute

<table>
<thead>
<tr>
<th>Description</th>
<th>The amount of allocated storage in MB for the data store.</th>
</tr>
</thead>
</table>

| Type | Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:  
|      | • Unavailable (-1)  
|      | Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal. |

**Warehouse name**  
USED_SPACE

### Free Space attribute

<table>
<thead>
<tr>
<th>Description</th>
<th>The amount of available storage in MB for the data store.</th>
</tr>
</thead>
</table>

| Type | Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:  
|      | • Unavailable (-1)  
|      | Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal. |
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
FREE_SPACE

**Percent Used attribute**

**Description**
The percentage of used space in the data store.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
PERCENT_USED or PU

**Percent Free attribute**

**Description**
The percentage of unused space in this data store.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
PERCENT_FREE or PF

**Maximum File Size attribute**

**Description**
The maximum size in KB of a file that might be allocated on this data store.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
- > 2048GB (-2)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
MAXIMUM_FILE_SIZE or MFS

**Connected Hosts attribute**

**Description**
The number of hosts that are connected to the data store.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CONNECTED_HOSTS or CH

**Connected VMs attribute**
Description
The number of virtual machines that are connected to the data store.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CONNECTED_VMS or CV

Connected Clusters attribute
Description
The number of clusters with hosts connected to this data store.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CONNECTED_CLUSTERS or CC

Managed System Name attribute
Description
The managed system name of the storage monitoring agent that is associated with the data.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MSN

Total Read attribute
Description
The total kilobytes read per second by all virtual machines that are configured for this datastore.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TOTAL_READ_KBPS or TRK

Total Write attribute
Description
The total kilobytes written per second by all virtual machines that are configured for this datastore.
**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TOTAL_WRITE_KBPS or TWK

**Total IO attribute**
**Description**
The sum of total kilobytes read and written per second by all virtual machines that are configured for this datastore.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TOTAL_IO_KBPS or TIK

**Datastore MOREf attribute**
**Description**
The internal managed object reference name of the datastore.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DATASTORE_MOREF or DM

**NetApp Volume Name attribute**
**Description**
A best effort guess at the corresponding NetApp volume name for the datastore.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)
- No DNS Record (No_DNS_Record)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
NETAPP_VOLUME_NAME or NVN

**Overcommitted attribute**
**Description**
The amount of space, in megabytes, that the datastore has provisioned without available backing storage. This value can be negative, with a lower bound of negative free space.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

<table>
<thead>
<tr>
<th>Warehouse name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Overcommitted attribute</td>
<td>The percentage of the total capacity of the datastore, which is overcommitted. This attribute has a lower bound of -100% and no upper bound.</td>
</tr>
<tr>
<td>Type</td>
<td>Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Unavailable (-1)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warehouse name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NodeID attribute</td>
<td>This attribute is only for IBM-internal use.</td>
</tr>
<tr>
<td>Type</td>
<td>String</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warehouse name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snapshot Storage Consumed attribute</td>
<td>The amount of disk space (in GB) that is used by the snapshots.</td>
</tr>
<tr>
<td>Type</td>
<td>Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Unavailable (-1)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warehouse name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Snapshot Storage Consumed attribute</td>
<td>The percentage amount of disk space that is used by the snapshots.</td>
</tr>
<tr>
<td>Type</td>
<td>Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Unavailable (-1)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
</tbody>
</table>
**Datastore Cluster attribute**

**Description**
The name of the data store cluster that the data store belongs to.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)
  
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DATASTORE_CLUSTER or DC

---

**Include Data In Summarization 0 attribute**

**Description**
This attribute is only for IBM-internal use. Indicating whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)
  
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (Capacity < 0 ) || (Used_Space < 0 ) ||
  (Free_Space < 0 ) || (Percent_Used < 0 ) ||
  (Percent_Snapshot_Storage_Consumed < 0 ) || (Percent_Free < 0 )? 0 : 1.

**Warehouse name**
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

---

**Include Data In Summarization 1 attribute**

**Description**
This attribute is only for IBM-internal use. Indicating whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)
  
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (Maximum_File_Size < 0 )? 0 : 1.

**Warehouse name**
INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

---

**Include Data In Summarization 2 attribute**

**Description**
This attribute is only for IBM-internal use. Indicating whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Source
The source for this attribute is derived: (Connected_Hosts < 0) ||
(Connected_VMs < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

Include Data In Summarization 3 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain
attribute data (numbers) in Tivoli Data Warehouse summarization. The valid
values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Source
The source for this attribute is derived: (Total_Read_KBps < 0) ||
(Total_Write_KBps < 0) || (Total_IO_KBps < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_3 or IDIS3

Include Data In Summarization 4 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain
attribute data (numbers) in Tivoli Data Warehouse summarization. The valid
values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Source
The source for this attribute is derived: (Overcommitted < 0) ||
(Percent_Overcommitted < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_4 or IDIS4

Include Data In Summarization 5 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain
attribute data (numbers) in Tivoli Data Warehouse summarization. The valid
values are 0 (exclude) and 1 (include).
Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source

The source for this attribute is derived: (Snapshot_Storage_Consumed < 0)? 0 : 1.

Warehouse name

INCLUDE_DATA_IN_SUMMARIZATION_5 or IDIS5

**Director attribute group**

This attribute group contains information about the IBM Systems Director configuration.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**

The following list contains information about each attribute in the Director attribute group:

**Node attribute: This attribute is a key attribute.**

**Description**

The managed system name of the agent.

**Type**

String

**Source**

The source for this attribute is the agent.

**Warehouse name**

NODE

**Timestamp attribute**

**Description**

The local time at the agent when the data was collected.

**Type**

String

**Source**

The source for this attribute is the agent.

**Warehouse name**

TIMESTAMP

**DirectorServer attribute**

**Description**

The host name of the IBM Director Server.

**Type**

String

**Source**

The source for this attribute is Script data.

**Warehouse name**

DIRECTORSERVER or D

**DirectorPort attribute**

**Description**

The port number for the IBM Director Server.

**Type**

String

**Source**

The source for this attribute is Script data.

**Warehouse name**

DIRECTORPORT or D0
### UseTEPCredential attribute

**Description**

Use Tivoli Enterprise Portal credentials for IBM Systems Director authentication.

**Type**

String

**Source**

The source for this attribute is Script data.

**Warehouse name**

USETEPCREDENTIAL or U

### Distributed Virtual Portgroups attribute group

This attribute group contains information about the distributed virtual portgroups in the virtual infrastructure.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

#### Attribute descriptions

The following list contains information about each attribute in the Distributed Virtual Portgroups attribute group:

- **Node attribute:** This attribute is a key attribute.
  - **Description**
    - The managed system name of the agent.
  - **Type**
    - String
  - **Source**
    - The source for this attribute is the agent.
  - **Warehouse name**
    - NODE

- **Timestamp attribute**
  - **Description**
    - The local time at the agent when the data was collected.
  - **Type**
    - String
  - **Source**
    - The source for this attribute is the agent.
  - **Warehouse name**
    - TIMESTAMP

- **Datacenter attribute:** This attribute is a key attribute.
  - **Description**
    - The name of the data center that uses this distributed virtual portgroup.
  - **Type**
    - String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
      - Unavailable (Unavailable)
  - **Warehouse name**
    - DATACENTER

- **Switch attribute:** This attribute is a key attribute.
  - **Description**
    - The name of the distributed virtual switch associated with this portgroup.
  - **Type**
    - String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
Portgroup attribute: This attribute is a key attribute.

Description
The name of this portgroup.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SWITCH_NAME or SN

Portgroup attribute: This attribute is a key attribute.

Description
The name of this portgroup.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PORTGROUP_NAME or PN

Overall Status attribute

Description
The overall alarm status of the portgroup. A value of red or yellow indicates that an alarm has been triggered for the portgroup.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OVERALL_STATUS or OS

Type attribute

Description
The type of this portgroup.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TYPE

Blocked attribute

Description
Whether traffic is being blocked for this portgroup.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
**Warehouse name**

**BLOCKED**

---

**Inbound Shaping Enabled attribute**

**Description**
Whether inbound traffic shaping is enabled for this portgroup.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

INBOUND_SHAPING_ENABLED or ISE

---

**Inbound Shaping Average Bandwidth attribute**

**Description**
The inbound traffic shaping target for average bandwidth.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

INBOUND_SHAPING_AVERAGE_BANDWIDTH or ISAB

---

**Inbound Shaping Burst Size attribute**

**Description**
The inbound traffic shaping target for burst size.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

INBOUND_SHAPING_BURST_SIZE or ISBS

---

**Inbound Shaping Peak Bandwidth attribute**

**Description**
The inbound traffic shaping target for peak bandwidth.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

INBOUND_SHAPING_PEAK_BANDWIDTH or ISPB

---

**Outbound Shaping Enabled attribute**

**Description**
Whether outbound traffic shaping is enabled for this portgroup.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OUTBOUND_SHAPING_ENABLED or OSE

Outbound Shaping Average Bandwidth attribute

Description
The outbound traffic shaping target for average bandwidth.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OUTBOUND_SHAPING_AVERAGE_BANDWIDTH or OSAB

Outbound Shaping Burst Size attribute

Description
The outbound traffic shaping target for burst size.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OUTBOUND_SHAPING_BURST_SIZE or OSBS

Outbound Shaping Peak Bandwidth attribute

Description
The outbound traffic shaping target for peak bandwidth.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OUTBOUND_SHAPING_PEAK_BANDWIDTH or OSPB

VLAN Type attribute

Description
The type of VLAN used for this portgroup.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
VLAN_TYPE

**VLAN ID attribute**

**Description**
The VLAN ID used by this portgroup. For portgroups that support ranges of VLANs or multiple VLANs, this value is set to Unavailable.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
VLAN_ID

**Include Data In Summarization 0 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (Inbound_Shaping_Average_Bandwidth < 0 ) || (Inbound_Shaping_Burst_Size < 0 ) || (Inbound_Shaping_Peak_Bandwidth < 0 )? 0 : 1.

**Warehouse name**  
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

**Include Data In Summarization 1 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (Outbound_Shaping_Peak_Bandwidth < 0 ) || (Outbound_Shaping_Average_Bandwidth < 0 ) || (Outbound_Shaping_Burst_Size < 0 )? 0 : 1.
Distributed Virtual Switch Health attribute group
This attribute group contains information about the health check of host system for distributed virtual switches.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Distributed Virtual Switch Health attribute group:

Node attribute: This attribute is a key attribute.
Description
The managed system name of the agent.
Type
String
Source
The source for this attribute is the agent.
Warehouse name
NODE

Timestamp attribute
Description
The local time at the agent when the data was collected.
Type
String
Source
The source for this attribute is the agent.
Warehouse name
TIMESTAMP

Source attribute: This attribute is a key attribute.
Description
The host name of the data source.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
SOURCE

Datacenter attribute: This attribute is a key attribute.
Description
The name of the data center that uses this distributed virtual switch.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
DATACENTER

Switch attribute: This attribute is a key attribute.
**Description**
The name of the Distributed Virtual Switch.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SWITCH_NAME or SN

**Portgroup attribute: This attribute is a key attribute.**

**Description**
The name of the portgroup.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
PORTGROUP_NAME or PN

**Uplink attribute: This attribute is a key attribute.**

**Description**
The name of the uplink that is used by the host to connect to the Distributed Virtual Switch.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
UPLINK_NAME or UN

**Host attribute**

**Description**
The host name of the ESX server that is connected to the Distributed Virtual Switch.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
HOST

**NIC attribute**

**Description**
The name of the physical network interface card (NIC) that is associated with the uplink.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NIC_NAME

Uplink Key attribute
Description
The uplink key that is used by the host to connect to the Distributed Virtual Switch.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
UPLINK_KEY

Summary attribute
Description
The health check summary.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SUMMARY

MTU Mismatch attribute
Description
Indicates whether the Maximum Transmission Unit (MTU) configured in the vSphere Distributed Switch is mismatched with the value configured in the Physical NIC. This MTU mismatch status is available only for MTU Health Check type.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)
- Yes (true)
- No (false)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MTU_MISMATCH or MM

DVS Teaming Status attribute
**Description**

The teaming check status of the Distributed Virtual Switch. This teaming check status is available only for the VLAN Health check and the Teaming and Failover Health check.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

DVS_TEAMING_STATUS or DTS

---

**Health Check Type attribute**

**Description**

The type of the health check.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- VLAN Health (com.vmware.vim.VMwareDVSMtuHealthCheckResult)
- MTU Health (com.vmware.vim.VMwareDVSvlanHealthCheckResult)
- Teaming and Failover Health (com.vmware.vim.VMwareDVSTeamHealthCheckResult)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

HEALTH_CHECK_TYPE or HCT

---

**Distributed Virtual Switches attribute group**

This attribute group contains information about the distributed virtual switches in the virtual infrastructure.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**

The following list contains information about each attribute in the Distributed Virtual Switches attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**

The managed system name of the agent.

**Type**

String

**Source**

The source for this attribute is the agent.

**Warehouse name**

NODE

**Timestamp attribute**

**Description**

The local time at the agent when the data was collected.

**Type**

String

**Source**

The source for this attribute is the agent.
Warehouse name
TIMESTAMP

**Datacenter attribute:** This attribute is a key attribute.

**Description**
The name of the data center that uses this distributed virtual switch.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATACENTER

**Switch attribute:** This attribute is a key attribute.

**Description**
The name of the distributed virtual switch.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SWITCH_NAME or SN

**Overall Status attribute**

**Description**
The overall alarm status of the distributed virtual switch. A value of red or yellow indicates that an alarm has been triggered for the distributed virtual switch.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OVERALL_STATUS or OS

**Number Of Portgroups attribute**

**Description**
The number of portgroups, including uplink portgroups, attached to this switch.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NUMBER_OF_PORTGROUPS or NOP

**Number Uplinks attribute**
Description
The number of distributed virtual uplinks that are attached to this switch.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
NUMBER_OF_UPLINKS or NOU

Number Hosts attribute
Description
The number of hosts that are attached to this switch.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
NUMBER_OF_HOSTS or NOH

Number VMs attribute
Description
The number of virtual machines that are attached to this switch.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
NUMBER_OF_VMS or NOV

Number Ports attribute
Description
The current number of ports, excluding conflict ports, of this switch.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
NUMBER_OF_PORTS or NOP0

Max Number Ports attribute
Description
The maximum number of ports, excluding conflict ports, allowed for this switch.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
### Transmitted attribute

**Description**
The total transmission rate in KBps of the uplinks on this switch.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- **Unavailable (-1)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
MAX_NUMBER_OF_PORTS or MNOP

### Received attribute

**Description**
The total reception rate in KBps of the uplinks on this switch.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- **Unavailable (-1)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TRANSMITTED or T

### Usage attribute

**Description**
The total rate in KBps that the uplinks are transmitting and receiving data on this switch.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- **Unavailable (-1)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
RECEIVED

### Include Data In Summarization 0 attribute

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- **Value Exceeds Maximum (2147483647)**
- **Value Exceeds Minimum (-2147483648)**
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**  
The source for this attribute is derived: (Number_Of_Portalongs < 0) || (Number_Of_Uplinks < 0) || (Number_Of_Ports < 0) ? 0 : 1.

**Warehouse name**  
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

**Include Data In Summarization 1 attribute**

**Description**  
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**  
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**  
The source for this attribute is derived: (Number_Of_Hosts < 0) || (Number_Of_VMs < 0) ? 0 : 1.

**Warehouse name**  
INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

**Include Data In Summarization 2 attribute**

**Description**  
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**  
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**  
The source for this attribute is derived: (Transmitted < 0) || (Received < 0) || (Usage < 0) ? 0 : 1.

**Warehouse name**  
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

**Include Data In Summarization 3 attribute**

**Description**  
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**  
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: \( \text{Max}\_\text{Number}\_\text{Of}\_\text{Ports} < 0 \) ? 0 : 1.

Warehouse name

**Distributed Virtual Uplinks attribute group**

This attribute group contains information about the distributed virtual uplinks in the virtual infrastructure.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the Distributed Virtual Uplinks attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**
The managed system name of the agent.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
NODE

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

**Datacenter attribute:** This attribute is a key attribute.

**Description**
The name of the data center that uses this distributed virtual uplink.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DATACENTER

**Switch attribute:** This attribute is a key attribute.

**Description**
The name of the distributed virtual switch that is attached to this uplink.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SWITCH_NAME or SN

**Portgroup attribute**

**Description**
The name of the portgroup for this uplink.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
PORTGROUP_NAME or PN

**Uplink attribute**

**Description**
The name of this uplink.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
UPLINK_NAME or UN

**Overall Status attribute**

**Description**
The overall alarm status of the uplink. A value of red or yellow indicates that an alarm has been triggered for the uplink.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
OVERALL_STATUS or OS

**Component State attribute**

**Description**
The component state of the uplink.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
COMPONENT_STATE or CS

**Server Hostname attribute**
Description
The host name of the ESX server to which the uplink belongs.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
  Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

 Warehouse name
HOST_SYSTEM or HS

NIC attribute
Description
The name of the physical NIC associated with this uplink.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
  Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

 Warehouse name
NIC

Transmitted attribute
Description
The total transmission rate in KBps of this uplink's physical NIC.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
  Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

 Warehouse name
TRANSMITTED or T

Received attribute
Description
The total reception rate in KBps of this uplink's physical NIC.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
  Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

 Warehouse name
RECEIVED

Usage attribute
Description
The total rate in KBps that data is being transmitted and received data on this uplink's physical NIC.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable** (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**USAGE**

**Status attribute**

**Description**
The current status, up or down, of the NIC.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable** (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**LINK_STATUS** or **LS**

**Link Speed attribute**

**Description**
The current operating speed of the NIC in Mbps.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable** (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**LINK_SPEED**

**Duplex attribute**

**Description**
The current operating mode of the NIC.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable** (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**DUPLEX**

**Managed System Name attribute**

**Description**
The managed system name of the subnode for the ESX server of the uplink.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable** (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
**Warehouse name**
SUBNODE_MSN or SM

**Link Utilization attribute**

**Description**
The percent usage of the NIC relative to the capacity of the link (including duplex).

**Type**
Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
LINK_UTILIZATION or LU

**Include Data In Summarization 0 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (Transmitted < 0) || (Received < 0) || (Usage < 0)? 0 : 1.

**Warehouse name**
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

**Include Data In Summarization 1 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (Link_Utilization < 0)? 0 : 1.

**Warehouse name**
INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

**Include Data In Summarization 2 attribute**
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Link_Speed < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

ESX Performance Object Status attribute group
The Performance Object Status attribute group contains information that reflects the status of other attribute groups so you can see the status of all of the performance objects that make up this application all at once. Each of these other performance attribute groups is represented by a row in this table (or other type of view). The status for an attribute group reflects the result of the last attempt to collect data for that attribute group, which allows you to see whether the agent is performing correctly. Unlike other attribute groups, the Performance Object Status attribute group does not reflect the state of the monitored application. This attribute group is most often used to determine why data is not available for one of the performance attribute groups.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the ESX Performance Object Status attribute group:

**Node attribute**: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

**Timestamp attribute**

Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

**Query Name attribute**: This attribute is a key attribute.

Description
The name of the attribute group.

Type
String
Warehouse name

Object Name attribute
Description
The name of the performance object.
Type
String

Warehouse name

Object Type attribute
Description
The type of the performance object.
Type
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- WMI (0)
- PERFMON (1)
- WMI ASSOCIATION GROUP (2)
- JMX (3)
- SNMP (4)
- SHELL COMMAND (5)
- JOINED GROUPS (6)
- CIMOM (7)
- CUSTOM (8)
- ROLLUP DATA (9)
- WMI REMOTE DATA (10)
- LOG FILE (11)
- JDBC (12)
- CONFIG DISCOVERY (13)
- NT EVENT LOG (14)
- FILTER (15)
- SNMP EVENT (16)
- PING (17)
- DIRECTOR DATA (18)
- DIRECTOR EVENT (19)
- SSH REMOTE SHELL COMMAND (20)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

Object Status attribute
Description
The status of the performance object.
Type
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- ACTIVE (0)
- INACTIVE (1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Error Code attribute
Description
The error code that is associated with the query.

Type
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- NO ERROR (0)
- GENERAL ERROR (1)
- OBJECT NOT FOUND (2)
- COUNTER NOT FOUND (3)
- NAMESPACE ERROR (4)
- OBJECT CURRENTLY UNAVAILABLE (5)
- COM LIBRARY INIT FAILURE (6)
- SECURITY INIT FAILURE (7)
- PROXY SECURITY FAILURE (9)
- NO INSTANCES RETURNED (10)
- ASSOCIATOR QUERY FAILED (11)
- REFERENCE QUERY FAILED (12)
- NO RESPONSE RECEIVED (13)
- CANNOT FIND JOINED QUERY (14)
- CANNOT FIND JOIN ATTRIBUTE IN QUERY 1 RESULTS (15)
- CANNOT FIND JOIN ATTRIBUTE IN QUERY 2 RESULTS (16)
- QUERY 1 NOT A SINGLETON (17)
- QUERY 2 NOT A SINGLETON (18)
- NO INSTANCES RETURNED IN QUERY 1 (19)
- NO INSTANCES RETURNED IN QUERY 2 (20)
- CANNOT FIND ROLLUP QUERY (21)
- CANNOT FIND ROLLUP ATTRIBUTE (22)
- FILE OFFLINE (23)
- NO HOSTNAME (24)
- MISSING LIBRARY (25)
- ATTRIBUTE COUNT MISMATCH (26)
- ATTRIBUTE NAME MISMATCH (27)
- COMMON DATA PROVIDER NOT STARTED (28)
- CALLBACK REGISTRATION ERROR (29)
- MDL LOAD ERROR (30)
- AUTHENTICATION FAILED (31)
- CANNOT RESOLVE HOST NAME (32)
- SUBNODE UNAVAILABLE (33)
- SUBNODE NOT FOUND IN CONFIG (34)
- ATTRIBUTE ERROR (35)
- CLASSPATH ERROR (36)
- CONNECTION FAILURE (37)
- FILTER SYNTAX ERROR (38)
- FILE NAME MISSING (39)
- SQL QUERY ERROR (40)
- SQL FILTER QUERY ERROR (41)
- SQL DB QUERY ERROR (42)
- SQL DB FILTER QUERY ERROR (43)
- PORT OPEN FAILED (44)
- ACCESS DENIED (45)
- TIMEOUT (46)
- NOT IMPLEMENTED (47)
- REQUESTED A BAD VALUE (48)
- RESPONSE TOO BIG (49)
- GENERAL RESPONSE ERROR (50)
- SCRIPT NONZERO RETURN (51)
- SCRIPT NOT FOUND (52)
- SCRIPT LAUNCH ERROR (53)
- CONF FILE DOES NOT EXIST (54)
- CONF FILE ACCESS DENIED (55)
- INVALID CONF FILE (56)
- EIF INITIALIZATION FAILED (57)
- CANNOT OPEN FORMAT FILE (58)
- FORMAT FILE SYNTAX ERROR (59)
- REMOTE HOST UNAVAILABLE (60)
- EVENT LOG DOES NOT EXIST (61)
- PING FILE DOES NOT EXIST (62)
- NO PING DEVICE FILES (63)
- PING DEVICE LIST FILE MISSING (64)
- SNMP MISSING PASSWORD (65)
- DISABLED (66)
- URLS FILE NOT FOUND (67)
- XML PARSE ERROR (68)
- NOT INITIALIZED (69)
- ICMP SOCKETS FAILED (70)
- DUPLICATE CONF FILE (71)
- KVM NO DATASOURCES (1000)
- KVM Datasource LOGIN FAILED (1005)
- KVM DATASOURCE NOT FOUND (1010)
- SUBNODE UNAVAILABLE (1033)
- KVM PROVIDER RESET (2222)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

ERROR_CODE or ERRCODE

**Last Collection Start attribute**

**Description**
The most recent time a data collection of this group started.

**Type**
Timestamp with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- NOT COLLECTED (0691231190000000)
- NOT COLLECTED (0000000000000001)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
LAST_COLLECTION_START or COLSTRT

**Last Collection Finished attribute**

**Description**
The most recent time a data collection of this group finished.

**Type**
Timestamp with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- NOT COLLECTED (0691231190000000)
- NOT COLLECTED (0000000000000001)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
LAST_COLLECTION_FINISHED or COLFINI

**Last Collection Duration attribute**

**Description**
The duration of the most recently completed data collection of this group in seconds.

**Type**
Real number (32-bit counter) with two decimal places of precision

Warehouse name
LAST_COLLECTION_DURATION or COLDURA

**Average Collection Duration attribute**

**Description**
The average duration of all data collections of this group in seconds.

**Type**
Real number (32-bit counter) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- NO DATA (-100)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
AVERAGE_COLLECTION_DURATION or COLAVGD

**Refresh Interval attribute**

**Description**
The interval at which this group is refreshed in seconds.

**Type**
Integer (32-bit counter)

Warehouse name
REFRESH_INTERVAL or REFRINT

**Number of Collections attribute**

**Description**
The number of times this group has been collected since agent start.

**Type**
Integer (32-bit counter)

Warehouse name
NUMBER_OF_COLLECTIONS or NUMCOLL

**Cache Hits attribute**

**Description**
The number of times an external data request for this group was satisfied from the cache.

**Type**
Integer (32-bit counter)

Warehouse name
CACHE_HITS or CACHEHT

**Cache Misses attribute**

**Description**
The number of times an external data request for this group was not available in the cache.

**Type**
Integer (32-bit counter)

Warehouse name
CACHE_MISSES or CACHEMS

**Cache Hit Percent attribute**
Description
The percentage of external data requests for this group that were satisfied from the cache.

Type
Real number (32-bit counter) with two decimal places of precision

Warehouse name
CACHE_HIT_PERCENT or CACHPCT

Intervals Skipped attribute
Description
The number of times a background data collection for this group was skipped because the previous collection was still running when the next one was due to start.

Type
Integer (32-bit counter)

Warehouse name
INTERVALS_SKIPPED or INTSKIP

Events attribute group
This attribute group contains events that are not specific to an ESX server.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Events attribute group:

Node attribute: This attribute is a key attribute.
Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute
Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Source Hostname attribute: This attribute is a key attribute.
Description
The host name of the data source that originated this event.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SOURCE_HOSTNAME or SH

Event Seq Number attribute: This attribute is a key attribute.
Description
A sequence number for this event.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
EVENT_SEQ_NUMBER or ESN

UserId attribute

Description
The user ID that caused the event.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Not applicable (Not applicable)
- Unavailable (Unavailable)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
USERID

Event Time attribute

Description
The time that the event occurred.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
EVENT_TIME

Event attribute

Description
The event data string.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
EVENT

Compute Resource attribute

Description
The compute resource that is associated with this event.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal.
Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
COMPUTE_RESOURCE or CR

**Datacenter attribute**

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>The data center that is associated with this event.</td>
<td>String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
</tbody>
</table>

**Warehouse name**
DATACENTER

**Virtual Machine attribute**

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>The virtual machine that is associated with this event.</td>
<td>String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
</tbody>
</table>

**Warehouse name**
VIRTUAL_MACHINE or VM

**Virtual Machine UUID attribute**

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>The UUID of the virtual machine that is associated with this event.</td>
<td>String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
</tbody>
</table>

**Warehouse name**
VIRTUAL_MACHINE_UUID or VMU

**Category attribute**

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>The severity level that is associated with the event by VMware.</td>
<td>String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
</tbody>
</table>
### Event Type attribute

**Description**
The type of event that is given by VMware.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

### Event Text attribute

**Description**
The full event data string.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

### Event Type ID attribute

**Description**
The type ID of the event that is given by VMware. This is unavailable unless the event is an extended event.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

### Entity Type attribute

**Description**
The type of entity of the event.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

### Datastore attribute

**Description**
The name of the data store that is associated with the event.
Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

DATASTORE

Datastore UUID attribute

Description

The Universal Unique ID of the data store that is associated with the event.

Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

DATASTORE_UUID or DU

Include Data In Summarization 0 attribute

Description

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source

The source for this attribute is derived: (Event_Seq_Number < 0)? 0 : 1.

Warehouse name

INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Monitored Servers attribute group

This attribute group is the current list of ESX servers that are being monitored.

Historical group

This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions

The following list contains information about each attribute in the Monitored Servers attribute group:

Node attribute: This attribute is a key attribute.

Description

The managed system name of the agent.

Type

String

Source

The source for this attribute is the agent.
Warehouse name

**NODE**

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

**Subnode MSN attribute:** This attribute is a key attribute.

**Description**
The Managed System Name of the subnode agent.

**Type**
String

**Warehouse name**
SUBNODE_MSN or SN_MSN

**Subnode Affinity attribute**

**Description**
The affinity for the subnode agent.

**Type**
String

**Warehouse name**
SUBNODE_AFFINITY or SN_AFFIN

**Subnode Type attribute:** This attribute is a key attribute.

**Description**
The Node Type of this subnode.

**Type**
String

**Warehouse name**
SUBNODE_TYPE or SN_TYPE

**Subnode Resource Name attribute**

**Description**
The Resource Name of the subnode agent.

**Type**
String

**Warehouse name**
SUBNODERESOURCE_NAME or SN_RES

**Subnode Version attribute**

**Description**
The Version of the subnode agent.

**Type**
String

**Warehouse name**
SUBNODE_VERSION or SN_VER

**Networked Servers attribute group**
This attribute group lists the hosts on each network.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the Networked Servers attribute group:

**Node attribute:** This attribute is a key attribute.
Description
   The managed system name of the agent.
Type
   String
Source
   The source for this attribute is the agent.
Warehouse name
   NODE

**Timestamp attribute**
Description
   The local time at the agent when the data was collected.
Type
   String
Source
   The source for this attribute is the agent.
Warehouse name
   TIMESTAMP

**Datacenter attribute:** This attribute is a key attribute.
Description
   The data center that this network is on.
Type
   String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
   - Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
   DATACENTER

**Network attribute:** This attribute is a key attribute.
Description
   The name of the network.
Type
   String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
   - Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
   NETWORK

**Switch attribute:** This attribute is a key attribute.
Description
   The switch that the network uses.
Type
   String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
   - Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
   SWITCH

**Server Hostname attribute:** This attribute is a key attribute.
**Description**
The host name of the ESX server that is connected to the network.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SERVER_HOSTNAME or SH

**Transmitted attribute**

**Description**
The total transmission rate in KBps of the host on this virtual switch.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TRANSMITTED or T

**Received attribute**

**Description**
The total reception rate in KBps of the host on this virtual switch.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
RECEIVED

**Usage attribute**

**Description**
The total rate in KBps that the host is transmitting and receiving data on this virtual switch.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
USAGE

**Managed System Name attribute**

**Description**
The managed system name of the subnode for the ESX server.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal.
Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SUBNODE_MSN or SM

**Include Data In Summarization 0 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (Transmitted < 0) || (Received < 0) || (Usage < 0)? 0 : 1.

**Warehouse name**
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

**Networked Virtual Machines attribute group**
This attribute group lists the virtual machine NICs on each network.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the Networked Virtual Machines attribute group:

**Node attribute: This attribute is a key attribute.**

**Description**
The managed system name of the agent.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
NODE

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

**Datacenter attribute: This attribute is a key attribute.**

**Description**
The data center that this virtual machine NIC is on.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATACENTER

Network attribute: This attribute is a key attribute.

Description
The name of the network the virtual machine NIC is on.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NETWORK

Switch attribute: This attribute is a key attribute.

Description
The name of the virtual switch to which the virtual machine NIC is connected.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SWITCH

Server Hostname attribute: This attribute is a key attribute.

Description
The hostname of the ESX server on which the virtual machine resides.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SERVER_HOSTNAME or SH

Virtual Machine attribute: This attribute is a key attribute.

Description
The name of the virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

VIRTUAL_MACHINE or VM

**VM NIC attribute:** This attribute is a key attribute.

**Description**
The name of the virtual machine NIC.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

VM_NIC

**Transmitted attribute**

**Description**
The total transmission rate in KBps of this virtual machine NIC.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

TRANSMITTED or T

**Received attribute**

**Description**
The total reception rate in KBps of this virtual machine NIC.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

RECEIVED

**Usage attribute**

**Description**
The total rate in KBps that data is being transmitted and received data on this virtual machine NIC.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

USAGE

**Managed System Name attribute**
Description
The managed system name of the subnode for the ESX server of the virtual
machine NIC.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise
Portal. The warehouse and queries return the values that are shown in
parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
SUBNODE_MSN or SM

Include Data In Summarization 0 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain
attribute data (numbers) in Tivoli Data Warehouse summarization. The valid
values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Source
The source for this attribute is derived: (Transmitted < 0) || (Received < 0) ||
(Usage < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Networked Virtual Switches attribute group
This attribute group contains information about the standard virtual switches in the virtual infrastructure
grouped by network.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Networked Virtual Switches
attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute

Description
The local time at the agent when the data was collected.

Type
String
**Source**
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

**Datacenter attribute:** This attribute is a key attribute.

**Description**
The name of the data center that uses this virtual switch.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DATACENTER

**Server Hostname attribute:** This attribute is a key attribute.

**Description**
The hostname of the ESX server to which the virtual switch belongs.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SERVER_HOSTNAME or SH

**Switch attribute:** This attribute is a key attribute.

**Description**
The name of the virtual switch.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SWITCH

**Network attribute:** This attribute is a key attribute.

**Description**
The name of the network with which the virtual switch is associated.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
NETWORK

**Number NICs attribute**
Description
The number of NICs connected to the virtual switch.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NUMBER_OF_NICS or NON

Transmitted attribute
Description
The total transmission rate in KBps of the host on this virtual switch.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TRANSMITTED or T

Received attribute
Description
The total reception rate in KBps of the host on this virtual switch.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
RECEIVED

Usage attribute
Description
The total rate in KBps that the host is transmitting and receiving data on this virtual switch.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
USAGE

Managed System Name attribute
Description
The managed system name of the subnode for the ESX server of the virtual switch.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal.
Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

SUBNODE_MSN or SM

**Include Data In Summarization 0 attribute**

**Description**

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**

The source for this attribute is derived: (Number_Of_NICs < 0) ? 0 : 1.

**Warehouse name**

INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

**Include Data In Summarization 1 attribute**

**Description**

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**

The source for this attribute is derived: (Transmitted < 0) || (Received < 0) || (Usage < 0) ? 0 : 1.

**Warehouse name**

INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

**Networks attribute group**

This attribute group contains information about the networks in the virtual infrastructure.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**

The following list contains information about each attribute in the Networks attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**

The managed system name of the agent.

**Type**

String
Source
The source for this attribute is the agent.

Warehouse name
 NODE

Timestamp attribute
Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
 TIMESTAMP

Datacenter attribute: This attribute is a key attribute.
Description
The name of the data center that uses this network.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
 DATACENTER

Network attribute: This attribute is a key attribute.
Description
The name of the network.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
 NETWORK

Overall Status attribute
Description
The overall alarm status of the network. A value of red or yellow indicates that an alarm has been triggered for the network.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
 OVERALL_STATUS or OS

Type attribute: This attribute is a key attribute.
Description
The type of network.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NETWORK_TYPE or NT

Number Hosts attribute
Description
The number of hosts connected to the network.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NUMBER_OF_HOSTS or NOH

Number VMs attribute
Description
The number of virtual machines connected to the network.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NUMBER_OF_VMS or NOV

Distributed Switch attribute
Description
The name of the distributed virtual switch for this network, if applicable.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DISTRIBUTED_SWITCH or DS

Performance Object Status attribute group
The Performance Object Status attribute group contains information that reflects the status of other attribute groups so you can see the status of all of the performance objects that make up this application all at once. Each of these other performance attribute groups is represented by a row in this table (or other type of view). The status for an attribute group reflects the result of the last attempt to collect data for that attribute group, which allows you to see whether the agent is performing correctly. Unlike other
attribute groups, the Performance Object Status attribute group does not reflect the state of the monitored application. This attribute group is most often used to determine why data is not available for one of the performance attribute groups.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**

The following list contains information about each attribute in the Performance Object Status attribute group:

**Node attribute:** This attribute is a key attribute.

- **Description**
  The managed system name of the agent.

- **Type**
  String

- **Source**
  The source for this attribute is the agent.

- **Warehouse name**
  NODE

**Timestamp attribute**

- **Description**
  The local time at the agent when the data was collected.

- **Type**
  String

- **Source**
  The source for this attribute is the agent.

- **Warehouse name**
  TIMESTAMP

**Query Name attribute:** This attribute is a key attribute.

- **Description**
  The name of the attribute group.

- **Type**
  String

- **Warehouse name**
  QUERY_NAME or ATTRGRP

**Object Name attribute**

- **Description**
  The name of the performance object.

- **Type**
  String

- **Warehouse name**
  OBJECT_NAME or OBJNAME

**Object Type attribute**

- **Description**
  The type of the performance object.

- **Type**
  Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - WMI (0)
  - PERFMON (1)
  - WMI ASSOCIATION GROUP (2)
  - JMX (3)
  - SNMP (4)
  - SHELL COMMAND (5)
  - JOINED GROUPS (6)
  - CIMOM (7)
  - CUSTOM (8)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**OBJECT_TYPE** or **OBJTYPE**

**Object Status attribute**

**Description**

The status of the performance object.

**Type**

Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- ACTIVE (0)
- INACTIVE (1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**OBJECT_STATUS** or **OBJSTTS**

**Error Code attribute**

**Description**

The error code that is associated with the query.

**Type**

Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- NO ERROR (0)
- GENERAL ERROR (1)
- OBJECT NOT FOUND (2)
- COUNTER NOT FOUND (3)
- NAMESPACE ERROR (4)
- OBJECT CURRENTLY UNAVAILABLE (5)
- COM LIBRARY INIT FAILURE (6)
- SECURITY INIT FAILURE (7)
- PROXY SECURITY FAILURE (9)
- NO INSTANCES RETURNED (10)
- ASSOCIATOR QUERY FAILED (11)
- REFERENCE QUERY FAILED (12)
- NO RESPONSE RECEIVED (13)
- CANNOT FIND JOINED QUERY (14)
- CANNOT FIND JOIN ATTRIBUTE IN QUERY 1 RESULTS (15)
- CANNOT FIND JOIN ATTRIBUTE IN QUERY 2 RESULTS (16)
- QUERY 1 NOT A SINGLETON (17)
- QUERY 2 NOT A SINGLETON (18)
- NO INSTANCES RETURNED IN QUERY 1 (19)
• NO INSTANCES RETURNED IN QUERY 2 (20)
• CANNOT FIND ROLLUP QUERY (21)
• CANNOT FIND ROLLUP ATTRIBUTE (22)
• FILE OFFLINE (23)
• NO HOSTNAME (24)
• MISSING LIBRARY (25)
• ATTRIBUTE COUNT MISMATCH (26)
• ATTRIBUTE NAME MISMATCH (27)
• COMMON DATA PROVIDER NOT STARTED (28)
• CALLBACK REGISTRATION ERROR (29)
• MDL LOAD ERROR (30)
• AUTHENTICATION FAILED (31)
• CANNOT RESOLVE HOST NAME (32)
• SUBNODE UNAVAILABLE (33)
• SUBNODE NOT FOUND IN CONFIG (34)
• ATTRIBUTE ERROR (35)
• CLASSPATH ERROR (36)
• CONNECTION FAILURE (37)
• FILTER SYNTAX ERROR (38)
• FILE NAME MISSING (39)
• SQL QUERY ERROR (40)
• SQL FILTER QUERY ERROR (41)
• SQL DB QUERY ERROR (42)
• SQL DB FILTER QUERY ERROR (43)
• PORT OPEN FAILED (44)
• ACCESS DENIED (45)
• TIMEOUT (46)
• NOT IMPLEMENTED (47)
• REQUESTED A BAD VALUE (48)
• RESPONSE TOO BIG (49)
• GENERAL RESPONSE ERROR (50)
• SCRIPT NONZERO RETURN (51)
• SCRIPT NOT FOUND (52)
• SCRIPT LAUNCH ERROR (53)
• CONF FILE DOES NOT EXIST (54)
• CONF FILE ACCESS DENIED (55)
• INVALID CONF FILE (56)
• EIF INITIALIZATION FAILED (57)
• CANNOT OPEN FORMAT FILE (58)
• FORMAT FILE SYNTAX ERROR (59)
• REMOTE HOST UNAVAILABLE (60)
• EVENT LOG DOES NOT EXIST (61)
• PING FILE DOES NOT EXIST (62)
• NO PING DEVICE FILES (63)
• PING DEVICE LIST FILE MISSING (64)
• SNMP MISSING PASSWORD (65)
• DISABLED (66)
• URLs FILE NOT FOUND (67)
• XML PARSE ERROR (68)
• NOT INITIALIZED (69)
• ICMP SOCKETS FAILED (70)
• DUPLICATE CONF FILE (71)
• KVM NO DATASOURCES (1000)
• KVM DATASOURCE LOGIN FAILED (1005)
• KVM DATASOURCE NOT FOUND (1010)
• SUBNODE UNAVAILABLE (1033)
• KVM PROVIDER RESET (2222)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
ERROR_CODE or ERRCODE

**Last Collection Start attribute**

**Description**
The most recent time a data collection of this group started.

**Type**
Timestamp with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- NOT COLLECTED (0691231190000000)
- NOT COLLECTED (0000000000000001)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
LAST_COLLECTION_START or COLSTRT

**Last Collection Finished attribute**

**Description**
The most recent time a data collection of this group finished.

**Type**
Timestamp with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- NOT COLLECTED (0691231190000000)
- NOT COLLECTED (0000000000000001)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
LAST_COLLECTION_FINISHED or COLFINI

**Last Collection Duration attribute**

**Description**
The duration of the most recently completed data collection of this group in seconds.

**Type**
Real number (32-bit counter) with two decimal places of precision

**Warehouse name**
LAST_COLLECTION_DURATION or COLDURA

**Average Collection Duration attribute**

**Description**
The average duration of all data collections of this group in seconds.

**Type**
Real number (32-bit counter) with two decimal places of precision

**Warehouse name**
AVERAGE_COLLECTION_DURATION or COLAVGD

**Refresh Interval attribute**
Resource Pool CPU attribute group
This attribute group contains information about CPU metrics for resource pools.
Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.
Attribute descriptions
The following list contains information about each attribute in the Resource Pool CPU attribute group:
Node attribute: This attribute is a key attribute.
Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute

Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Server Hostname attribute: This attribute is a key attribute.

Description
The host name of the ESX server.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SERVER_HOSTNAME or SH

Parent Name attribute: This attribute is a key attribute.

Description
The name of the parent of this resource pool.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PARENT_NAME or PN

Pool Name attribute: This attribute is a key attribute.

Description
The name of this resource pool.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
POOL_NAME

Expandable attribute
Description
Indicates if the CPU reservation is permitted to grow beyond the specified configuration value when the parent resource pool has sufficient unreserved CPU resource.

Type
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Yes (1)
- No (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
EXPANDABLE

Limit attribute
Description
The configured upper limit of CPU resources in MHz that this resource pool can get even if there are sufficient resources that would otherwise permit the limit to be higher. A value of -1 indicates that there is no limit.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-2)
- No limit (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
LIMIT

Reservation attribute
Description
The amount of CPU resource in MHz that is guaranteed to be available to the resource pool.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
RESERVATION or R

Share Level attribute
Description
The named level for the defined number of shares. This level corresponds to the Shares attribute.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
**Warehouse name**  
SHARE_LEVEL or SL

**Shares attribute**

**Description**
The relative weighting of CPU allocations given to this resource pool in actual numeric form. This attribute is only applicable when the shares level is defined as custom.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-2)
- Not applicable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
SHARES

**Max Usage attribute**

**Description**
The current upper bound on CPU usage in MHz. This limit is based on the limit that is configured for the resource pool and the limits that are configured for all parent resource pools.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
MAX_USAGE

**CPU Usage attribute**

**Description**
The CPU usage in MHz of all running child virtual machines including virtual machines in child resource pools.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Reservation Used attribute**

**Description**
The total amount of CPU resources in MHz that have been used to satisfy the reservation requirements of all descendants of this resource pool.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Reservation Used VM attribute

**Description**
The total amount of CPU resources in MHz that have been used to satisfy the reservations of running virtual machines in this resource pool and its descendants.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
RESERVATION_USED or RU

Unreserved attribute

**Description**
The total amount of CPU resources in MHz available to satisfy a reservation for child resource pool.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
RESERVATION_USED_VM or RUV

Unreserved VM attribute

**Description**
The total amount of CPU resources available in MHz to satisfy a reservation for a child virtual machine.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
UNRESERVED

Percent Reserved VMs attribute

**Description**
The percentage of CPU resources that are reserved for virtual machines.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
PERCENT_RESERVED_VMS or PRV

Percent Overall Usage attribute
Description
The percentage of CPU resources being used relative to the maximum amount currently available.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PERCENT_OVERALL_USAGE or POU

NodeID attribute
Description
This attribute is only for IBM-internal use.

Type
String

Warehouse name
NODEID

Include Data In Summarization 0 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Reservation < 0) || (Shares < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Source
The source for this attribute is derived: (Percent_Overall_Usage < 0) || (Max_Usage < 0) || (CPU_Usage < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

Include Data In Summarization 2 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Reservation_Used < 0) || (Percent_Reserved_VMs < 0) || (Reservation_Used_VM < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

Include Data In Summarization 3 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Unreserved < 0) || (Unreserved_VM < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_3 or IDIS3

Resource Pool General attribute group
This attribute group contains information about general metrics and the configuration of resource pools.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Resource Pool General attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String
Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute
Description
The local time at the agent when the data was collected.
Type
String
Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Server Hostname attribute: This attribute is a key attribute.
Description
The host name of the ESX server.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SERVER_HOSTNAME or SH

Parent Name attribute: This attribute is a key attribute.
Description
The name of the parent of this resource pool.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PARENT_NAME or PN

Pool Name attribute: This attribute is a key attribute.
Description
The name of this resource pool.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
POOL_NAME

Number VMs attribute
Description
The number of virtual machines that are children of this resource pool including virtual machines in child resource pools.
Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

NUMBER_VMS

Number VMs On attribute

Description
The number of virtual machines that are children of this resource pool including virtual machines in child resource pools that are powered on.

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

NUMBER_VMS_ON or NVO

Number Child Pools attribute

Description
The number of resource pools that are immediate children of this resource pool.

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

NUMBER_CHILD_POOLS or NCP

CPU Usage attribute

Description
The CPU usage in MHz of all running child virtual machines including virtual machines in child resource pools.

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

CPU_USAGE

Memory Usage attribute

Description
The memory usage in MB of all running child virtual machines including virtual machines in child resource pools.

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable** (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

MEMORY_USAGE or MU

**Overall Status attribute**

**Description**

The overall status indication of this resource pool.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable** (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

STATUS

**NodeID attribute**

**Description**

This attribute is only for IBM-internal use.

**Type**

String

**Warehouse name**

NODEID

**Include Data In Summarization 0 attribute**

**Description**

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Value Exceeds Maximum** (2147483647)
- **Value Exceeds Minimum** (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**

The source for this attribute is derived: (Number_VMs < 0) || (Number_VMs_Last < 0) || (Number_Child_Pools < 0) ? 0 : 1.

**Warehouse name**

INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

**Include Data In Summarization 1 attribute**

**Description**

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Value Exceeds Maximum** (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (CPU_Usage < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

Include Data In Summarization 2 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Memory_Usage < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

Resource Pool Memory attribute group
This attribute group contains information about memory metrics for resource pools.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Resource Pool Memory attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute

Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Server Hostname attribute: This attribute is a key attribute.

Description
The host name of the ESX server.
Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

SERVER_HOSTNAME or SH

Parent Name attribute: This attribute is a key attribute.

Description

The name of the parent of this resource pool.

Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

PARENT_NAME or PN

Pool Name attribute: This attribute is a key attribute.

Description

The name of this resource pool.

Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

POOL_NAME

Expandable attribute

Description

Indicates if the memory reservation is permitted to grow beyond the specified configuration value when the parent resource pool has sufficient unreserved CPU resource.

Type

Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Yes (1)
- No (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

EXPANDABLE

Limit attribute

Description

The configured upper limit of memory resources in MB that this resource pool can get even if there are sufficient resources that would otherwise permit the limit to be higher. A value of -1 indicates that there is no limit.
Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-2)
- No limit (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
LIMIT

Reservation attribute

Description
The amount of memory resource in MB that is guaranteed to be available to the resource pool.

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
RESERVATION or R

Share Level attribute

Description
The named level for the defined number of shares. This value corresponds to the Shares attribute.

Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SHARE_LEVEL or SL

Shares attribute

Description
The relative weighting of memory allocations given to this resource pool. This attribute is applicable only when the shares level is defined as custom.

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-2)
- Not applicable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SHARES

Max Usage attribute
Description
The current upper bound on memory usage in MB. This value is based on the limit configured for this resource pool and the limits configured for all parent resource pools.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MAX_USAGE

Memory Usage attribute
Description
The memory usage in MB of all running child virtual machines including virtual machines in child resource pools.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MEMORY_USAGE or MU

Reservation Used attribute
Description
The total amount of memory resources in MB that have been used to satisfy the reservation requirements of all descendants of this resource pool.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
RESERVATION_USED or RU

Reservation Used VM attribute
Description
The total amount of memory resources in MB that have been used to satisfy the reservations of running virtual machines in this resource pool and its descendants.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
RESERVATION_USED_VM or RUV

Unreserved attribute
Description
The total amount of memory resources in MB available to satisfy a reservation for a child resource pool.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
UNRESERVED

Unreserved VM attribute

Description
The total amount of memory resources available in MB to satisfy a reservation for a child virtual machine.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
UNRESERVED_VM or UV

Percent Reserved VMs attribute

Description
The percentage of memory resources that are reserved for virtual machines.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PERCENT_RESERVED_VMS or PRV

Percent Overall Usage attribute

Description
The percentage of memory resources being used relative to the maximum amount currently available.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PERCENT_OVERALL_USAGE or POU

NodeID attribute

Description
This attribute is only for IBM-internal use.
Type
String

Warehouse name
NODEID

Include Data In Summarization 0 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Limit < 0) || (Reservation < 0) || (Shares < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Memory_Usage < 0) || (Max_Usage < 0) || (Percent_Overall_Usage < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

Include Data In Summarization 2 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Source
The source for this attribute is derived: (Reservation_Used < 0) ||
(Reservation_Used_VM < 0) || (Percent_Reserved_VMs < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

Include Data In Summarization 3 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain
attribute data (numbers) in Tivoli Data Warehouse summarization. The valid
values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
  • Value Exceeds Maximum (2147483647)
  • Value Exceeds Minimum (-2147483648)
  • Any other value is the value that is returned by the agent in the Tivoli Enterprise
    Portal.

Source
The source for this attribute is derived: (Unreserved < 0) || (Unreserved_VM <
0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_3 or IDIS3

Server attribute group
This attribute group contains basic information about an ESX server.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Server attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute

Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Server Hostname attribute: This attribute is a key attribute.

Description
The host name of the ESX server.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise
Portal. The warehouse and queries return the values that are shown in
parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SERVER_HOSTNAME or SH

---

**System Up Time attribute**

**Description**
The number of seconds since the server was started.

**Type**
DEFAULT with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SYSTEM_UP_TIME or SUT

---

**Connection State attribute**

**Description**
The connection state of the server.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CONNECTION_STATE or CS

---

**Product attribute**

**Description**
The VMware product string for the installed level of ESX.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
PRODUCT

---

**Build number attribute**

**Description**
The VMware product build number for the installed level of ESX.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
BUILD_NUMBER or BN
**Version attribute**

**Description**

The VMware product version for the installed level of ESX.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

VERSION

**vMotion enabled attribute**

**Description**

A flag to indicate whether vMotion is configured on this server.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

VMOTION_ENABLED or VE

**Overall Status attribute**

**Description**

An indicator of the overall status of the server.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

OVERALL_STATUS or OS

**Number VMs attribute**

**Description**

The number of virtual machines configured on this server.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

NUMBER_VMS

**Number VMs On attribute**

**Description**

The number of virtual machines configured on this server that are powered on.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the
The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

NUMBER_VMS_ON or NVO

**Physical CPUs attribute**

**Description**

The number of physical CPUs on this server.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

PHYSICAL_CPUS or PC

**NICs attribute**

**Description**

The number of NIC interfaces on this server.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

NICS

**Physical Memory attribute**

**Description**

The amount of physical memory on this server in MB.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

PHYSICAL_MEMORY or PM

**Overall CPU Util attribute**

**Description**

The overall CPU usage of the server.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Overall CPU Util attribute

Description
The overall memory usage of the server.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

UUID attribute

Description
The UUID of the server.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Datacenter attribute

Description
The name of the data center for this server.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Description</th>
<th>Type</th>
<th>Warehouse name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datacenter MOREF</td>
<td>The internal managed object reference name of the data center for this server.</td>
<td>String with enumerated values.</td>
<td>DATACENTER_MOREF or DM</td>
</tr>
<tr>
<td>Total CPU MHz</td>
<td>The total amount of the CPU of the server in MHz.</td>
<td>Integer (32-bit gauge) with</td>
<td>TOTAL_CPU_MHZ or TCM</td>
</tr>
<tr>
<td>Cluster</td>
<td>The name of the cluster that this server is a member of or unavailable if not a member of any cluster.</td>
<td>String with enumerated values.</td>
<td>CLUSTER</td>
</tr>
<tr>
<td>Datastore Space</td>
<td>The total capacity in GB of the data stores connected to this server. This is across all of the data stores that this server is configured to use.</td>
<td>Integer (32-bit gauge) with</td>
<td>DATASTORE_SPACE or DS</td>
</tr>
<tr>
<td>Datastore Used</td>
<td>The total amount of datastore storage in GB that is actually in use by this server. This is across all of the data stores that this server is configured to use.</td>
<td>Integer (32-bit gauge) with</td>
<td></td>
</tr>
</tbody>
</table>
Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

USED_DATASTORE or UD

Maintenance Mode attribute

Description

Whether this server is in maintenance mode.

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)
- No (0)
- Yes (1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

MAINTENANCE_MODE or MM

NodeID attribute

Description

This attribute is only for IBM-internal use.

Type

String

Warehouse name

NODEID

Total VM Configured Memory attribute

Description

The total amount of memory in GB configured for all VMs on this server.

Type

Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

TOTAL_VM_CONFIGURED_MEMORY or TVCM

Total VM Provisioned Space attribute

Description

The total amount of space in GB, that has been provisioned for use by VMs on this server.

Type

Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TOTAL_VM_PROVISIONED_SPACE or TVPS

**Fully Qualified Name attribute**

**Description**
This host's fully qualified name.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
FULLY_QUALIFIED_NAME or FQN

**CPU Packages attribute**

**Description**
The number of CPU packages for this host.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CPU_PACKAGES or CP

**Processor Family attribute**

**Description**
The processor family of this host's CPUs.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
PROCESSOR_FAMILY or PF

**System Vendor attribute**

**Description**
The system vendor of this host.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SYSTEM_VENDOR or SV

**System Model attribute**
Description
The system model of this host.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SYSTEM_MODEL or SM

BIOS Date attribute
Description
The date of release for this system's BIOS.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
BIOS_DATE

HyperThreading Enabled attribute
Description
Whether hyperthreading is enabled on this server.

Type
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Yes (1)
- No (0)
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
HYPERTHREADING_ENABLED or HE

Performance Error Rate attribute
Description
The error rate of performance monitoring API calls against this host over a configured interval.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PERFORMANCE_ERROR_RATE or PER

Performance Error Pct attribute
Description
The percentage of performance monitoring API calls against this host that failed during their last execution.
Type
Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PERFORMANCE_ERROR_PCT or PEP

Latency attribute

Description
The amount of time (in percentage) that the resource pool waits in the ready state and is not scheduled because of a CPU resource contention.

Type
Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
LATENCY

Demand attribute

Description
The average active CPU load (in MHz) for the last minute.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DEMAND

Used CPU MHz attribute

Description
The amount of the CPU (in MHz) that is used by the server.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
USED_CPU_MHZ or UCM

Energy Usage attribute

Description
The amount of energy (in joules) that is used since the host system was started.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable** (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

ENERGY_USAGE or EU

**Power Usage attribute**

**Description**
The amount of power (in watts) that is currently used.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable** (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

POWER_USAGE or PU

**Power Capacity attribute**

**Description**
The maximum amount of power (in watts) that can be used.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable** (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

POWER_CAPACITY or PC0

**IP Address attribute**

**Description**
The IP address of the host system.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable** (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

IP_ADDRESS

**Serial Number attribute**

**Description**
The serial number of the hardware of the host system.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable** (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Storage Adapter Max Latency attribute

**Description**
The highest latency (in milliseconds) across all the storage adapters that are used by the host.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Storage Path Max Latency attribute

**Description**
The highest latency (in milliseconds) across all the storage paths that are used by the host.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Power State attribute

**Description**
The power status of the host system. The valid values are POWERED_OFF, POWERED_ON, STAND_BY, and UNKNOWN.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Current EVC Mode attribute

**Description**
The current Enhanced VMotion Compatibility (EVC) mode of the host system.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
**Description**

The maximum Enhanced VMotion Compatibility (EVC) mode of the host system.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

MAX_EVC_MODE or MEM

---

**Include Data In Summarization 0 attribute**

**Description**

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**

The source for this attribute is derived: (Number_VMs < 0) || (Number_VMs_On < 0) ? 0 : 1.

**Warehouse name**

INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

---

**Include Data In Summarization 1 attribute**

**Description**

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**

The source for this attribute is derived: (NICs < 0) || (Physical_CPUs < 0) || (CPU_Packages < 0) || (Physical_Memory < 0) ? 0 : 1.

**Warehouse name**

INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

---

**Include Data In Summarization 2 attribute**

**Description**

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Overall_CPU_Util < 0) || (Total_CPU_MHz < 0) || (Avg_VM_CPU_Percent_Rdy < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

Include Data In Summarization 3 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Datastore_Space < 0) || (Used_Datastore < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_3 or IDIS3

Include Data In Summarization 4 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Latency < 0) || (Demand < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_4 or IDIS4

Include Data In Summarization 5 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
INCLUDE_DATA_IN_SUMMARIZATION_5 or IDIS5

Include Data In Summarization 6 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Energy_Usage < 0) || (Power_Usage < 0) || (Power_Capacity < 0)? 0 : 1.

Include Data In Summarization 7 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Overall_Memory_Util < 0)? 0 : 1.

Include Data In Summarization 8 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Storage_Adapter_Max_Latency < 0) || (Storage_Path_Max_Latency < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_8 or IDIS8

Include Data In Summarization 9 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Used_CPU_MHz < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_9 or IDIS9

Server CPU attribute group
This attribute group contains information about CPU usage for a server.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Server CPU attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute

Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Server Hostname attribute: This attribute is a key attribute.
Description
The host name of the ESX server.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SERVER_HOSTNAME or SH

CPU Number attribute: This attribute is a key attribute.

Description
The number of this CPU.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CPU_NUMBER

CPU Utilization attribute

Description
The usage of this CPU.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CPU_UTILIZATION or CU

NodeID attribute

Description
This attribute is only for IBM-internal use.

Type
String

Warehouse name
NODEID

Core Utilization attribute

Description
The percentage of the CPU core that is currently utilized. A core is utilized if either a single or both the logical CPU cores are utilized when hyper-threading is enabled.

Type
Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

CORE_UTILIZATION or CU0

**Include Data In Summarization 0 attribute**

**Description**

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**

The source for this attribute is derived: (CPU_Utilization < 0) ? 0 : 1.

**Warehouse name**

INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

**Include Data In Summarization 1 attribute**

**Description**

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**

The source for this attribute is derived: (Core_Utilization < 0) ? 0 : 1.

**Warehouse name**

INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

**Server DataStore attribute group**

This attribute group contains information about data stores for a server.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**

The following list contains information about each attribute in the Server DataStore attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**

The managed system name of the agent.

**Type**

String

**Source**

The source for this attribute is the agent.
Warehouse name
NODE

Timestamp attribute
Description
The local time at the agent when the data was collected.
Type
String
Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Server Hostname attribute: This attribute is a key attribute.
Description
The host name of the ESX server.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SERVER_HOSTNAME or SH

Name attribute: This attribute is a key attribute.
Description
The name of the data store.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NAME

Free Space attribute
Description
The amount of available storage in MB.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
FREE_SPACE

Used Space attribute
Description
The amount of allocated storage in MB.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
Maximum File Size attribute

**Description**
The maximum size in KB of a file that might be allocated.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)
- > 2048GB (-2)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
USED_SPACE

Capacity attribute

**Description**
The storage capacity in MB. This metric does not apply to floppy or CD drives.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
MAXIMUM_FILE_SIZE or MFS

Percent Used attribute

**Description**
The percentage of used space in the data store.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
PERCENT_USED or PU

Percent Free attribute

**Description**
The percentage of unused space in this data store.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
| Warehouse name | DESCRIPTION | TYPE | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
|--------------|--------------|------|--------|------|------------|--------|------|----------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
| TYPE         | TYPE         | STRING | WITH | ENUMERATED | VALUES. | THE | STRINGS | ARE | DISPLAYED | IN | THE | Tivoli | Enterprise | Portal. | THE | Warehouse | and | queries | return | the | values | that | are | shown | in | parentheses. | The | following | values | are | defined: | • | Unavailable | (Unavailable) | Any | other | value | is | the | value | that | is | returned | by | the | agent | in | the | Tivoli | Enterprise | Portal. |
Read Latency attribute

Description
The average amount of time (in milliseconds) taken for a read operation from the datastore.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
READ_LATENCY or RL

Write Latency attribute

Description
The average amount of time (in milliseconds) taken for a write operation from the datastore.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
WRITE_LATENCY or WL

Include Data In Summarization 0 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Free_Space < 0) || (Used_Space < 0) || (Percent_Used < 0) || (Percent_Free < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).
Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source

The source for this attribute is derived: (Read_Latency < 0) || (Write_Latency < 0) ? 0 : 1.

Warehouse name

INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

Server Disk attribute group

This attribute group contains information about disk usage for a server.

Historical group

This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions

The following list contains information about each attribute in the Server Disk attribute group:

Node attribute: This attribute is a key attribute.

Description

The managed system name of the agent.

Type

String

Source

The source for this attribute is the agent.

Warehouse name

NODE

Timestamp attribute

Description

The local time at the agent when the data was collected.

Type

String

Source

The source for this attribute is the agent.

Warehouse name

TIMESTAMP

Server Hostname attribute: This attribute is a key attribute.

Description

The host name of the ESX server.

Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

SERVER_HOSTNAME or SH

Disk Name attribute: This attribute is a key attribute.

Description

The name of a virtual disk on the server.
Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

DISK_NAME

Read attribute

Description
The amount of data read in the interval for this disk in KBps.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
READ

Write attribute

Description
The amount of data written in the interval for this disk in KB per second.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
WRITE

Number Read attribute

Description
The number of read operations on the disk in the performance interval.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NUMBER_READ or NR

Number Write attribute

Description
The number of write operations on the disk in the performance interval.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
NUMBER_WRITE or NW

**BUS Resets attribute**

**Description**
The number of bus resets in the performance interval.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
BUS_RESETS

**Commands attribute**

**Description**
The number of disk commands issued during the performance interval.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
COMMANDS

**Commands Aborted attribute**

**Description**
The number of disk commands stopped during the performance interval.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
COMMANDS_ABORTED or CA

**Device Latency attribute**

**Description**
The average amount of time in milliseconds to complete an operation by the physical device.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DEVICE_LATENCY or DL

**Device Read Latency attribute**
Description
The average amount of time in milliseconds that a read operation took by the physical device.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DEVICE_READ_LATENCY or DRL

Device Write Latency attribute
Description
The average amount of time in milliseconds that a write operation took by the physical device.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DEVICE_WRITE_LATENCY or DWL

Device Total Latency attribute
Description
The sum of the average amount of time in milliseconds to complete read and write operations by the physical device.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DEVICE_TOTAL_LATENCY or DTL

Kernel Latency attribute
Description
The average amount of time in milliseconds to complete an operation by the VMware kernel.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
KERNEL_LATENCY or KL

Kernel Read Latency attribute
Description
The average amount of time in milliseconds that a read operation took by the
VMware kernel.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
KERNEL_READ_LATENCY or KRL

Kernel Write Latency attribute

Description
The average amount of time in milliseconds that a write operation took by the
VMware kernel.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
KERNEL_WRITE_LATENCY or KWL

Kernel Total Latency attribute

Description
The sum of the average amount of time in milliseconds to complete read and
write an operations by the VMware kernel.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
KERNEL_TOTAL_LATENCY or KTL

Queue Latency attribute

Description
The average amount of time in milliseconds spent in the queue for the VMware
kernel per IO command.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.

Warehouse name
QUEUE_LATENCY or QL

Queue Read Latency attribute
**Description**
The average amount of time in milliseconds that a read operation spent in the queue for the VMware kernel.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
QUEUE_READ_LATENCY or QRL

---

**Queue Write Latency attribute**

**Description**
The average amount of time in milliseconds that a write operation spent in the queue for the VMware kernel.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
QUEUE_WRITE_LATENCY or QWL

---

**Queue Total Latency attribute**

**Description**
The sum of the average amount of time in milliseconds spent in the queue for reads and writes in the VMware kernel per IO command.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
QUEUE_TOTAL_LATENCY or QTL

---

**Total Read Latency attribute**

**Description**
The average total amount of time in milliseconds spent on a read operation for both the physical and kernel layers.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TOTAL_READ_LATENCY or TRL

---

**Total Write Latency attribute**

---
Description
The average total amount of time in milliseconds spent on a write operation for both the physical and kernel layers.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TOTAL_WRITE_LATENCY or TWL

Total Latency attribute

Description
The average total amount of time spent on an IO operation for both the physical and kernel layers.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TOTAL_LATENCY or TL

Backing Datastore attribute

Description
The name of the data store that backs this server disk if there is one.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Not Applicable (Not Applicable)
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
BACKING_DATASTORE or BD

NodeID attribute

Description
This attribute is only for IBM-internal use.

Type
String

Warehouse name
NODEID

Include Data In Summarization 0 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
Value Exceeds Maximum (2147483647)
Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Read < 0) || (Write < 0) ||
(Number_Read < 0) || (Number_Write < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Device_Latency < 0) ||
(Device_Total_Latency < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

Include Data In Summarization 2 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Kernel_Latency < 0) ||
(Kernel_Total_Latency < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

Include Data In Summarization 3 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
Value Exceeds Maximum (2147483647)
Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Queue_Latency < 0) ||
(Queue_Total_Latency < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_3 or IDIS3

Include Data In Summarization 4 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Total_Read_Latency < 0) ||
(Device_Read_Latency < 0) || (Kernel_Read_Latency < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_4 or IDIS4

Include Data In Summarization 5 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Total_Write_Latency < 0) ||
(Device_Write_Latency < 0) || (Kernel_Write_Latency < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_5 or IDIS5

Include Data In Summarization 6 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Total_Latency < 0) || (Queue_Read_Latency < 0) || (Queue_Write_Latency < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_6 or IDIS6

**Server HBA attribute group**

This attribute group contains information about the host bus adapters (HBA) of the server.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the Server HBA attribute group:

**Node attribute:** This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

**Warehouse name**
NODE

**Timestamp attribute**

Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

**Server Hostname attribute:** This attribute is a key attribute.

Description
The host name of the ESX server.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SERVER_HOSTNAME or SH

**Bus attribute**

Description
The bus number of this HBA.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**BUS**

**Device attribute:** This attribute is a key attribute.

**Description**
The device name of this HBA.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**DEVICE**

**Driver attribute**

**Description**
The driver being used for this HBA.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**DRIVER**

**Model attribute**

**Description**
The model string for this HBA.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**MODEL**

**PCI ID attribute**

**Description**
The PCI ID for this HBA.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**PCI_ID**

**Status attribute**
Description
The operational status for this HBA.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
STATUS

NodeID attribute

Description
This attribute is only for IBM-internal use.

Type
String

Warehouse name
NODEID

Read attribute

Description
The average amount of data that is read (in KB per second) by the storage adapter.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
READ

Write attribute

Description
The average amount of data that is written (in KB per second) by the storage adapter.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
WRITE

Read Latency attribute

Description
The average amount of time (in milliseconds) over a given sample interval that the storage adapter consumes for a read operation to complete. This average amount of time is the sum of kernel latency and device latency.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
READ_LATENCY or RL

**Write Latency attribute**

**Description**
The average amount of time (in milliseconds) over a given sample interval that the storage adapter consumes for a write operation to complete. This average amount of time is the sum of kernel latency and device latency.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
WRITE_LATENCY or WL

**Speed attribute**

**Description**
The current operating speed (in KB per second) of the adapter. This attribute is available for the HostFibreChannelHba HBA type.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SPEED

**Current Link Speed attribute**

**Description**
The current operating link speed (in megabits per second) of the port. This attribute is available for the HostInternetScsiHba HBA type.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CURRENT_LINK_SPEED or CLS

**Max Link Speed attribute**

**Description**
The maximum supported link speed (in megabits per second) of the port. This attribute is available for the HostInternetScsiHba HBA type.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Storage Adapter Throughput Usage attribute

Description
The I/O rate (in KB per second) of the storage adapter.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
STORAGE_ADAPTER_THROUGHPUT_USAGE or SATU

HBA Type attribute

Description
The type of Host Bus Adapter (HBA). The valid values are HostBlockHba, HostFibreChannelHba, HostInternetScsiHba, and HostParallelScsiHba.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
HBA_TYPE

Include Data In Summarization 0 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Read < 0) || (Write < 0) || (Read_Latency < 0) || (Write_Latency < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**

The source for this attribute is derived: (Speed < 0) || (Current_Link_Speed < 0) || (Max_Link_Speed < 0) || (Storage_Adapter_Throughput_Usage < 0)? 0: 1.

**Warehouse name**

INCLUDE_DATA_IN_SUMMARIZATION_1 or IDISI

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**Server Health attribute group**

This attribute group contains ESX server health information.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**

The following list contains information about each attribute in the Server Health attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**

The managed system name of the agent.

**Type**

String

**Source**

The source for this attribute is the agent.

**Warehouse name**

NODE

**Timestamp attribute**

**Description**

The local time at the agent when the data was collected.

**Type**

String

**Source**

The source for this attribute is the agent.

**Warehouse name**

TIMESTAMP

**Server Hostname attribute:** This attribute is a key attribute.

**Description**

The host name of the ESX server.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

SERVER_HOSTNAME or SH

**Sensor Type attribute**

**Description**

The type of sensor.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal.
Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SENSOR_TYPE or ST

**Sensor Name attribute**

**Description**
The name of the sensor.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SENSOR_NAME or SN

**Sensor Status attribute**

**Description**
The operational status of the sensor.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SENSOR_STATUS or SS

**Sensor Value attribute**

**Description**
The value of the sensor.

**Type**
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-2147483648)
- Not applicable (-2147483647)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SENSOR_VALUE or SV

**Sensor Units attribute**

**Description**
The units of Sensor_Value.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)
- Not applicable (Not applicable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SENSOR_UNITS or SU

**NodeID attribute**

**Description**
This attribute is only for IBM-internal use.

**Type**
String

**Warehouse name**
NODEID

---

**Server Memory attribute group**

This attribute group contains information about memory usage for a server.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**

The following list contains information about each attribute in the Server Memory attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**
The managed system name of the agent.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
NODE

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

**Server Hostname attribute:** This attribute is a key attribute.

**Description**
The host name of the ESX server.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SERVER_HOSTNAME or SH

**Physical Memory attribute**

**Description**
The amount of physical memory in MB on this server.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

PHYSICAL_MEMORY or PM

**Memory Usage attribute**

**Description**
The amount of physical memory in use in MB.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

MEMORY_USAGE or MU

**Service Console attribute**

**Description**
The amount of memory reserved by the service console for the server in KB.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

SERVICE_CONSOLE or SC

**Memory Utilization attribute**

**Description**
The physical memory usage as a percentage of used physical memory divided by physical memory installed.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

MEMORY_UTILIZATION or MU0

**Active Memory attribute**

**Description**
The amount of memory that is actively used in KB.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

ACTIVE_MEMORY or AM

**Granted Memory attribute**

**Description**
The amount of memory available for use in KB.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

GRANTED_MEMORY or GM

**Swap Used attribute**

**Description**
The amount of memory used for swap space in KB.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

SWAP_USED

**Free Memory attribute**

**Description**
The amount of physical memory that is currently free in MB.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

FREE_MEMORY or FM

**Balloon Used attribute**

**Description**
The amount of memory used by the virtual machine memory control system in KB.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

BALLOON_USED or BU

**Swap In Rate attribute**
Description
The rate at which memory is swapped in in kilobytes per second.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SWAP_IN_RATE or SIR

Swap Out Rate attribute

Description
The rate at which memory is swapped out in kilobytes per second.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SWAP_OUT_RATE or SOR

Swap Total Rate attribute

Description
The total rate at which memory is swapped in or out in kilobytes per second.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SWAP_TOTAL_RATE or STR

NodeID attribute

Description
This attribute is only for IBM-internal use.

Type
String

Warehouse name
NODEID

Active Write attribute

Description
The amount of memory (in KB) that is written to disk.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
ACTIVE_WRITE or AW
Swap In Rate From Host Cache attribute

Description
The rate (in KB per second) at which the memory is swapped from the host cache to the active memory.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SWAP_IN_RATE_HOST_CACHE or SIRHC

Swap Out Rate From Host Cache attribute

Description
The rate (in KB per second) at which the memory is swapped from the active memory to the host cache.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SWAP_OUT_RATE_HOST_CACHE or SORHC

Low Free Threshold attribute

Description
The threshold of the free host physical memory (in KB). The ESX server starts recovering the memory from the virtual machines by using ballooning and swapping when the threshold is reached.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
LOW_FREE_THRESHOLD or LFT

Granted Max Memory attribute

Description
The maximum amount of memory (in KB) that can be used by the virtual machine.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
GRANTED_MAX_MEMORY or GMM

Granted Min Memory attribute
Description
The minimum amount of memory (in KB) that can be used by the virtual machine.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
GRANTED_MIN_MEMORY or GMM0

Include Data In Summarization 0 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Memory_Utilization < 0) || (Active_Memory < 0) || (Granted_Memory < 0) || (Swap_Used < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Swap_In_Rate < 0) || (Swap_Out_Rate < 0) || (Swap_Total_Rate < 0)? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

Include Data In Summarization 2 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Active_Write < 0) || (Low_Free_Threshold < 0) || (Granted_Max_Memory < 0) || (Balloon_Used < 0) || (Granted_Min_Memory < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

Include Data In Summarization 3 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Memory_Usage < 0) || (Free_Memory < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_3 or IDIS3

Include Data In Summarization 4 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Swap_In_Rate_Host_Cache < 0) || (Swap_Out_Rate_Host_Cache < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_4 or IDIS4

Server Network attribute group
This attribute group contains information about network usage for a server.
Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Server Network attribute group:

Node attribute: This attribute is a key attribute.
- **Description**
  - The managed system name of the agent.
- **Type**
  - String
- **Source**
  - The source for this attribute is the agent.
- **Warehouse name**
  - NODE

Timestamp attribute
- **Description**
  - The local time at the agent when the data was collected.
- **Type**
  - String
- **Source**
  - The source for this attribute is the agent.
- **Warehouse name**
  - TIMESTAMP

Server Hostname attribute: This attribute is a key attribute.
- **Description**
  - The host name of the ESX server.
- **Type**
  - String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
    - Unavailable (Unavailable)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
- **Warehouse name**
  - SERVER_HOSTNAME or SH

NIC Name attribute: This attribute is a key attribute.
- **Description**
  - The name or label of this network interface.
- **Type**
  - String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
    - Unavailable (Unavailable)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
- **Warehouse name**
  - NIC_NAME

Usage attribute
- **Description**
  - The sum of data transmitted and received in the performance interval in KB per second.
- **Type**
  - Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**USAGE**

**Transmitted attribute**

**Description**

The amount of data transmitted in the performance interval in KB per second.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

TRANSMITTED or T

**Received attribute**

**Description**

The amount of data received in the performance interval in KB per second.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

RECEIVED

**Pkts Received attribute**

**Description**

The number of packets received in the performance interval.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

PKTS_RECEIVED or PR

**Pkts Transmitted attribute**

**Description**

The number of packets transmitted in the performance interval.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

PKTS_TRANSMITTED or PT
### Status attribute

**Description**
The current status, up or down, of the NIC.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- **Unavailable (Unavailable)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
STATUS

### Link Speed attribute

**Description**
The current operating speed of the NIC in MB per second (mbps).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- **Unavailable (-1)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
LINK_SPEED

### Duplex attribute

**Description**
The current operating mode of the NIC.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- **Unavailable (Unavailable)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DUPLEX

### Switch attribute

**Description**
The name of the virtual switch that the NIC is configured with.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- **Unavailable (Unavailable)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
VIRTUAL_SWITCH or VS

### Link Utilization attribute

**Description**
The percent usage of the NIC relative to the capacity of the link (including duplex).

**Type**
Real number (32-bit gauge) with two decimal places of precision with
enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
LINK_UTILIZATION or LU

**NodeID attribute**

**Description**
This attribute is only for IBM-internal use.

**Type**
String

**Warehouse name**
NODEID

**Datacenter attribute**

**Description**
The name of the data center this ESX Server is a member of.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DATACENTER

**Cluster attribute**

**Description**
The name of the cluster that this ESX server is a member of or unavailable if not a member of any cluster.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CLUSTER

**Transmit Pkts Dropped attribute**

**Description**
The number of transmit packets dropped in the performance interval.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TRANSMIT_PKTS_DROPPED or TPD

**Receive Pkts Dropped attribute**
Description
The number of receive packets dropped in the performance interval.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
RECEIVE_PKTS_DROPPED or RPD

Pkts Dropped attribute

Description
The number of packets dropped in the performance interval.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PKTS_DROPPED or PD

Physical Address attribute

Description
The physical address of this NIC.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PHYSICAL_ADDR or PA

Include Data In Summarization 0 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Usage < 0) || (Transmitted < 0) || (Received < 0) || (Pkts_Received < 0) || (Pkts_Transmitted < 0)? 0: 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Link_Speed < 0) || (Link_Utilization < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

Include Data In Summarization 2 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Transmit_Pkts_Dropped < 0) || (Receive_Pkts_Dropped < 0) || (Pkts_Dropped < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

Server SAN attribute group
This attribute group contains information about the SAN devices for a server.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Server SAN attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute

Description
The local time at the agent when the data was collected.
Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Disk Name attribute: This attribute is a key attribute.

Description
The name of the disk.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DISK_NAME

Datastore attribute

Description
The name of the associated data store for the disk.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Not applicable (Not applicable)
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATASTORE

Paths attribute

Description
The number of paths the host has to the device.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PATHS

Broken Paths attribute

Description
The number of broken paths the host has to the device.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
**Disabled Paths attribute**

**Description**
The number of disabled paths the host has to the device.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Path Selection Policy attribute**

**Description**
The path selection policy the host uses to determine how to access the device.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**NodeID attribute**

**Description**
This attribute is only for IBM-internal use.

**Type**
String

---

**Server Virtual Switches attribute group**

This attribute group contains information about the virtual switches in the virtual infrastructure.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the Server Virtual Switches attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**
The managed system name of the agent.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
NODE

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.
**Datacenter attribute:** This attribute is a key attribute.

**Description**
The name of the data center that uses this virtual switch.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DATACENTER

**Server Hostname attribute:** This attribute is a key attribute.

**Description**
The host name of the ESX server that the virtual switch belongs to.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SERVER_HOSTNAME or SH

**Switch attribute:** This attribute is a key attribute.

**Description**
The name of the virtual switch.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SWITCH

**Network attribute:** This attribute is a key attribute.

**Description**
The name of the network with which the virtual switch is associated.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
NETWORK
**Number NICs attribute**

**Description**
The number of NICs connected to the virtual switch.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
NUMBER_OF_NICS or NON

---

**Transmitted attribute**

**Description**
The amount of data transmitted in the performance interval in KB per second.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TRANSMITTED or T

---

**Received attribute**

**Description**
The amount of data received in the performance interval in KB per second.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
RECEIVED

---

**Usage attribute**

**Description**
The total usage of the virtual switch.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
USAGE

---

**Include Data In Summarization 0 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Transmitted < 0) | (Received < 0) | (Usage < 0) ? 0 : 1.

Warehouse name
INCLCOMPLETE_DATA_IN_SUMMARIZATION_0 or IDIS0

Server VM Datastore Utilization attribute group
This attribute group contains information about how each virtual machine is utilizing a data store.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Server VM Datastore Utilization attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute

Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Name attribute: This attribute is a key attribute.

Description
The name of the data store.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NAME

DataCenter attribute: This attribute is a key attribute.

Description
The name of the data center that contains this data store.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATACENTER

Virtual Machine attribute
Description
The name of the virtual machine on the data store.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VIRTUAL_MACHINE or VM

Committed attribute
Description
The amount of space in GB, on this data store, that this virtual machine is using.

Type
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
COMMITTED

Uncommitted attribute
Description
The reserved but unused amount of space in GB, on this data store, that this virtual machine can use in the future.

Type
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
UNCOMMITTED or U

Provisioned attribute
Description
The total reserved amount of space in GB, on this data store, that this virtual machine can use.

Type
Real number (32-bit gauge) with three decimal places of precision with
enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

<table>
<thead>
<tr>
<th>Warehouse name</th>
<th>PROVISIONED or P</th>
</tr>
</thead>
</table>

**Unshared attribute**

**Description**

The amount of space in GB, on this data store, occupied by this virtual machine that is not shared with any other virtual machines.

**Type**

Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

UNSHARED

**Percent Committed attribute**

**Description**

The percentage of space on this datastore that is committed as a percentage of the provisioned amount.

**Type**

Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

PERCENT_COMMITTED or PC

**NodeID attribute**

**Description**

This attribute is only for IBM-internal use.

**Type**

String

**Warehouse name**

NODEID

**Include Data In Summarization 0 attribute**

**Description**

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Committed < 0) || (Uncommitted < 0) || (Provisioned < 0) || (Unshared < 0) || (Percent_Committed < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

**SubNode Events attribute group**

This attribute group contains events for a server.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the SubNode Events attribute group:

- **Node attribute:** This attribute is a key attribute.
  - **Description**
    The managed system name of the agent.
  - **Type**
    String
  - **Source**
    The source for this attribute is the agent.
  - **Warehouse name**
    NODE

- **Timestamp attribute**
  - **Description**
    The local time at the agent when the data was collected.
  - **Type**
    String
  - **Source**
    The source for this attribute is the agent.
  - **Warehouse name**
    TIMESTAMP

- **Server Hostname attribute:** This attribute is a key attribute.
  - **Description**
    The host name of the ESX server that originated this event.
  - **Type**
    String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
    - Unavailable (Unavailable)
    Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
  - **Warehouse name**
    SERVER_HOSTNAME or SH

- **Event Seq Number attribute:** This attribute is a key attribute.
  - **Description**
    A sequence number for the event.
  - **Type**
    Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
    - Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

EVENT_SEQ_NUMBER or ESN

**UserId attribute**

Description

The user ID that caused the event.

Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Not applicable (Not applicable)
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

USERID

**Event Time attribute**

Description

The time that the event occurred.

Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

EVENT_TIME

**Event attribute**

Description

The event data string.

Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

EVENT

**Compute Resource attribute**

Description

The compute resource associated with this event.

Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

COMPUTE_RESOURCE or CR

**Datacenter attribute**
Description
The data center associated with this event.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATACENTER

Virtual Machine attribute

Description
The virtual machine associated with this event.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VIRTUAL_MACHINE or VM

Virtual Machine UUID attribute

Description
The UUID of the virtual machine associated with this event.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VIRTUAL_MACHINE_UUID or VMU

ESX Server UUID attribute

Description
The UUID of the ESX server associated with this event.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
ESX_SERVER_UUID or ESU

Category attribute

Description
The severity level associated with the event by VMware.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**CATEGORY**

**Event Type attribute**

**Description**

The type of event given by VMware.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**EVENT_TYPE**

**Event Text attribute**

**Description**

The full event data string.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**EVENT_TEXT**

**Event Type ID attribute**

**Description**

The type ID of the event given by VMware. This is unavailable unless the event is an extended event.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**EVENT_TYPE_ID or ETI**

**Entity Type attribute**

**Description**

The entity type of the event.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Include Data In Summarization 0 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Event_Seq_Number < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Tasks attribute group
This attribute group provides information about the tasks that are completed on the vCenter server.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Tasks attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute

Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Source Hostname attribute: This attribute is a key attribute.

Description
The host name of the data source that created the task.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
**Warehouse name**

SOURCE_HOSTNAME or SH

**Name attribute:** This attribute is a key attribute.

**Description**
The name of the task.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
NAME

**Target Entity attribute**

**Description**
The name of the target managed entity for the task.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TARGET_ENTITY or TE

**Status attribute**

**Description**
The status of the task. The valid values are error and success.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
STATUS

**Initiated By attribute**

**Description**
The type of the entity that created the task. The valid values are user name, another schedule task name, alarm name, and system.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
INITIATED_BY or IB

**Queue Time attribute**

**Description**
The date and time when the task was created.

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Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
QUEUE_TIME
Start Time attribute
Description
The date and time when the task started running.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
START_TIME
Completed Time attribute
Description
The date and time when the task was completed.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
COMPLETED_TIME or CT
Target Entity Type attribute
Description
The type of the target managed entity for the task.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TARGET_ENTITY_TYPE or TET
ErrorMessage attribute
Description
The reason for the task failure.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

ERROR_MESSAGE or EM

### Thread Pool Status attribute group

The Thread Pool Status attribute group contains information that reflects the status of the internal thread pool used to collect data asynchronously.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

#### Attribute descriptions

The following list contains information about each attribute in the Thread Pool Status attribute group:

- **Node attribute:** This attribute is a key attribute.
  - **Description**
    - The managed system name of the agent.
  - **Type**
    - String
  - **Source**
    - The source for this attribute is the agent.
  - **Warehouse name**
    - NODE

- **Timestamp attribute**
  - **Description**
    - The local time at the agent when the data was collected.
  - **Type**
    - String
  - **Source**
    - The source for this attribute is the agent.
  - **Warehouse name**
    - TIMESTAMP

- **Thread Pool Size attribute**
  - **Description**
    - The number of threads currently existing in the thread pool.
  - **Type**
    - Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
      - NO DATA (-1)
      - NO DATA (-100)
    - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
  - **Warehouse name**
    - THREAD_POOL_SIZE or THPSIZE

- **Thread Pool Max Size attribute**
  - **Description**
    - The maximum number of threads allowed to exist in the thread pool.
  - **Type**
    - Integer (32-bit numeric property) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
      - NO DATA (-1)
      - NO DATA (-100)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
THREAD_POOL_MAX_SIZE or TMAXSZ

**Thread Pool Active Threads attribute**

**Description**
The number of threads in the thread pool currently active doing work.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- NO DATA (-1)
- NO DATA (-100)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
THREAD_POOL_ACTIVE_THREADS or TPACTTH

**Thread Pool Avg Active Threads attribute**

**Description**
The average number of threads in the thread pool simultaneously active doing work.

**Type**
Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- NO DATA (-1)
- NO DATA (-100)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
THREAD_POOL_AVG_ACTIVE_THREADS or TPAVGAT

**Thread Pool Min Active Threads attribute**

**Description**
The smallest number of threads in the thread pool that have simultaneously been active doing work.

**Type**
Integer (32-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- NO DATA (-1)
- NO DATA (-100)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
THREAD_POOL_MIN_ACTIVE_THREADS or TPMINAT

**Thread Pool Max Active Threads attribute**

**Description**
The peak number of threads in the thread pool that have simultaneously been active doing work.

**Type**
Integer (32-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
THREAD_POOL_MAX_ACTIVE_THREADS or TPMAXAT

**ThreadPool Queue Length attribute**

**Description**
The number of jobs currently waiting in the thread pool queue.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- NO DATA (-1)
- NO DATA (-100)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
THREAD_POOL_QUEUE_LENGTH or TPQLGTH

**ThreadPool Avg Queue Length attribute**

**Description**
The average length of the thread pool queue during this run.

**Type**
Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- NO DATA (-1)
- NO DATA (-100)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
THREAD_POOL_AVG_QUEUE_LENGTH or TPAVGQL

**ThreadPool Min Queue Length attribute**

**Description**
The minimum length the thread pool queue has reached.

**Type**
Integer (32-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- NO DATA (-1)
- NO DATA (-100)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
THREAD_POOL_MIN_QUEUE_LENGTH or TPMINQL

**ThreadPool Max Queue Length attribute**

**Description**
The peak length the thread pool queue has reached.

**Type**
Integer (32-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- NO DATA (-1)
• NO DATA (-100)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

THREAD_POOL_MAX_QUEUE_LENGTH or TPMAXQL

**Thread Pool Avg Job Wait attribute**

**Description**

The average time a job spends waiting on the thread pool queue in seconds.

**Type**

Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

• NO DATA (-1)
• NO DATA (-100)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

THREAD_POOL_AVG_JOB_WAIT or TPAVJBW

**Thread Pool Total Jobs attribute**

**Description**

The number of jobs completed by all threads in the pool since agent start.

**Type**

Integer (32-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

• NO DATA (-1)
• NO DATA (-100)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

THREAD_POOL_TOTAL_JOBS or TPTJOBS

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**Topological Events attribute group**

This attribute group posts events when ESX servers and virtual machines are created or destroyed, or when virtual machines are relocated using vMotion.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**

The following list contains information about each attribute in the Topological Events attribute group:

**Node attribute: This attribute is a key attribute.**

**Description**

The managed system name of the agent.

**Type**

String

**Source**

The source for this attribute is the agent.

**Warehouse name**

NODE

**Timestamp attribute**

**Description**

The local time at the agent when the data was collected.
### Type

**String**

**Source**

The source for this attribute is the agent.

**Warehouse name**

TIMESTAMP

### Entity Type attribute

**Description**

The type of topological entity to which the event applies.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Host System (Host System)
- Virtual Machine (Virtual Machine)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

ENTITY_TYPE or ET

### Event Type attribute

**Description**

The type of topological event that occurred.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Created (Created)
- Destroyed (Destroyed)
- Relocated (Relocated)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

EVENT_TYPE

### Host UUID attribute

**Description**

The UUID of the host system associated with this event.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

HOST_UUID

### VM UUID attribute

**Description**

The UUID of the virtual machine associated with this event.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
VM_UUID

**Managed System Name attribute**

**Description**  
The managed system name associated with this event.

**Type**  
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable (Unavailable)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
MSN

**Name attribute**

**Description**  
The name of the virtual machine or host that is producing this topology update.

**Type**  
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable (Unavailable)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
NAME

**DATASTORE UUID attribute**

**Description**  
The Universal Unique ID of the data store that is associated with the event.

**Type**  
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable (Unavailable)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
DATASTORE_UUID or DU

**Server Hostname attribute**

**Description**  
The host name of the ESX server that is associated with the event.

**Type**  
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- **Unavailable (Unavailable)**

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
SERVER_HOSTNAME or SH
Topology attribute group
This attribute group contains information about the topology of servers and virtual machines.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Topology attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute

Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

NodeName attribute

Description
The name of this node in the tree.

Type
String

Warehouse name
NODENAME

NodeID attribute: This attribute is a key attribute.

Description
The identifier for this node in the topology.

Type
String

Warehouse name
NODEID

NodeType attribute

Description
The type of node in the tree.

Type
String

Warehouse name
NODETYPE

NodeStatus attribute

Description
The status of this node.

Type
String

Warehouse name
NODESTATUS

ConnectToNode attribute: This attribute is a key attribute.

Description
Indicates a connection from the NodeID to the node specified here.
Triggered Alarms attribute group
This attribute group contains information about the alarms in the virtual infrastructure.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the Triggered Alarms attribute group:

Node attribute: This attribute is a key attribute.
Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute
Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Datacenter attribute: This attribute is a key attribute.

Description
The name of this data center.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATACENTER

Alarm Status attribute

Description
The alarm status for this alarm.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
ALARM_STATUS or OS

Alarm Triggered Time attribute

Description
The time that this alarm is triggered.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
ALARM_TRIGGERED_TIME or ATT

Alarm Name attribute: This attribute is a key attribute.

Description
The name of the alarm that got triggered.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
ALARM_NAME

Description attribute

Description
The description of this alarm.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DESCRIPTION or D

Triggered Entity attribute

Description
The name of the entity that this alarm was triggered on.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TRIGGERED_ENTITY or TE

Affected Entity attribute

Description
The name of the entity that was affected by this alarm.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
AFFECTED_ENTITY or EN

vCenters attribute group
This attribute group displays basic information about VMware data sources.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the vCenters attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE
timestamp attribute

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

configured address attribute: This attribute is a key attribute.

**Description**
The host address of the data source as entered in the agent data source configuration.

**Type**
String

**Warehouse name**
CONFIGURED_ADDRESS or CA

fqdn attribute

**Description**
The fully qualified domain name of the data source.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
FQDN

ip address attribute

**Description**
The IP address of the data source.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
IP_ADDRESS

web services port attribute

**Description**
The port through which the agent communicates with the data source.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
WEB_SERVICES_PORT or WSP

agent connection attribute
**Description**
The current connection status of this agent to the configured data source.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
- Down (0)
- Up (1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
AGENT_CONNECTION or AC

**Type attribute**
Description
The type of data source, which can be vCenter or ESX server.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
- ESX (0)
- vCenter (1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TYPE

**Inventory Age attribute**
Description
The number of seconds elapsed since the last time the inventory was updated.

**Type**
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
INVENTORY_AGE or IA

**Current CU Execution Time attribute**
Description
The number of seconds that the currently executing collection units have been executing, divided by the number of currently executing collection units.

**Type**
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CURRENT_CU_EXECUTION_TIME or CCET
**Average CU Execution Time attribute**

**Description**
The number of seconds that the previously executed collection units executed, divided by the number of previously executed collection units.

**Type**
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
AVERAGE_CU_EXECUTION_TIME or ACET

**Current CU Queue Time attribute**

**Description**
The number of seconds that the currently queued collection units have been queued, divided by the number of currently queued collection units.

**Type**
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CURRENT_CU_QUEUE_TIME or CCQT

**Average CU Queue Time attribute**

**Description**
The number of seconds that the previously queued collection units were queued, divided by the number of previously queued collection units.

**Type**
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
AVERAGE_CU_QUEUE_TIME or ACQT

**Collection Units attribute**

**Description**
The total number of collection units.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
COLLECTION_UNITS or CU
**Queued Collection Units attribute**

**Description**
The total number of collection units currently queued.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
QUEUED_COLLECTION_UNITS or QCU

**Executing Collection Units attribute**

**Description**
The total number of collection units currently executing.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
EXECUTING_COLLECTION_UNITS or ECU

**Virtual Machines attribute group**

This attribute group contains basic information about the virtual machines running on a server.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the Virtual Machines attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**
The managed system name of the agent.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
NODE

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

**VM Name attribute:** This attribute is a key attribute.

**Description**
The user-defined display name of this virtual machine.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VM_NAME

VM Server Name attribute: This attribute is a key attribute.

Description
The host name of the ESX server that runs this virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VM_SERVER_NAME or VSN

Power Status attribute

Description
The current power status of the virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
POWER_STATUS or PS

Up Time attribute

Description
The number of seconds since the virtual machine was started.

Type
DEFAULT with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
UP_TIME

Heartbeats attribute

Description
The number of heartbeats received from the virtual machine.

Type
DEFAULT with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

HEARTBEATS

**GuestOS Name attribute**

**Description**
The full name of the guest operating system for this virtual machine.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

GUESTOS_NAME or GN

**Guest State attribute**

**Description**
The operational state of the guest operating system installed in this virtual machine. The values can be running, shuttingdown, resetting, standby, notrunning, and unknown.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

GUEST_STATE or GS

**IP Address attribute**

**Description**
The IP address of this virtual machine.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

IP_ADDRESS

**Hostname attribute**

**Description**
The host name of this virtual machine.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

HOSTNAME
Num CPUs attribute
Description
The number of CPUs configured for this virtual machine.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.
Warehouse name
NUM_CPUS

Resource Pool attribute
Description
The name of the resource pool of which this virtual machine is a member.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise
Portal. The warehouse and queries return the values that are shown in
parentheses. The following values are defined:
- Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.
Warehouse name
RESOURCE_POOL or RP

Memory Size attribute
Description
The memory size of the virtual machine in MB.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.
Warehouse name
MEMORY_SIZE or MS

Memory Limit attribute
Description
The memory limit of the virtual machine in MB.
Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are
shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise
Portal.
Warehouse name
MEMORY_LIMIT or ML

Tools Status attribute
Description
The operational status of the VMware VM Tools package in the guest operating
system.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise
Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TOOLS_STATUS or TS

**VM OS Type attribute**

**Description**
The guest family for the operating system.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
VM_OS_TYPE

**CPU Utilization attribute**

**Description**
The overall CPU usage of this virtual machine during the collection interval.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CPU_UTILIZATION or CU

**CPU Shares attribute**

**Description**
The number of CPU shares, the relative weight, allocated to this virtual machine. This number is the actual value when the shares level has been configured as 'custom'. In general, the more shares a virtual machine has the more resource it gets.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-2)
- Not applicable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CPU_SHARES

**Memory Shares attribute**

**Description**
The number of memory shares, the relative weight, allocated to this virtual machine. This number is the actual value when the shares level has been configured as 'custom'. In general, the more shares a virtual machine has the more resource it gets.
Fault Tolerance attribute

Description
An indication of the protection of the virtual machine against hardware failures. This attribute can be configured with a secondary virtual machine or it can be running on a server that is a member of a cluster that is configured for High Availability.

Type
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- None (-1)
- FT Primary (1)
- FT NonPrimary (2)
- HA (3)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
FAULT_TOLERANCE or FT

VM Percent Ready attribute

Description
The CPU percent ready metric across all the virtual machine CPUs.

Type
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VM_PERCENT_RDY or VPR

Universally Unique Identifier attribute

Description
The UUID (Universally Unique Identifier) for this virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
UUID

VM MORef attribute
Description
The internal managed object reference name of the virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
MOREF

Datacenter attribute: This attribute is a key attribute.

Description
The name of this data center.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATACENTER

Overall Status attribute

Description
The overall status for this alarm.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OVERALL_STATUS or OS

Used CPU MHz attribute

Description
The total amount of CPU used by this virtual machine during the last sample period measured in MHz.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
USED_CPU_MHZ or UCM

Cluster attribute

Description
The name of the cluster that this virtual machine is a member of or unavailable if not a member of any cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal.
Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**CLUSTER**

**NodeID attribute**

**Description**

This attribute is only for IBM-internal use.

**Type**

String

**Warehouse name**

**NODEID**

**CPU Reservation attribute**

**Description**

Minimum amount of CPU in mhz guaranteed to be available to the virtual machine.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**CPU_RESERVATION or CR**

**Memory Reservation attribute**

**Description**

Minimum amount of memory in MB guaranteed to be available to the virtual machine.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**MEMORY_RESERVATION or MR**

**CPU Limit attribute**

**Description**

The CPU limit of the virtual machine in mhz.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**CPU_LIMIT**

**Guest OS Managed System Name attribute**
**Description**  
The managed system name of the guest OS agent within the virtual machine.

**Type**  
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
GUESTOS_MSN or GM

**Number Of Snapshots attribute**

**Description**  
The number of snapshots stored for this virtual machine.

**Type**  
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
NUMBER_OF_SNAPSHOTS or NOS

**VM Template attribute**

**Description**  
Indicates whether this virtual machine is a template instead of a regular virtual machine.

**Type**  
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
- Yes (1)
- No (0)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
TEMPLATE

**Snapshot Storage Consumed attribute**

**Description**  
The amount of disk space (in MB) that is used by the virtual machine for the snapshots.

**Type**  
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**  
SNAPSHOT_STORAGE_CONSUMED or SSC

**Storage DRS Enable attribute**

**Description**  
Indicates whether the Storage DRS is enabled.
Type
Integer with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- True (1)
- False (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
STORAGE_DRS_ENABLE or SDE

Connection State attribute
Description
The connection status of the virtual machine. The valid values are connected, disconnected, inaccessible, invalid, and orphaned.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CONNECTION_STATE or CS

Instance UUID attribute
Description
The virtual center specific 128-bit Universal Unique ID (UUID) of a virtual machine. The UUID is represented as a hexadecimal string. This identifier is used by VirtualCenter to uniquely identify all the virtual machine instances.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
INSTANCE_UUID or IU

FT Instance UUID attribute
Description
The instance UUID of the fault tolerance virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
FT_INSTANCE_UUID or FIU

Include Data In Summarization 0 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).
Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source

The source for this attribute is derived: (Memory_Size < 0) || (Memory_Shares < 0) || (Memory_Reservation < 0)? 0 : 1.

Warehouse name

INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute

Description

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source

The source for this attribute is derived: (CPU_Shares < 0) || (Num_CPUs < 0) || (CPU_Reservation < 0)? 0 : 1.

Warehouse name

INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

Include Data In Summarization 2 attribute

Description

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source

The source for this attribute is derived: (CPU_Utilization < 0) || (Used_CPU_MHz < 0)? 0 : 1.

Warehouse name

INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2

Include Data In Summarization 3 attribute

Description

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).
Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source

The source for this attribute is derived: (VM_Percent_RDY < 0 )? 0 : 1.

Warehouse name

INCLUDE_DATA_IN_SUMMARIZATION_3 or IDIS3

Include Data In Summarization 4 attribute

Description

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source

The source for this attribute is derived: (Number_Of_Snapshots<0) | | (Snapshot_Storage_Consumed<0)? 0 : 1.

Warehouse name

INCLUDE_DATA_IN_SUMMARIZATION_4 or IDIS4

Include Data In Summarization 5 attribute

Description

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source

The source for this attribute is derived: (Memory_Limit<0)? 0 : 1.

Warehouse name

INCLUDE_DATA_IN_SUMMARIZATION_5 or IDIS5

Include Data In Summarization 6 attribute

Description

This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type

Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Virtual Switches attribute group

This attribute group contains information about the standard virtual switches in the virtual infrastructure.

Historical group

This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions

The following list contains information about each attribute in the Virtual Switches attribute group:

Node attribute: This attribute is a key attribute.

Description

The managed system name of the agent.

Type

String

Source

The source for this attribute is the agent.

Warehouse name

NODE

Timestamp attribute

Description

The local time at the agent when the data was collected.

Type

String

Source

The source for this attribute is the agent.

Warehouse name

TIMESTAMP

Datacenter attribute: This attribute is a key attribute.

Description

The name of the data center that uses this virtual switch.

Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

DATACENTER

Server Hostname attribute: This attribute is a key attribute.

Description

The hostname of the ESX server to which the virtual switch belongs.

Type

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal.
Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SERVER_HOSTNAME or SH

**Switch attribute: This attribute is a key attribute.**

**Description**
The name of the virtual switch.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SWITCH

**Number NICs attribute**

**Description**
The number of NICs connected to the virtual switch.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
NUMBER_OF_NICS or NON

**Transmitted attribute**

**Description**
The total transmission rate in KBps of the host on this virtual switch.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TRANSMITTED or T

**Received attribute**

**Description**
The total reception rate in KBps of the host on this virtual switch.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name RECEIVED

Usage attribute

Description
The total rate in KBps that the host is transmitting and receiving data on this virtual switch.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name USAGE

Managed System Name attribute

Description
The managed system name of the subnode for the ESX server of the virtual switch.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name SUBNODE_MSN or SM

Include Data In Summarization 0 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Number_Of_NICs < 0)? 0 : 1.

Warehouse name INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute

Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Transmitted < 0) || (Received < 0) || (Usage < 0)? 0: 1.

Warehouse name
INCLUDER_DATA_IN_SUMMARIZATION_1 or IDIS1

VM CPU attribute group
This attribute group contains information about CPU usage for virtual machines that are powered on.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the VM CPU attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute

Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

VM Name attribute: This attribute is a key attribute.

Description
The user-defined display name of this virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VM_NAME

VM Server Name attribute: This attribute is a key attribute.

Description
The host name of the ESX server that runs this virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

VM_SERVER_NAME or VSN

**CPU Number attribute:** This attribute is a key attribute.

**Description**
The virtual CPU number.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

CPU_NUMBER

**Wait Time attribute**

**Description**
The amount of time the CPU spent in the wait state in milliseconds.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

WAIT_TIME

**Used Time attribute**

**Description**
The amount of time the CPU used in milliseconds.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

USED_TIME

**Ready Time attribute**

**Description**
The amount of time the CPU spent in the ready state in milliseconds.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

READY_TIME

**Sys Time attribute**
**Description**
The amount of time the CPU spent in the system state in milliseconds.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SYS_TIME

**Utilization attribute**

**Description**
The CPU usage percentage. This value is calculated as user time divided by the sum of used, ready, and wait times.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
UTILIZATION or U

**Percent Ready attribute**

**Description**
The CPU ready time percentage. This value is calculated as the amount of time the VM spent in the ready state divided by the size of the sample interval.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
PERCENT_RDY or PR

**VM Name CPU Number attribute**

**Description**
A concatenation of the VM Name and the CPU ID.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
VM_NAME_CPU_NUMBER or VNCN

**User Time attribute**

**Description**
The amount of time the CPU spent in the user (non_system) state in milliseconds.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the
Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**USER_TIME**

**VM HostName attribute**

**Description**
The host name of the virtual machine.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**VM_HOSTNAME or VH**

**VM OS Type attribute**

**Description**
The family for the guest operating system.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**VM_OS_TYPE**

**NodeID attribute**

**Description**
This attribute is only for IBM-internal use.

**Type**
String

**Warehouse name**

**NODEID**

**Include Data In Summarization 0 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
The source for this attribute is derived: (Wait_Time < 0) || (Ready_Time < 0) || (Used_Time < 0) || (Utilization < 0) || (Percent_Rdy < 0) || (User_Time < 0) ? 0 : 1.

Warehouse name

INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

**VM Datastore Utilization attribute group**

This attribute group contains information about the how each virtual machine is utilizing a data store.

**Historical group**

This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**

The following list contains information about each attribute in the VM Datastore Utilization attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**

The managed system name of the agent.

**Type**

String

**Source**

The source for this attribute is the agent.

**Warehouse name**

NODE

**Timestamp attribute**

**Description**

The local time at the agent when the data was collected.

**Type**

String

**Source**

The source for this attribute is the agent.

**Warehouse name**

TIMESTAMP

**Name attribute:** This attribute is a key attribute.

**Description**

The name of this datastore.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

NAME

**DataCenter attribute:** This attribute is a key attribute.

**Description**

The name of the data center that contains this datastore.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
**Warehouse name**
DATACENTER

**Virtual Machine attribute**

**Description**
The name of the virtual machine on the datastore.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
VIRTUAL_MACHINE or VM

**Committed attribute**

**Description**
The amount of space in GB, on this datastore, that is being used by this virtual machine.

**Type**
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
COMMITTED

**Uncommitted attribute**

**Description**
The reserved but unused amount of space in GB, on this datastore, that can be used in the future by this virtual machine.

**Type**
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
UNCOMMITTED or U

**Provisioned attribute**

**Description**
The total reserved amount of space in GB, on this datastore, that can be used by this virtual machine.

**Type**
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
### Unshared attribute

**Description**
The amount of space in GB, on this datastore, occupied by this virtual machine that is not shared with any other virtual machines.

**Type**
Real number (32-bit gauge) with three decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

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### Percent Committed attribute

**Description**
The percentage of space on this datastore that is committed as a percentage of the provisioned amount.

**Type**
Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

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### Total Read attribute

**Description**
The total kilobytes read per second by this vm from this datastore.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

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### Total Write attribute

**Description**
The total kilobytes written per second by this vm from this datastore.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
**Total IO attribute**

**Description**
The sum of total kilobytes read and written per second by this vm from this datastore.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
TOTAL_IO_KBPS or TIK

**NodeID attribute**

**Description**
This attribute is only for IBM-internal use.

**Type**
String

**Warehouse name**
NODEID

**Include Data In Summarization 0 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (Committed < 0) || (Uncommitted < 0) || (Provisioned < 0) || (Unshared < 0) || (Percent_Committed < 0) ? 0 : 1.

**Warehouse name**
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

**Include Data In Summarization 1 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (Total_Read_KBps < 0) || (Total_Write_KBps < 0) || (Total_IO_KBps < 0) ? 0 : 1.
VM Disk attribute group

This attribute group contains information about disk usage for virtual machines.

Historical group

This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions

The following list contains information about each attribute in the VM Disk attribute group:

Node attribute: This attribute is a key attribute.

Description
The managed system name of the agent.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute

Description
The local time at the agent when the data was collected.

Type
String

Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

VM Name attribute: This attribute is a key attribute.

Description
The user-defined display name of this virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VM_NAME

VM Server Name attribute: This attribute is a key attribute.

Description
The host name of the ESX server that runs this virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VM_SERVER_NAME or VSN

Description attribute: This attribute is a key attribute.

Description
The disk label and description.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DESCRIPTION or D

Access attribute

Description
The disk access (read or write).

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
ACCESS

Capacity attribute

Description
The capacity of the disk in MB.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)
- Not applicable (0)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CAPACITY

Removable attribute

Description
Indicates whether the disk is a removable disk.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
REMOVABLE

Connected attribute

Description
Indicates whether the disk is currently connected to the virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
CONNECTED

**VM HostName attribute**

**Description**
The host name of the virtual machine.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
VM_HOSTNAME or VH

**VM OS Type attribute**

**Description**
The guest family for the operating system.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
VM_OS_TYPE

**Disk Shares attribute**

**Description**
The number of disk shares, or the relative weight, allocated to this virtual machine. This is the actual value when the shares level has been configured as 'custom'. In general, the more shares a virtual machine has the more resource it gets.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-2)
- Not Applicable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
DISK_SHARES or DS

**Backing data store attribute**

**Description**
The name of the data store that backs this disk.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Not Applicable (Not Applicable)
- Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
BACKING_DATASTORE or BD

**NodeID attribute**

**Description**
This attribute is only for IBM-internal use.

**Type**
String

**Warehouse name**
NODEID

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**VM Disk Performance attribute group**
This attribute group provides information about the performance of the disks that are associated with the virtual machines.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the VM Disk Performance attribute group:

**Node attribute: This attribute is a key attribute.**

**Description**
The managed system name of the agent.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
NODE

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

**Virtual Machine Name attribute: This attribute is a key attribute.**

**Description**
The name of the virtual machine.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
VIRTUAL_MACHINE or VM

**Disk Name attribute: This attribute is a key attribute.**

**Description**
The name of the disk.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal.
Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DISK_NAME

Read attribute

Description
The amount of data that is read (in KB per second) from the disk during the collection interval.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
READ

Write attribute

Description
The amount of data that is written (in KB per second) to the disk during the collection interval.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
WRITE

Number Read attribute

Description
The number of times the data was read from the disk.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NUMBER_READ or NR

Number Write attribute

Description
The number of times the data was written to the disk.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

NUMBER_WRITE or NW

**VM MOREf attribute**

**Description**
The internal managed object reference name of the virtual machine.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
MOREF

**Include Data In Summarization 0 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (Read < 0) || (Write < 0) || (Number_Read < 0) || (Number_Write < 0) ? 0 : 1.

**Warehouse name**
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

**VM Memory attribute group**
This attribute group contains information about memory usage for virtual machines.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the VM Memory attribute group:

**Node attribute**
This attribute is a key attribute.

**Description**
The managed system name of the agent.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
NODE

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.
Type
  String

Source
  The source for this attribute is the agent.

Warehouse name
  TIMESTAMP

VM Name attribute: This attribute is a key attribute.
  Description
    The user-defined display name of this virtual machine.
  Type
    String with enumerated values. The strings are displayed in the Tivoli Enterprise
    Portal. The warehouse and queries return the values that are shown in
    parentheses. The following values are defined:
    • Unavailable (Unavailable)
    Any other value is the value that is returned by the agent in the Tivoli Enterprise
    Portal.

Warehouse name
  VM_NAME

VM Server Name attribute: This attribute is a key attribute.
  Description
    The host name of the ESX server that runs this virtual machine.
  Type
    String with enumerated values. The strings are displayed in the Tivoli Enterprise
    Portal. The warehouse and queries return the values that are shown in
    parentheses. The following values are defined:
    • Unavailable (Unavailable)
    Any other value is the value that is returned by the agent in the Tivoli Enterprise
    Portal.

Warehouse name
  VM_SERVER_NAME or VSN

Total Size attribute
  Description
    Total amount of memory allocated to the virtual machine in MB.
  Type
    Integer (32-bit gauge) with enumerated values. The strings are displayed in the
    Tivoli Enterprise Portal. The warehouse and queries return the values that are
    shown in parentheses. The following values are defined:
    • Unavailable (-1)
    Any other value is the value that is returned by the agent in the Tivoli Enterprise
    Portal.

Warehouse name
  TOTAL_SIZE

Max Alloc attribute
  Description
    Maximum amount of memory in MB that can be used by the virtual machine.
    The value is -1 if there is no limit.
  Type
    Integer (32-bit gauge) with enumerated values. The strings are displayed in the
    Tivoli Enterprise Portal. The warehouse and queries return the values that are
    shown in parentheses. The following values are defined:
    • Unavailable (-2)
    • No limit (-1)
    Any other value is the value that is returned by the agent in the Tivoli Enterprise
    Portal.
**Warehouse name**
MAX_ALLOC

**Min Alloc attribute**

**Description**
Minimum amount of memory in MB guaranteed to be allocated to the virtual machine.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
MIN_ALLOC

**Host Usage attribute**

**Description**
The amount of host (server) memory in MB that is currently being used by the virtual machine.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
HOST_USAGE

**Swap To File attribute**

**Description**
The total amount of virtual machine memory that has been swapped out to the swap file in KB.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
SWAP_TO_FILE or STF

**Balloon Usage attribute**

**Description**
The amount of memory in KB being used by the VMware balloon driver.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
BALLOON_USAGE or BU

**Guest Usage attribute**
Description
The amount of memory being used by the guest operating system in MB. The value can be between 0 and the configured memory size of the virtual machine.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
GUEST_USAGE or GU

Host Util attribute

Description
The percentage of memory (average) that was used by the virtual machine over the past sample interval. This value is calculated as the percentage of MemoryHostUsage over MemoryTotalSize.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
HOST_UTIL

Guest Util attribute

Description
The percentage of memory (average) that was used by the guest running in this virtual machine over the past sample interval. This value is calculated as the percentage of MemoryGuestUsage over MemoryTotalSize.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
GUEST_UTIL

VM HostName attribute

Description
The host name of the virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VM_HOSTNAME or VH

VM OS Type attribute
**Description**
The guest family for the operating system.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
VM_OS_TYPE

**Host Free attribute**

**Description**
The amount of virtual machine memory currently free in MB. This value is calculated as the difference between MemoryTotalSize and MemoryHostUsage.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
HOST_FREE

**Guest Free attribute**

**Description**
The amount of guest OS memory currently free in MB. This value is calculated as the difference between MemoryTotalSize and MemoryGuestUsage.

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
GUEST_FREE

**NodeID attribute**

**Description**
This attribute is only for IBM-internal use.

**Type**
String

**Warehouse name**
NODEID

**Datacenter attribute:** This attribute is a key attribute.

**Description**
The name of the data center that contains this virtual machine.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
DATACENTER

Usage attribute

Description
The amount of memory (in percentage) that is used from the total configured or available memory.

Type
Real number (32-bit gauge) with two decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
USAGE

Active attribute

Description
The amount of memory (in MB) that is actively used.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
ACTIVE

Shared attribute

Description
The amount of memory (in MB) that is shared with other virtual machines.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SHARED

Granted attribute

Description
The amount of memory (in MB) that is mapped to the virtual machine.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
GRANTED

Include Data In Summarization 0 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Total_Size < 0) || (Host_Usage < 0) || (Host_Util < 0) || (Guest_Usage < 0) || (Guest_Util < 0) || (Guest_Free < 0) || (Host_Free < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

Include Data In Summarization 1 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Min_Alloc < 0) || (Usage < 0) || (Swap_To_File < 0) || (Balloon_Usage < 0) || (Active < 0) || (Shared < 0) || (Granted < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_1 or IDIS1

Include Data In Summarization 2 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: (Max_Alloc < 0) ? 0 : 1.

Warehouse name
INCLUDE_DATA_IN_SUMMARIZATION_2 or IDIS2
VM Network attribute group

This attribute group contains information about the network usage for the virtual machines on this ESX server.

Historical group

This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions

The following list contains information about each attribute in the VM Network attribute group:

**Node attribute: This attribute is a key attribute.**

<table>
<thead>
<tr>
<th>Description</th>
<th>The managed system name of the agent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>String</td>
</tr>
<tr>
<td>Source</td>
<td>The source for this attribute is the agent.</td>
</tr>
<tr>
<td>Warehouse name</td>
<td>NODE</td>
</tr>
</tbody>
</table>

**Timestamp attribute**

<table>
<thead>
<tr>
<th>Description</th>
<th>The local time at the agent when the data was collected.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>String</td>
</tr>
<tr>
<td>Source</td>
<td>The source for this attribute is the agent.</td>
</tr>
<tr>
<td>Warehouse name</td>
<td>TIMESTAMP</td>
</tr>
</tbody>
</table>

**VM Name attribute: This attribute is a key attribute.**

<table>
<thead>
<tr>
<th>Description</th>
<th>The user-defined display name of this virtual machine.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Unavailable (Unavailable)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
<tr>
<td>Warehouse name</td>
<td>VM_NAME</td>
</tr>
</tbody>
</table>

**VM Server Name attribute: This attribute is a key attribute.**

<table>
<thead>
<tr>
<th>Description</th>
<th>The host name of the ESX server that runs this virtual machine.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:</td>
</tr>
<tr>
<td></td>
<td>• Unavailable (Unavailable)</td>
</tr>
<tr>
<td></td>
<td>Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.</td>
</tr>
<tr>
<td>Warehouse name</td>
<td>VM_SERVER_NAME or VSN</td>
</tr>
</tbody>
</table>

**Description attribute**

<table>
<thead>
<tr>
<th>Description</th>
<th>The description of this NIC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal.</td>
</tr>
</tbody>
</table>
Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**DESCRIPTION or D**

**Physical Address attribute:** This attribute is a key attribute.

**Description**

The physical address of this NIC.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**PHYSICAL_ADDR or PA**

**Transmitted attribute**

**Description**

The amount of data transmitted in the sample interval in KB per second.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**TRANSMITTED or T**

**Received attribute**

**Description**

The amount of data received in the sample interval in KB per second.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

**RECEIVED**

**Pkts Transmitted attribute**

**Description**

The number of packets transmitted in the sample interval.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
PKTS_TRANS

Pkts Received attribute

Description
The number of packets received in the sample interval.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PKTS_RECD

VM HostName attribute

Description
The host name of the virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VM_HOSTNAME or VH

VM OS Type attribute

Description
The guest family for the operating system.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VM_OS_TYPE

Network attribute

Description
The network name that the virtual NIC is associated with.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
NETWORK_NAME or NN

Switch attribute

Description
The name of the virtual switch that interface uses.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SWITCH

NodeID attribute
Description
This attribute is only for IBM-internal use.

Type
String

Warehouse name
NODEID

Datacenter attribute
Description
The name of the data center this virtual machine is a member of.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATACENTER

Cluster attribute
Description
The name of the cluster that this virtual machine is a member of or unavailable if not a member of any cluster.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
CLUSTER

Include Data In Summarization 0 attribute
Description
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Value Exceeds Maximum (2147483647)
- Value Exceeds Minimum (−2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
VM Orphaned Disk attribute group

This attribute group provides information about an orphaned virtual machine disk.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the VM Orphaned Disk attribute group:

**Node attribute:** This attribute is a key attribute.

*Description*
The managed system name of the agent.

*Type*
String

*Source*
The source for this attribute is the agent.

*Warehouse name*
NODE

**Timestamp attribute**

*Description*
The local time at the agent when the data was collected.

*Type*
String

*Source*
The source for this attribute is the agent.

*Warehouse name*
TIMESTAMP

**Source attribute:** This attribute is a key attribute.

*Description*
The host name of the data source.

*Type*
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

*Warehouse name*
SOURCE

**DataCenter attribute:** This attribute is a key attribute.

*Description*
The name of the data center that the data store belongs to.

*Type*
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)
- Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
Warehouse name
DATACENTER

Datastore Cluster attribute: This attribute is a key attribute.

- **Description**
  The name of the data store cluster that the data store belongs to.

- **Type**
  String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (Unavailable)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATASTORE_CLUSTER or DC

Datastore attribute: This attribute is a key attribute.

- **Description**
  The name of the data store that the orphaned virtual machine disk belongs to.

- **Type**
  String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (Unavailable)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DATASTORE

File Path attribute

- **Description**
  The path of the orphaned virtual machine disk.

- **Type**
  String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (Unavailable)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
FILE_PATH

FileSize attribute

- **Description**
  The size (in MB) of the orphaned virtual machine disk.

- **Type**
  Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (-1)
  - Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
FILE_SIZE

Last Modified attribute

- **Description**
  The time when the orphaned virtual machine disk was last modified.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
LAST_MODIFIED or LM

**Owner attribute**

**Description**
The name of the owner of the orphaned virtual machine disk.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**
OWNER

### VM Partition attribute group
This attribute group contains information about disk partitions for virtual machines.

**Historical group**
This attribute group is eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the VM Partition attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**
The managed system name of the agent.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
NODE

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**Warehouse name**
TIMESTAMP

**VM Name attribute:** This attribute is a key attribute.

**Description**
The user-defined display name of this virtual machine.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

VM_NAME

**VM Server Name attribute: This attribute is a key attribute.**

**Description**

The host name of the ESX server that runs this virtual machine.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

VM_SERVER_NAME or VSN

**Description attribute: This attribute is a key attribute.**

**Description**

The description or label of this disk partition.

**Type**

String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

DESCRIPTION or D

**Capacity attribute**

**Description**

The size of the partition in MB.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

CAPACITY

**Free Space attribute**

**Description**

The amount of unused space in MB.

**Type**

Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:

- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Warehouse name**

FREE_SPACE

**Used Space attribute**
Description
The amount of space used in MB.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
USED_SPACE

Percent Used attribute
Description
The percentage usage of used space.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PERCENT_USED or PU

Percent Free attribute
Description
The percentage of space on the partition is unallocated.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PERCENT_FREE or PF

VM HostName attribute
Description
The host name of the virtual machine.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
VM_HOSTNAME or VH

VM OS Type attribute
Description
The guest family for the operating system.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)
  Any other value is the value that is returned by the agent in the Tivoli Enterprise
  Portal.

Warehouse name
  VM_OS_TYPE

**NodeID attribute**

**Description**
This attribute is only for IBM-internal use.

**Type**
String

**Warehouse name**
NODEID

**Include Data In Summarization 0 attribute**

**Description**
This attribute is only for IBM-internal use. Indicates whether to include certain attribute data (numbers) in Tivoli Data Warehouse summarization. The valid values are 0 (exclude) and 1 (include).

**Type**
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Value Exceeds Maximum (2147483647)
• Value Exceeds Minimum (-2147483648)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: (Free_Space < 0) || (Used_Space < 0) || (Percent_Used < 0) || (Percent_Free < 0)? 0 : 1.

**Warehouse name**
INCLUDE_DATA_IN_SUMMARIZATION_0 or IDIS0

**VM Snapshot attribute group**
This attribute group is for IBM-internal use only.

**Historical group**
This attribute group is not eligible for use with Tivoli Data Warehouse.

**Attribute descriptions**
The following list contains information about each attribute in the VM Snapshot attribute group:

**Node attribute:** This attribute is a key attribute.

**Description**
The managed system name of the agent.

**Type**
String

**Source**
The source for this attribute is the agent.

**Timestamp attribute**

**Description**
The local time at the agent when the data was collected.

**Type**
String

**Source**
The source for this attribute is the agent.

**VM SnapshotFileLayout attribute group**
This attribute group is for IBM-internal use only.
Historical group
This attribute group is not eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the VM SnapshotFileLayout attribute group:

Node attribute: This attribute is a key attribute.
Description
The managed system name of the agent.
Type
String
Source
The source for this attribute is the agent.

Timestamp attribute
Description
The local time at the agent when the data was collected.
Type
String
Source
The source for this attribute is the agent.

VM Snapshots attribute group
This attribute group provides information about the snapshots for the virtual machines.

Historical group
This attribute group is eligible for use with Tivoli Data Warehouse.

Attribute descriptions
The following list contains information about each attribute in the VM Snapshots attribute group:

Node attribute: This attribute is a key attribute.
Description
The managed system name of the agent.
Type
String
Source
The source for this attribute is the agent.

Warehouse name
NODE

Timestamp attribute
Description
The local time at the agent when the data was collected.
Type
String
Source
The source for this attribute is the agent.

Warehouse name
TIMESTAMP

Snapshot Name attribute
Description
The name of the snapshot.
Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
- Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.
**Source**
The source for this attribute is derived: Snapshot_Name_I.

**Warehouse name**
SNAPSHOT_NAME or SN

**VM Name attribute**

**Description**
The name of the virtual machine.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: VM_Name_I.

**Warehouse name**
VM_NAME

**Creation Time attribute**

**Description**
The date and time when the snapshot was created.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: Creation_Date_I.

**Warehouse name**
CREATION_TIME or CT

**Description attribute**

**Description**
The description of the snapshot.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

**Source**
The source for this attribute is derived: Description_I.

**Warehouse name**
DESCRIPTION or D

**VM State attribute**

**Description**
The state of the virtual machine when the snapshot was created.

**Type**
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
  - Unavailable (Unavailable)
Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: Virtual_Machine_State_I.

Warehouse name
VM_STATE

Space Consumed attribute

Description
The amount of disk space (in MB) that is used by the snapshot.

Type
Integer (32-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (-1)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: Space_Consumed_I.

Warehouse name
SPACE_CONSUMED or SC

Snapshot MORRef attribute: This attribute is a key attribute.

Description
The internal managed object reference name of the snapshot.

Type
String with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values that are shown in parentheses. The following values are defined:
• Unavailable (Unavailable)

Any other value is the value that is returned by the agent in the Tivoli Enterprise Portal.

Source
The source for this attribute is derived: ManRef_I.

Warehouse name
SNAPSHOT_MOREF or SM

Disk capacity planning for historical data

Disk capacity planning for a monitoring agent is a prediction of the amount of disk space to be consumed for each attribute group with historical data that is being collected. Required disk storage is an important factor when you are defining data collection rules and your strategy for historical data collection.

The Capacity planning for historical data table provides the following information required to calculate disk space for this monitoring agent:

Table
Table name as it is displayed in the warehouse database, if the attribute group is configured to be written to the warehouse. The table name listed here corresponds to the table name in “Attribute groups for the monitoring agent” on page 33.

Attribute group
Name of the attribute group used to create the table in the warehouse database if it is short enough to fit in the table naming constraints of the database being used for the warehouse. The attribute group name listed here corresponds to the Warehouse table name in “Attribute groups for the monitoring agent” on page 33.
**Bytes per row (agent)**
Estimate of the record length for each row or instance written to the agent disk for historical data collection. This estimate can be used for agent disk space planning purposes.

**Database bytes per row (warehouse)**
Estimate of the record length for detailed records written to the warehouse database, if the attribute group is configured to be written to the warehouse. Detailed records are records that have been uploaded from the agent for long-term historical data collection. This estimate can be used for warehouse disk-space planning purposes.

**Aggregate bytes per row (warehouse)**
Estimate of the record length for aggregate records written to the warehouse database, if the attribute group is configured to be written to the warehouse. Aggregate records are created by the Summarization agent for attribute groups that have been configured for summarization. This estimate can be used for warehouse disk-space planning purposes.

In addition to the information in the tables, you must know the number of rows of data that you plan to collect. An attribute group can have single or multiple rows of data depending on the application environment that is being monitored. For example, if your attribute group is monitoring each processor in your computer and you have a dual processor computer, the number of rows is two.

**Table 1. Capacity planning for historical data logged by the VMware VI agent**

<table>
<thead>
<tr>
<th>Table</th>
<th>Attribute group</th>
<th>Bytes per row (agent)</th>
<th>Database bytes per row (warehouse)</th>
<th>Aggregate bytes per row (warehouse)</th>
</tr>
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<tbody>
<tr>
<td>KVMAA</td>
<td>KVM_ACTIVE_TASKS</td>
<td>880</td>
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<td>922</td>
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<td>KVMAA</td>
<td>KVM_AGENT_EVENTS</td>
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<td>221</td>
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<tr>
<td>KVMAA</td>
<td>KVM_CLUSTERED_LATENCIES</td>
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<td>893</td>
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<td>KVMAA</td>
<td>KVM_CLUSTERED_RESOURCE_POOLS</td>
<td>658</td>
<td>668</td>
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<td>KVMAA</td>
<td>KVM_CLUSTERED_SERVERS</td>
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<td>KVM_CLUSTERED_VIRTUAL_APPS</td>
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<td>KVMAA</td>
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<td>720</td>
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<td>KVM_DATASTORE_HOST_DISKS</td>
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Table 1. Capacity planning for historical data logged by the VMware VI agent (continued)

<table>
<thead>
<tr>
<th>Table</th>
<th>Attribute group</th>
<th>Bytes per row (agent)</th>
<th>Database bytes per row (warehouse)</th>
<th>Aggregate bytes per row (warehouse)</th>
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<td>KVM_VM_SNAPSHOT</td>
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</table>
Table 1. Capacity planning for historical data logged by the VMware VI agent (continued)

<table>
<thead>
<tr>
<th>Table</th>
<th>Attribute group</th>
<th>Bytes per row (agent)</th>
<th>Database bytes per row (warehouse)</th>
<th>Aggregate bytes per row (warehouse)</th>
</tr>
</thead>
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<td>KVM_VM_SNAPSHOTFILELAYOUT</td>
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<td>KVM_VM_SNAPSHOTS</td>
<td>680</td>
<td>683</td>
<td>759</td>
</tr>
</tbody>
</table>

For more information about historical data collection, see “Managing historical data” in the *IBM Tivoli Monitoring Administrator’s Guide*. 
Chapter 5. Situations reference

A situation is a logical expression involving one or more system conditions. Situations are used to monitor the condition of systems in your network. You can manage situations from the Tivoli Enterprise Portal by using the Situation Editor or from the command-line interface using the tacmd commands for situations. You can manage private situations in the private configuration XML file.

About situations

The monitoring agents that you use to monitor your system environment include a set of predefined situations that you can use as-is. You can also create new situations to meet your requirements.

Predefined situations contain attributes that check for system conditions common to many enterprises. Using predefined situations can improve the speed with which you can begin using the IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI. You can change the conditions or values being monitored by a predefined situation to the conditions or values best suited to your enterprise.

You can display predefined situations and create your own situations using the Situation editor. The Situation editor initially lists the situations associated with the Navigator item that you selected. When you click a situation name or create a situation, a panel opens with the following tabs:

Formula
Formula describing the condition being tested.

Distribution
List of managed systems (operating systems, subsystems, or applications) to which the situation can be distributed. All the VMware VI agent managed systems are assigned by default.

Expert advice
Comments and instructions to be read in the event workspace.

Action
Command to be sent to the system.

EIF
Customize forwarding of the event to an Event Integration Facility receiver. (Available when the Tivoli Enterprise Monitoring Server is configured to forward events.)

Until
Options to close the event after a period of time, or when another situation becomes true.

Additional information about situations

The Tivoli Enterprise Portal User’s Guide contains more information about predefined and custom situations and how to use them to respond to alerts.

For a list of the predefined situations and information about each individual situation for this monitoring agent, see "Predefined situations."

Predefined situations

The monitoring agent contains predefined situations, which are organized by Navigator item.

Agent level Navigator items

- VMware VI
  - Not applicable
- Clusters
- KVM_Cluster_Effective_CPU_Low
- KVM_Cluster_CPU_Util_High
- KVM_Cluster_Effective_Mem_Low
- KVM_Cluster_Memory_Util_High
- KVM_Cluster_Effective_Svrs_Low
- KVM_Cluster_Bad_Status

- Datastores
  - KVM_Datastore_Usage_High
  - KVM_Datastore_Inaccessible
  - KVM_Datastore_Bad_Status

- Events
  - KVM_Cluster_Critical_Event
  - KVM_Datastore_Critical_Event
  - KVM_VM_Critical_Event

- Monitored Servers
  - KVM_Take_Action_Failure
  - KVM_Collection_Error
  - KVM_ESX_Server_Unavailable
  - KVM_Host_System.Created
  - KVM_Host_System_Destroyed
  - KVM_Virtual_Machine.Created
  - KVM_Virtual_Machine_Destroyed
  - KVM_Virtual_Machine_Relocated
  - KVM_Host_System_Destroyed
  - KVM_Host_System_Destroyed2
  - KVM_Virtual_Machine_Destroyed
  - KVM_Virtual_Machine_Destroyed2
  - KVM_Virtual_Machine_Relocated
  - KVM_Collection_Time_Excessive

- Networks
  - Not applicable

VMware VI (ESX) subnode

- VMware VI
  - Not applicable

- CPU
  - KVM_VM_CPU_Util_High
  - KVM_VM_CPU_Ready_High

- Disk
  - KVM_Server_Disk_Reads_High
  - KVM_Server_Disk_Writes_High
  - KVM_VM_Disk_Free_Low

- ESX Server
Situation descriptions

Each situation description provides information about the situation that you can use to monitor the condition of systems in your network.

The situation descriptions provide the following information:

Description
Information about the conditions that the situation tests.

Formula
Syntax that contains one or more logical expressions that describe the conditions for the situation to monitor.

Distribution
Whether the situation is automatically distributed to instances of the agent or is available for manual distribution.

Run at startup
Whether the situation starts monitoring when the agent starts.

Sampling interval
Number of seconds that elapse between one sample of data that the monitoring agent collects for the server and the next sample.
Situation persistence
Whether the conditions specified in the situation evaluate to "true" for the defined number of occurrences in a row before the situation is raised. The default of one means that no persistence-checking takes place.

Severity
Severity of the predefined events: Warning, Informational, or Critical.

Clearing conditions
Controls when a true situation closes: after a period, when another situation is true, or whichever occurs first if both are selected.

VMware VI Navigator item
No predefined situations are included for this Navigator item.

Clusters Navigator item
The situation descriptions are organized by the Navigator item to which the situations are relevant.

KVM_Cluster_Effective_CPU_Low situation
Description
The effective CPU amount of the cluster is low.

The situation is evaluated for each distinct value of the DATACENTER attribute.

Formula
*IF *VALUE KVM_CLUSTERS.Percent_Effective_CPU *GE 0 *AND *VALUE KVM_CLUSTERS.Percent_Effective_CPU *LT 50

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
1 minute 30 seconds

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

KVM_Cluster_CPU_Util_High situation
Description
The CPU utilization of the cluster is high.

The situation is evaluated for each distinct value of the DATACENTER attribute.

Formula
*IF *VALUE KVM_CLUSTERS.CPU_Utilization *GT 90

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
1 minute 30 seconds
**Situation persistence**

The number of times the conditions of the situation must occur for the situation to be true is 1.

**Error conditions**

Warning

**Clearing conditions**

The situation clears when the condition becomes false.

**KVM_Cluster_Effective_Mem_Low situation**

**Description**

The effective memory of the cluster amount is low.

The situation is evaluated for each distinct value of the DATACENTER attribute.

**Formula**

\[\text{IF VALUE KVM\_CLUSTERS.\text{Percent}\_Effective\_Memory} \geq 0 \text{ AND VALUE KVM\_CLUSTERS.\text{Percent}\_Effective\_Memory} < 50\]

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

**Distribution**

This situation is automatically distributed to instances of this agent.

**Run at startup**

Yes

**Sampling interval**

1 minute 30 seconds

**Situation persistence**

The number of times the conditions of the situation must occur for the situation to be true is 1.

**Error conditions**

Warning

**Clearing conditions**

The situation clears when the condition becomes false.

**KVM_Cluster_Memory_Util_High situation**

**Description**

The memory utilization of the cluster is high.

The situation is evaluated for each distinct value of the DATACENTER attribute.

**Formula**

\[\text{IF VALUE KVM\_CLUSTERS.\text{Memory}\_Utilization} > 90\]

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

**Distribution**

This situation is automatically distributed to instances of this agent.

**Run at startup**

Yes

**Sampling interval**

1 minute 30 seconds

**Situation persistence**

The number of times the conditions of the situation must occur for the situation to be true is 1.

**Error conditions**

Warning

**Clearing conditions**

The situation clears when the condition becomes false.

**KVM_Cluster_Effective_Svrs_Low situation**

**Description**

The number of effective servers in the cluster is low.
The situation is evaluated for each distinct value of the DATACENTER attribute.

**Formula**

\[ \text{IF } \text{VALUE KVM_CLUSTERS.Percent_Effective_Servers } \geq 0 \text{ AND } \text{VALUE KVM_CLUSTERS.Percent_Effective_Servers } < 30 \]

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

**Distribution**

This situation is automatically distributed to instances of this agent.

**Run at startup**

Yes

**Sampling interval**

1 minute 30 seconds

**Situation persistence**

The number of times the conditions of the situation must occur for the situation to be true is 1.

**Error conditions**

Warning

**Clearing conditions**

The situation clears when the condition becomes false.

**KVM_Cluster_Bad_Status situation**

**Description**

The status of the cluster is not green.

The situation is evaluated for each distinct value of Cluster_Name.

**Formula**

\[ \text{IF } \text{VALUE KVM_CLUSTERS.Overall_Status } \neq 'Unavailable' \text{ AND } \text{VALUE KVM_CLUSTERS.Overall_Status } \neq 'green' \]

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

**Distribution**

This situation is automatically distributed to instances of this agent.

**Run at startup**

Yes

**Sampling interval**

15 minutes

**Situation persistence**

The number of times the conditions of the situation must occur for the situation to be true is 1.

**Error conditions**

Warning

**Clearing conditions**

The situation clears when the condition becomes false.

**Datastores Navigator item**

The situation descriptions are organized by the Navigator item to which the situations are relevant.

**KVM_Datastore_Usage_High situation**

**Description**

The data store is nearing or is at its defined capacity.

The situation is evaluated for each distinct value of the NAME attribute.

**Formula**

\[ \text{IF } \text{VALUE KVM_DATASTORES.Percent_Used } > 90 \]

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.
KVM_Datastore_Inaccessible situation

Description
The connectivity status of the data store is currently false.
The situation is evaluated for each distinct value of the NAME attribute.

Formula

*IF *VALUE KVM_DATASTORES.Accessible *EQ 'No'

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
30 seconds

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Critical

Clearing conditions
The situation clears when the condition becomes false.

KVM_Datastore_Bad_Status situation

Description
The status of the data store is not green.
The situation is evaluated for each distinct value of the NAME attribute.

Formula

*IF *VALUE KVM_DATASTORES.Overall_Status *NE 'Unavailable' *AND *VALUE KVM_DATASTORES.Overall_Status *NE 'green'

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
30 seconds

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.
Clearing conditions
The situation clears when the condition becomes false.

Events Navigator item
The situation descriptions are organized by the Navigator item to which the situations are relevant.

KVM_Cluster_Critical_Event situation
Description
An error has occurred on the cluster.
The situation is evaluated for each distinct value of Compute_Resource.

Formula
*IF *VALUE KVM_EVENTS.Entity_Type *EQ 'Cluster' *AND *VALUE KVM_EVENTS.Category *EQ 'error'

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
None. Data is analyzed when it becomes available.

Situation persistence
Not Applicable

Error conditions
Critical

Clearing conditions
The situation does not clear automatically.

KVM_Datastore_Critical_Event situation
Description
An error has occurred on the data store.
The situation is evaluated for each distinct value of Datastore.

Formula
*IF *VALUE KVM_EVENTS.Entity_Type *EQ 'Datastore' *AND *VALUE KVM_EVENTS.Category *EQ 'error'

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
None. Data is analyzed when it becomes available.

Situation persistence
Not Applicable

Error conditions
Critical

Clearing conditions
The situation does not clear automatically.

KVM_VM_Critical_Event situation
Description
An error has occurred on the virtual machine.
The situation is evaluated for each distinct value of Virtual_Machine.
**Monitored Servers Navigator item**

The situation descriptions are organized by the Navigator item to which the situations are relevant.

**KVM_Take_Action_Failure situation**

**Description**

A problem occurred during a Take Action command.

The situation is evaluated for the table.

**Formula**

*IF VALUE KVM_AGENT_EVENTS.Subsystem EQ 'Task' *AND* VALUE KVM_AGENT_EVENTS.Severity EQ 'Warning'

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

**Distribution**

This situation is automatically distributed to instances of this agent.

**Run at startup**

Yes

**Sampling interval**

None. Data is analyzed when it becomes available.

**Situation persistence**

Not Applicable

**Error conditions**

Warning

**Clearing conditions**

The situation does not clear automatically.

**KVM_Collection_Error situation**

**Description**

An ESX server is not responding to performance API queries.

The situation is evaluated for the table.

**Formula**

*IF VALUE KVM_AGENT_EVENTS.Message EQ 23 *AND* VALUE KVM_AGENT_EVENTS.Severity EQ 'Warning'

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

**Distribution**

This situation is automatically distributed to instances of this agent.
Run at startup
Yes
Sampling interval
None. Data is analyzed when it becomes available.
Situation persistence
Not Applicable
Error conditions
Warning
Clearing conditions
The situation does not clear automatically.

**KVM_ESX_Server_Unavailable situation**

Description
An ESX Server is unavailable.
The situation is evaluated for each distinct value of the NODENAME attribute.

Formula
*IF *VALUE KVM_TOPOLOGY.NodeStatus *NE 'Unavailable' *AND *VALUE
KVM_TOPOLOGY.NodeStatus *NE 'connected' *AND *VALUE KVM_TOPOLOGY.NodeType *EQ
'kvm.ESX_Server'

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in
this formula.

Distribution
This situation is available for distribution.

Run at startup
No
Sampling interval
1 minute 30 seconds
Situation persistence
The number of times the conditions of the situation must occur for the situation to be
true is 1.
Error conditions
Warning
Clearing conditions
The situation clears when the condition becomes false.

**KVM_Host_System_Created situation**

Description
A new ESX server was created.
The situation is evaluated for each distinct value of the ET attribute.

Formula
*IF *VALUE KVM_TOPOLOGICAL_EVENTS.Entity_Type *EQ 'Host System' *AND *VALUE
KVM_TOPOLOGICAL_EVENTS.Event_Type *EQ 'Created'

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in
this formula.

Distribution
This situation is available for distribution.

Run at startup
No
Sampling interval
None. Data is analyzed when it becomes available.
Situation persistence
Not Applicable
Error conditions
Informational
Clearing conditions
The situation does not clear automatically.
KVM_Host_System_Destroyed situation
Description
An ESX server was destroyed.
The situation is evaluated for each distinct value of the ET attribute.

Formula
*IF *VALUE KVM_TOPOLOGICAL_EVENTS.Entity_Type *EQ 'Host System' *AND *VALUE KVM_TOPOLOGICAL_EVENTS.Event_Type *EQ 'Destroyed'

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is available for distribution.

Run at startup
No

Sampling interval
None. Data is analyzed when it becomes available.

Situation persistence
Not Applicable

Error conditions
Informational

Clearing conditions
The situation does not clear automatically.

KVM_Virtual_Machine_Created situation
Description
A new virtual machine was created.
The situation is evaluated for each distinct value of the ET attribute.

Formula
*IF *VALUE KVM_TOPOLOGICAL_EVENTS.Entity_Type *EQ 'Virtual Machine' *AND *VALUE KVM_TOPOLOGICAL_EVENTS.Event_Type *EQ 'Created'

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is available for distribution.

Run at startup
No

Sampling interval
None. Data is analyzed when it becomes available.

Situation persistence
Not Applicable

Error conditions
Informational

Clearing conditions
The situation does not clear automatically.

KVM_Virtual_Machine_Destroyed situation
Description
A virtual machine was destroyed.
The situation is evaluated for each distinct value of the ET attribute.

Formula
*IF *VALUE KVM_TOPOLOGICAL_EVENTS.Entity_Type *EQ 'Virtual Machine' *AND *VALUE KVM_TOPOLOGICAL_EVENTS.Event_Type *EQ 'Destroyed'

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is available for distribution.
**KVM_Virtual_Machine_Relocated situation**

**Description**
A virtual machine was relocated.

The situation is evaluated for each distinct value of the ET attribute.

**Formula**
*IF* *
VALUE KVM_TOPOLOGICAL_EVENTS.Entity_Type *EQ 'Virtual Machine' *AND *VALUE KVM_TOPOLOGICAL_EVENTS.Event_Type *EQ 'Relocated' *

See ["Attributes in each attribute group" on page 37](#) for descriptions of the attributes in this formula.

**Distribution**
This situation is available for distribution.

**Run at startup**
No

**Sampling interval**
None. Data is analyzed when it becomes available.

**Situation persistence**
Not Applicable

**Error conditions**
Informational

**Clearing conditions**
The situation does not clear automatically.

---

**KVM_Host_System_Created2 situation**

**Description**
A new ESX server was created.

The situation is evaluated for each distinct value of Name.

**Formula**
*IF* *
VALUE KVM_TOPOLOGICAL_EVENTS.Entity_Type *EQ 'Host System' *AND *VALUE KVM_TOPOLOGICAL_EVENTS.Event_Type *EQ 'Created' *

See ["Attributes in each attribute group" on page 37](#) for descriptions of the attributes in this formula.

**Distribution**
This situation is available for distribution.

**Run at startup**
No

**Sampling interval**
None. Data is analyzed when it becomes available.

**Situation persistence**
Not Applicable

**Error conditions**
Informational

**Clearing conditions**
The situation does not clear automatically.

---

**KVM_Host_System_Destroyed2 situation**
Description
An ESX server was destroyed.
The situation is evaluated for each distinct value of Name.

Formula
*IF *VALUE KVM_TOPOLOGICAL_EVENTS.Entity_Type *EQ 'Host System' *AND *VALUE
KVM_TOPOLOGICAL_EVENTS.Event_Type *EQ 'Destroyed'

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in
this formula.

Distribution
This situation is available for distribution.

Run at startup
No

Sampling interval
None. Data is analyzed when it becomes available.

Situation persistence
Not Applicable

Error conditions
Informational

Clearing conditions
The situation does not clear automatically.

KVM_Virtual_Machine_Created2 situation
Description
A new virtual machine was created.
The situation is evaluated for each distinct value of Name.

Formula
*IF *VALUE KVM_TOPOLOGICAL_EVENTS.Entity_Type *EQ 'Virtual Machine' *AND *VALUE
KVM_TOPOLOGICAL_EVENTS.Event_Type *EQ 'Created'

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in
this formula.

Distribution
This situation is available for distribution.

Run at startup
No

Sampling interval
None. Data is analyzed when it becomes available.

Situation persistence
Not Applicable

Error conditions
Informational

Clearing conditions
The situation does not clear automatically.

KVM_Virtual_Machine_Destroyed2 situation
Description
A virtual machine was destroyed.
The situation is evaluated for each distinct value of Name.

Formula
*IF *VALUE KVM_TOPOLOGICAL_EVENTS.Entity_Type *EQ 'Virtual Machine' *AND *VALUE
KVM_TOPOLOGICAL_EVENTS.Event_Type *EQ 'Destroyed'

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in
this formula.

Distribution
This situation is available for distribution.
KVM_Virtual_Machine_Relocated situation

Description
A virtual machine was relocated.

The situation is evaluated for each distinct value of Name.

Formula
*IF *VALUE KVM_TOPOLOGICAL_EVENTS.Entity_Type *EQ 'Virtual Machine' *AND *VALUE KVM_TOPOLOGICAL_EVENTS.Event_Type *EQ 'Relocated'

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is available for distribution.

Run at startup
No

Sampling interval
None. Data is analyzed when it becomes available.

Situation persistence
Not Applicable

Error conditions
Informational

Clearing conditions
The situation does not clear automatically.

KVM_Connection_Failure situation

Description
A problem exists with the data source connection.

The situation is evaluated for each distinct value of Configured_Address.

Formula
*IF *VALUE KVM_VCENTERS.Agent_Connection *EQ 0

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
30 seconds

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Critical

Clearing conditions
The situation clears when the condition becomes false.

KVM_Inventory_Out_Of_Date situation
Description
The agent inventory is out of date.
The situation is evaluated for each distinct value of Configured_Address.

Formula
*IF VALUE KVM_VCENTERS.Inventory_Age GT 180000
See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
30 seconds

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Critical

Clearing conditions
The situation clears when the condition becomes false.

KVM_Collection_Time_Excessive situation

Description
A data collection is taking excessively long.
The situation is evaluated for each distinct value of Configured_Address.

Formula
*IF VALUE KVM_VCENTERS.Current_CU_Execution_Time GT 600000
See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
2 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Critical

Clearing conditions
The situation clears when the condition becomes false.

Networks Navigator item
No predefined situations are included for this Navigator item.

VMware VI subnode
The situation descriptions are organized by the Navigator item to which the situations are relevant.

VMware VI Navigator item
No predefined situations are included for this Navigator item.
**CPU Navigator item**

**KVM_VM_CPU_Util_High situation**

**Description**
The CPU utilization is high.
The situation is evaluated for each distinct value of the VM_NAME attribute.

**Formula**
*IF *VALUE KVM_VM_CPU.Utilization *GT 90

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

**Distribution**
This situation is automatically distributed to instances of this agent.

**Run at startup**
Yes

**Sampling interval**
15 minutes

**Situation persistence**
The number of times the conditions of the situation must occur for the situation to be true is 1.

**Error conditions**
Critical

**Clearing conditions**
The situation clears when the condition becomes false.

**KVM_VM_CPU_Ready_High situation**

**Description**
The CPU percent ready is high.
The situation is evaluated for each distinct value of the VM_NAME attribute.

**Formula**
*IF *VALUE KVM_VM_CPU.Percent_Rdy *GT 15

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

**Distribution**
This situation is available for distribution.

**Run at startup**
No

**Sampling interval**
15 minutes

**Situation persistence**
The number of times the conditions of the situation must occur for the situation to be true is 1.

**Error conditions**
Warning

**Clearing conditions**
The situation clears when the condition becomes false.

**Disk Navigator item**

**KVM_Server_Disk_Reads_High situation**

**Description**
The disk read activity is high.
The situation is evaluated for each distinct value of the SH attribute.

**Formula**
*IF *VALUE KVM_SERVER_DISK.Read *GT 5000

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.
Distribution
This situation is available for distribution.

Run at startup
No

Sampling interval
15 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

KVM_Server_Disk_Writes_High situation
Description
The disk write activity is high.
The situation is evaluated for each distinct value of the SH attribute.

Formula
*IF *VALUE KVM_SERVER_DISK.Write *GT 5000
See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is available for distribution.

Run at startup
No

Sampling interval
15 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

KVM_VM_Disk_Free_Low situation
Description
The virtual machine disk partition free space is low.
The situation is evaluated for each distinct value of the VM_NAME attribute.

Formula
*IF *VALUE KVM_VM_PARTITION.Percent_Free *GE 0 *AND *VALUE KVM_VM_PARTITION.Percent_Free *LT 10
See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
15 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning
Clearing conditions
The situation clears when the condition becomes false.

**ESX Server Navigator item**

**KVM_Server_CPU_Util_High situation**

**Description**
The CPU utilization is high.
The situation is evaluated for each distinct value of the SH attribute.

**Formula**
*IF VALUE KVM_SERVER.Overall_CPU_Util GE 90

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

**Distribution**
This situation is automatically distributed to instances of this agent.

**Run at startup**
Yes

**Sampling interval**
15 minutes

**Situation persistence**
The number of times the conditions of the situation must occur for the situation to be true is 1.

**Error conditions**
Warning

**Clearing conditions**
The situation clears when the condition becomes false.

**KVM_Server_Memory_Util_High situation**

**Description**
The memory utilization is high.
The situation is evaluated for each distinct value of the SH attribute.

**Formula**
*IF VALUE KVM_SERVER.Overall_Memory_Util GE 90

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

**Distribution**
This situation is automatically distributed to instances of this agent.

**Run at startup**
Yes

**Sampling interval**
15 minutes

**Situation persistence**
The number of times the conditions of the situation must occur for the situation to be true is 1.

**Error conditions**
Warning

**Clearing conditions**
The situation clears when the condition becomes false.

**KVM_ESX_Server_Disconnected situation**

**Description**
An ESX Server is not connected.
The situation is evaluated for each distinct value of the SH attribute.
Formula
*IF *VALUE KVM_SERVER.Connection_State *NE 'Unavailable' *AND *VALUE KVM_SERVER.Connection_State *NE 'connected' *AND *VALUE KVM_SERVER.Maintenance_Mode *NE Yes
See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
1 minute 30 seconds

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

KVM_Host_Server_Bad_Status situation
Description
The status of the host server is not green.
The situation is evaluated for each distinct value of Server_Hostname.

Formula
*IF *VALUE KVM_SERVER.Overall_Status *NE 'Unavailable' *AND *VALUE KVM_SERVER.Overall_Status *NE 'green'
See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
15 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

KVM_Server_VMotion_Event situation
Description
A VMotion event has been detected.
The situation is evaluated for each distinct value of Event_Text.

Formula
*IF *VALUE KVM_SUBNODE_EVENTS.Event_Type *EQ 'VmMigratedEvent' *OR *VALUE KVM_SUBNODE_EVENTS.Event_Type *EQ 'DrsVmMigratedEvent'
See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.
KVM_Server_Critical_Event situation
Description
An error has occurred on the ESX server.
The situation is evaluated for each distinct value of Server_Hostname.
Formula
*IF VALUE KVM_SUBNODE_EVENTS.Entity_Type EQ 'HostSystem' AND VALUE KVM_SUBNODE_EVENTS.Category EQ 'error'
See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.
Distribution
This situation is available for distribution.
Run at startup
No
Sampling interval
None. Data is analyzed when it becomes available.
Situation persistence
Not Applicable
Error conditions
Critical
Clearing conditions
The situation does not clear automatically.

KVM_Server_VM_Critical_Event situation
Description
An error has occurred on the virtual machine.
The situation is evaluated for each distinct value of Virtual_Machine.
Formula
*IF VALUE KVM_SUBNODE_EVENTS.Entity_Type EQ 'VirtualMachine' AND VALUE KVM_SUBNODE_EVENTS.Category EQ 'error'
See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.
Distribution
This situation is available for distribution.
Run at startup
No
Sampling interval
None. Data is analyzed when it becomes available.
Situation persistence
Not Applicable
Error conditions
Critical
Clearing conditions
The situation does not clear automatically.

KVM_Server_Datastore_Free_Low situation
Description
The data store free space is low.

The situation is evaluated for each distinct value of the SH attribute.

Formula
*IF *VALUE KVM_SERVER_DATASTORE.Percent_Free *GE 0 *AND *VALUE KVM_SERVER_DATASTORE.Percent_Free *LT 10

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
15 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

KVM_Server_HBA_Fault situation

Description
An ESX server host bus adapter has a fault.

The situation is evaluated for each distinct value of Device.

Formula
*IF *VALUE KVM_SERVER_HBA.Status *EQ 'fault'

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
15 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

Memory Navigator item

KVM_VM_Guest_Memory_Util_High situation

Description
The virtual machine guest memory usage is high.

The situation is evaluated for each distinct value of the VM_NAME attribute.

Formula
*IF *VALUE KVM_VM_MEMORY.Guest_Util *GT 90

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.
Distribution
   This situation is automatically distributed to instances of this agent.

Run at startup
   Yes

Sampling interval
   15 minutes

Situation persistence
   The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
   Warning

Clearing conditions
   The situation clears when the condition becomes false.

KVM_VM_Host_Memory_Util_High situation
Description
   The virtual machine host memory usage is high.
   The situation is evaluated for each distinct value of the VM_NAME attribute.

Formula
   *IF *VALUE KVM_VM_MEMORY.Host_Util *GT 90

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
   This situation is automatically distributed to instances of this agent.

Run at startup
   Yes

Sampling interval
   15 minutes

Situation persistence
   The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
   Warning

Clearing conditions
   The situation clears when the condition becomes false.

Network Navigator item
KVM_Server_Transmit_Rate_High situation
Description
   The transmit rate is high for the server.
   The situation is evaluated for each distinct value of the SH attribute.

Formula
   *IF *VALUE KVM_SERVER_NETWORK.Transmitted *GT 5000

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
   This situation is available for distribution.

Run at startup
   No

Sampling interval
   15 minutes

Situation persistence
   The number of times the conditions of the situation must occur for the situation to be true is 1.
KVM_Server_Receive_Rate_High situation

Description
The receive rate is high for the server.
The situation is evaluated for each distinct value of the SH attribute.

Formula
*IF *VALUE KVM_SERVER_NETWORK.Received *GT 5000

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is available for distribution.

Run at startup
No

Sampling interval
15 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

KVM_NIC_Down situation

Description
The host NIC adapter is not operational.
The situation is evaluated for each distinct value of NIC_Name.

Formula
*IF *VALUE KVM_SERVER_NETWORK.Status *EQ 'down' *AND *VALUE
KVM_SERVER_NETWORK.Virtual_Switch *NE 'Unavailable'

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is available for distribution.

Run at startup
No

Sampling interval
15 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

KVM_VM_Transmit_Rate_High situation

Description
The transmit rate is high for the virtual machine.
The situation is evaluated for each distinct value of the VM_NAME attribute.

Formula
*IF *VALUE KVM_VM_NETWORK.Transmitted *GT 5000
See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is available for distribution.

Run at startup
No

Sampling interval
15 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

KVM_VM_Receive_Rate_High situation
Description
The receive rate is high for the virtual machine.

The situation is evaluated for each distinct value of the VM_NAME attribute.

Formula
*IF *VALUE KVM_VM_NETWORK.Received *GT 5000

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is available for distribution.

Run at startup
No

Sampling interval
15 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

Resource Pools Navigator item
KVM_Resource_Pool_CPU_High situation
Description
The CPU utilization is high.

The situation is evaluated for each distinct value of the SH attribute.

Formula
*IF *VALUE KVM_RESOURCE_POOL_CPU.Percent_Overall_Usage *GE 90

See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
15 minutes
Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

KVM_Resource_Pool_Memory_High situation
Description
The memory utilization is high.
The situation is evaluated for each distinct value of the SH attribute.

Formula
*IF *VALUE KVM_RESOURCE_POOL_MEMORY.Percent_Overall_Usage *GE 90
See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is automatically distributed to instances of this agent.

Run at startup
Yes

Sampling interval
15 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Warning

Clearing conditions
The situation clears when the condition becomes false.

Virtual Machines Navigator item
KVM_VM_Powered_Off situation
Description
The virtual machine is powered off.
The situation is evaluated for each distinct value of the VM_NAME attribute.

Formula
*IF *VALUE KVM_VIRTUAL_MACHINES.Power_Status *EQ 'poweredOff'
See “Attributes in each attribute group” on page 37 for descriptions of the attributes in this formula.

Distribution
This situation is available for distribution.

Run at startup
No

Sampling interval
15 minutes

Situation persistence
The number of times the conditions of the situation must occur for the situation to be true is 1.

Error conditions
Informational

Clearing conditions
The situation clears when the condition becomes false.

KVM_Snapshots_High situation
Description
The number of snapshots is high.
The situation is evaluated for each distinct value of the VM_NAME attribute.

**Formula**

*IF *VALUE KVM_VIRTUAL_MACHINES.Number_Of_Snapshots *GE 32

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

**Distribution**

This situation is available for distribution.

**Run at startup**

No

**Sampling interval**

15 minutes

**Situation persistence**

The number of times the conditions of the situation must occur for the situation to be true is 1.

**Error conditions**

Warning

**Clearing conditions**

The situation clears when the condition becomes false.

**KVM_VM_Bad_Status situation**

**Description**

The status of the virtual machine is not green.

The situation is evaluated for each distinct value of VM_Name.

**Formula**

*IF *VALUE KVM_VIRTUAL_MACHINES.Overall_Status *NE 'Unavailable' *AND *VALUE KVM_VIRTUAL_MACHINES.Overall_Status *NE 'green'

See "Attributes in each attribute group" on page 37 for descriptions of the attributes in this formula.

**Distribution**

This situation is available for distribution.

**Run at startup**

No

**Sampling interval**

15 minutes

**Situation persistence**

The number of times the conditions of the situation must occur for the situation to be true is 1.

**Error conditions**

Warning

**Clearing conditions**

The situation clears when the condition becomes false.
Chapter 6. Take Action commands reference

Take Action commands can be run from the portal client or included in a situation or a policy.

**About Take Action commands**

When included in a situation, the command runs when the situation becomes true. A Take Action command in a situation is also referred to as reflex automation. When you enable a Take Action command in a situation, you automate a response to system conditions. For example, you can use a Take Action command to send a command to restart a process on the managed system or to send a text message to a cell phone.

In advanced automation, policies are used to take actions, schedule work, and automate manual tasks. A policy comprises a series of automated steps called activities that are connected to create a workflow. After an activity is completed, the Tivoli Enterprise Portal receives return-code feedback, and advanced automation logic responds with subsequent activities that are prescribed by the feedback.

A basic Take Action command shows the return code of the operation in a message box that is displayed after the action is completed or in a log file. After you close this window, no further information is available for this action.

**Additional information about Take Action commands**

For more information about working with Take Action commands, see “Take Action commands” in the Tivoli Enterprise Portal User’s Guide.

For a list of the Take Action commands for this monitoring agent and a description of each command, see “Predefined Take Action commands” and the information for each individual command.

**Predefined Take Action commands**

Not all agents have predefined Take Action commands. But you can create Take Action commands for any agent.

This monitoring agent contains the following Take Action commands:
- PowerOffVM
- PowerOnVM

**Take Action command descriptions**

Each Take Action command description provides information you can use to decide whether to run the Take Action command or whether to include the Take Action command in a situation or a policy.

The descriptions of the Take Action commands provide the following information:

**Description**

Actions the command performs on the system to which it is sent, and the permissions required for the Take Action command to function.

**Return codes**

Information that the Take Action command returns.
PowerOffVM action

This action attempts to power off a virtual machine. Two parameters are required for this action: the host name of the ESX server and the name of the virtual machine (the display name, not the virtual machine host name).

System command

To include the Take Action command in a situation or workflow policy, use the following syntax for the system command:

```plaintext
POWEROFFVM \n
[KVM_VIRTUAL_MACHINES.VM_Name]
```

You can use attribute substitution to supply the Take Action command arguments from the situation, for example:

```plaintext
POWEROFFVM \n
[&{KVM_VIRTUAL_MACHINES.VM_Name}]
```

You can also use attribute substitution in a workflow policy though the format is slightly different:

```plaintext
POWEROFFVM \n
[&WaitOnSituation:KVM_VIRTUAL_MACHINES.VM_Name]
```

Command arguments

- **Name**: KVM_VIRTUAL_MACHINES.VM_Name
  - **Description**: Name of the virtual machine to be powered off.
  - **Default**: ""

Destination systems

DESTINATIONS_NONE_OR_LIST

Return codes

- **Return Code: 8**
  - **Return Code Type**: TIMED_OUT
  - Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  - Message ID: KVM1019
  - Message: WARNING::NO MESSAGE FOUND FOR THIS RETURN CODE!!!!!
- **Return Code: 12**
  - **Return Code Type**: INSUFFICIENT_USER_AUTHORITY
  - Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  - Message ID: KVM1020
  - Message: WARNING::NO MESSAGE FOUND FOR THIS RETURN CODE!!!!!
- **Return Code: 0**
  - **Return Code Type**: OK
  - Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  - Message ID: KVM5004I
  - Message: The request to power off the virtual machine was sent successfully.
- **Return Code: 1**
  - **Return Code Type**: NOT_RUNNING
  - Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  - Message ID: KVM5005I
  - Message: The virtual machine is powered off.
- **Return Code: 2**
  - **Return Code Type**: GENERAL_ERROR
  - Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  - Message ID: KVM5006E
  - Message: Could not perform the requested power off action.
- **Return Code: 3**
  - **Return Code Type**: GENERAL_ERROR
PowerOnVM action

This action attempts to power on a virtual machine. Two parameters are required for this action: the host name of the ESX server and the name of the virtual machine (the display name, not the virtual machine host name).

System command

To include the Take Action command in a situation or workflow policy, use the following syntax for the system command:

```
POWERONVM \n
[KVM_VIRTUAL_MACHINES.VM_Name] \n
[KVM_VIRTUAL_MACHINES.VM_Server_Name]
```

You can use attribute substitution to supply the Take Action command arguments from the situation, for example:

```
POWERONVM \n
[&{KVM_VIRTUAL_MACHINES.VM_Name}] \n
[&{ KVM_VIRTUAL_MACHINES.VM_Server_Name}] 
```

You can also use attribute substitution in a workflow policy though the format is slightly different:

```
POWERONVM \n
[&WaitOnSituation:KVM_VIRTUAL_MACHINES.VM_Name] \n
[&WaitOnSituation:KVM_VIRTUAL_MACHINES.VM_Server_Name]
```

Command arguments

- **Name**: KVM_VIRTUAL_MACHINES.VM_Name
  - **Description**: Name of the virtual machine to be powered on.
  - **Default**: 
- **Name**: KVM_VIRTUAL_MACHINES.VM_Server_Name
  - **Description**: Name of the target virtual machine server.
  - **Default**: 

Destination systems

 DESTINATIONS_NONE_OR_LIST End

Return codes
• Return Code: 8
  – Return Code Type: TIMED_OUT
  – Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  – Message ID: KVM1019
  – Message: WARNING::NO MESSAGE FOUND FOR THIS RETURN CODE!!!!!!

• Return Code: 12
  – Return Code Type: INSUFFICIENT_USER_AUTHORITY
  – Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  – Message ID: KVM1020
  – Message: WARNING::NO MESSAGE FOUND FOR THIS RETURN CODE!!!!!!

• Return Code: 0
  – Return Code Type: OK
  – Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  – Message ID: KVM5001I
  – Message: The request to power on the virtual machine was sent successfully.

• Return Code: 1
  – Return Code Type: ALREADY_RUNNING
  – Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  – Message ID: KVM5002I
  – Message: The virtual machine is already powered on.

• Return Code: 2
  – Return Code Type: GENERAL_ERROR
  – Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  – Message ID: KVM5003E
  – Message: Could not perform the requested power on action.

• Return Code: 3
  – Return Code Type: GENERAL_ERROR
  – Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  – Message ID: KVM5007E
  – Message: The ESX server name specified is invalid or could not be found.

• Return Code: 4
  – Return Code Type: GENERAL_ERROR
  – Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  – Message ID: KVM5008E
  – Message: One of the required parameters for this action was not specified.

• Return Code: 5
  – Return Code Type: GENERAL_ERROR
  – Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  – Message ID: KVM5009E
  – Message: An unknown action was specified for this request.

• Return Code: 6
  – Return Code Type: GENERAL_ERROR
  – Operating systems: [linux26,linux26_zseries_64,linux_x86_64,windows,wix64]
  – Message ID: KVM5045E
  – Message: The specified virtual machine was not found.
Chapter 7. Policies reference

Policies are used as an advanced automation technique for implementing more complex workflow strategies than you can create through simple automation. All agents do not provide predefined policies, but you can create policies for any agent.

A policy is a set of automated system processes that can take actions, schedule work for users, or automate manual tasks. You use the Workflow Editor to design policies. You control the order in which the policy executes a series of automated steps, which are also called activities. Policies are connected to create a workflow. After an activity is completed, the Tivoli Enterprise Portal receives return-code feedback, and advanced automation logic responds with subsequent activities prescribed by the feedback.

For more information about working with policies, see “Automation with policies” in the Tivoli Enterprise Portal User’s Guide.

For information about using the Workflow Editor, see the IBM Tivoli Monitoring Administrator’s Guide or the Tivoli Enterprise Portal online help.

Predefined policies

This monitoring agent contains predefined workflow policies that interact with Tivoli Application Dependency Discovery Manager systems to keep the VMware topology up-to-date between scheduled discoveries performed by the Tivoli Application Dependency Discovery Manager sensors.

All these predefined policies are, by default, configured to send requests to the Tivoli Application Dependency Discovery Manager system identified by the name of VMWARE-TADDM in IBM Tivoli Monitoring.

In order to create the VMWARE-TADDM Tivoli Application Dependency Discovery Manager system in IBM Tivoli Monitoring, see the instructions listed in the section on initialization of Tivoli Application Dependency Discovery Manager policies in the Tivoli Enterprise Portal User’s Guide.

After the VMWARE-TADDM Tivoli Application Dependency Discovery Manager system is created in IBM Tivoli Monitoring, complete the following steps to enable the predefined policies to run:

1. Click the Workflow Editor icon.
2. Select a VMware Workflow policy and select the Auto start check box.
3. Ensure the policy is configured.
4. To save your changes, click OK or Apply.

This monitoring agent contains the following policies:

- KVM_VM_Created
- KVM_VM_Deleted
- KVM_VM_Relocated
- KVM_VMMotion

KVM_VM_Created

This policy sends a create request to Tivoli Application Dependency Discovery Manager when a new virtual machine is created.
The create request is sent so that the corresponding virtual machine CDM object is created in the Tivoli Application Dependency Discovery Manager database. This policy is triggered by the KVM_Virtual_Machine_Created situation.

This policy includes two workflow activities:

**On Demand Report activity**
- Used to collect additional information about the virtual machine being created that is not present in the situation processed, for example, the virtual machine name.

**Send a Tivoli Application Dependency Discovery Manager Update activity**
- Used to send a create update to Tivoli Application Dependency Discovery Manager. The payload consists of the data contained in the situation processed and the data returned by the On Demand Report.

**KVM_VM_Deleted**
This policy sends a delete request to Tivoli Application Dependency Discovery Manager when a new virtual machine is deleted.

The delete request is sent so that the corresponding virtual machine CDM object is deleted from the Tivoli Application Dependency Discovery Manager database. This policy is triggered by the KVM_Virtual_Machine_Deleted situation.

This policy consists of a single workflow activity:

**Send a Tivoli Application Dependency Discovery Manager Update activity**
- Used to send a delete update to Tivoli Application Dependency Discovery Manager. The payload consists of the data contained in the situation processed.

**KVM_VM_Relocated**
This policy sends a move request to Tivoli Application Dependency Discovery Manager when a virtual machine disk storage is moved.

The move request is sent so that the virtualizes relationship of the corresponding virtual machine CDM object is updated in the Tivoli Application Dependency Discovery Manager database. This policy is triggered by the KVM_Virtual_Machine_Relocated situation.

This policy consists of a single workflow activity:

**Send a Tivoli Application Dependency Discovery Manager Update activity**
- Used to send a move update to Tivoli Application Dependency Discovery Manager. The payload consists of the data contained in the situation processed.

**KVM_VM_RMotion**
This policy sends a move request to Tivoli Application Dependency Discovery Manager when a virtual machine is moved to execute somewhere else.

The move request is sent so that the virtualizes relationship of the corresponding virtual machine CDM object is updated in the Tivoli Application Dependency Discovery Manager database. This policy is triggered by the KVM_Server_VMotion situation.

This policy consists of a single workflow activity:

**Send a Tivoli Application Dependency Discovery Manager Update activity**
- Used to send a move update to Tivoli Application Dependency Discovery Manager. The payload consists of the data contained in the situation processed.
Chapter 8. Troubleshooting

Problems can be related to IBM Tivoli Monitoring or the specific agent that you are using.

For general troubleshooting information, see the *IBM Tivoli Monitoring Troubleshooting Guide*. For other problem-solving options, see “Support information” on page 356.

You can resolve some problems by ensuring that your system matches the system requirements listed in the Prerequisites topic for the agent in the information center, or in the Requirements topic of the agent user’s guide.

The following activities can help you find a solution to the problem you are having:

- "Gathering product information for IBM Software Support"
- "Using logging” on page 324
- "Consulting the lists of identified problems and workarounds” on page 324

Gathering product information for IBM Software Support

Before contacting IBM Software Support about a problem you are experiencing with this product, gather the information shown in Table 2.

Table 2. Information to gather before contacting IBM Software Support

<table>
<thead>
<tr>
<th>Information type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log files</td>
<td>Collect trace log files from failing systems. Most logs are located in a logs subdirectory on the host computer. See “Principal trace log files” on page 325 for lists of all trace log files and their locations. For general information about the IBM Tivoli Monitoring environment, see the <em>Tivoli Enterprise Portal User’s Guide</em>.</td>
</tr>
<tr>
<td>VMware Virtual Center information</td>
<td>Version number and patch level</td>
</tr>
<tr>
<td>Operating system</td>
<td>Operating system version number and patch level</td>
</tr>
<tr>
<td>Messages</td>
<td>Messages and other information displayed on the screen</td>
</tr>
<tr>
<td>Version numbers for IBM Tivoli Monitoring</td>
<td>Version number of the following members of the monitoring environment:</td>
</tr>
<tr>
<td></td>
<td>• IBM Tivoli Monitoring. Also provide the patch level, if available.</td>
</tr>
<tr>
<td></td>
<td>• IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI</td>
</tr>
<tr>
<td>Screen captures</td>
<td>Screen captures of incorrect output, if any</td>
</tr>
<tr>
<td>(UNIX systems only) Core dump files</td>
<td>If the system stops on UNIX systems, collect the core dump file from the <em>install_dir/bin</em> directory, where <em>install_dir</em> is the directory where you installed the monitoring agent.</td>
</tr>
</tbody>
</table>

You can use the pdcollect tool to collect the most commonly used information from a system. This tool gathers log files, configuration information, version information, and other data. For more information about using this tool, see the “pdcollect tool” in the *IBM Tivoli Monitoring Troubleshooting Guide*. 
For information about working with IBM Software Support, see IBM Support Portal Service Requests and PMRs (http://www.ibm.com/support/entry/portal/Open_service_request/Software/Software_support_(general)).

**Using logging**

Logging is the primary troubleshooting feature in the VMware VI agent. *Logging* refers to the text messages and trace data that is generated by the VMware VI agent. Messages and trace data are sent to a file.

Trace data captures transient information about the current operating environment when a component or application fails to operate as designed. IBM Software Support personnel use the captured trace information to determine the source of an error or unexpected condition. See "Trace logging" for more information.

**Consulting the lists of identified problems and workarounds**

Known problems are organized into types such as those in the following list to make them easier to locate:
- Installation and configuration
- General usage and operation
- Display of monitoring data
- Take Action commands

Information about symptoms and detailed workarounds for these types of problems is located in "Problems and workarounds" on page 335.

For general troubleshooting information, see the *IBM Tivoli Monitoring Troubleshooting Guide*.

**Trace logging**

Trace logs are used to capture information about the operating environment when component software fails to operate as designed.

The principal log type is the RAS (Reliability, Availability, and Serviceability) trace log. These logs are in the English language only. The RAS trace log mechanism is available for all components of IBM Tivoli Monitoring. Most logs are located in a logs subdirectory on the host computer. See the following information to learn how to configure and use trace logging:
- "Principal trace log files" on page 325
- "Examples: Using trace logs" on page 329
- "Setting RAS trace parameters by using the GUI" on page 330

**Note:** The documentation refers to the RAS facility in IBM Tivoli Monitoring as "RAS1."

IBM Software Support personnel use the information captured by trace logging to trace a problem to its source or to determine why an error occurred. All components in the IBM Tivoli Monitoring environment have a default tracing level. The tracing level can be changed on a per-component level to adjust the type of trace information collected, the degree of trace detail, the number of trace logs to be kept, and the amount of disk space used for tracing.

**Overview of log file management**

Knowing the naming conventions for log files helps you to find the files.
Agent log file naming conventions

Table 3 provides the names, locations, and descriptions of IBM Tivoli Monitoring general RAS1 log files. The log file names for the VMware VI agent adhere to the following naming convention:

Windows systems

```
hostname_productcode_instance-name_program_HEXtimestamp-nn.log
```

Linux and UNIX systems

```
hostname_productcode_instance-name_program_HEXtimestamp-nn.log
```

Where:

- **hostname**
  - Host name of the computer where the monitoring component is running.

- **productcode**
  - Two-character product code. For IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI, the product code is vm.

- **instance-name**
  - Instance name of the agent.

- **program**
  - Name of the program being run.

- **HEXtimestamp**
  - Hexadecimal time stamp representing the time at which the program started.

- **nn**
  - Rolling log suffix.

Principal trace log files

Trace log files are located on various systems.

Table 3 contains locations, file names, and descriptions of trace logs that can help determine the source of problems with agents.

<table>
<thead>
<tr>
<th>System where log is located</th>
<th>File name and path</th>
<th>Description</th>
</tr>
</thead>
</table>
| On the Tivoli Enterprise Monitoring Server | **Windows:** The IBM Tivoli Monitoring timestamp.log file in the install_dir\InstallITM path  
- **UNIX:** The candle_installation.log file in the install_dir/logs path  
- **Linux:** The candle_installation.log file in the install_dir/logs path | Provides details about products that are installed.  
**Note:** Trace logging is enabled by default. A configuration step is not required to enable this tracing. |
<p>| On the Tivoli Enterprise Monitoring Server | The Warehouse_Configuration.log file is in the following location on Windows systems: install_dir\InstallITM | Provides details about the configuration of data warehousing for historical reporting. |</p>
<table>
<thead>
<tr>
<th>System where log is located</th>
<th>File name and path</th>
<th>Description</th>
</tr>
</thead>
</table>
| On the Tivoli Enterprise Monitoring Server | The name of the RAS log file is as follows:  
   - **Windows**: `install_dir\logs\hostname_ms_timestamp-nn.log`  
   - **UNIX**: `install_dir/logs/hostname_ms_timestamp-nn.log`  
   - **Linux**: `install_dir/logs/hostname_ms_timestamp-nn.log`  
   **Note**: File names for RAS1 logs include a hexadecimal time stamp. Also on UNIX systems, a log with a decimal time stamp is provided: `hostname_productcode_timestamp.log` and `hostname_productcode_timestamp.pid` in the `install_dir/logs` path, where `nnnnn` is the process ID number. | Traces activity on the monitoring server. |
| On the Tivoli Enterprise Portal Server | The name of the RAS log file is as follows:  
   - **Windows**: `install_dir\logs\hostname_cq_HEXtimestamp-nn.log`  
   - **UNIX**: `install_dir/logs/hostname_cq_HEXtimestamp-nn.log`  
   - **Linux**: `install_dir/logs/hostname_cq_HEXtimestamp-nn.log`  
   **Note**: File names for RAS1 logs include a hexadecimal time stamp. Also on UNIX systems, a log with a decimal time stamp is provided: `hostname_productcode_timestamp.log` and `hostname_productcode_timestamp.pid` in the `install_dir/logs` path, where `nnnnn` is the process ID number. | Traces activity on the portal server. |
| On the Tivoli Enterprise Portal Server | The teps_odbc.log file is located in the following path:  
   - **Windows**: `install_dir\InstallITM`  
   - **UNIX**: `install_dir/logs`  
   - **Linux**: `install_dir/logs`  
   When you enable historical reporting, this log file traces the status of the warehouse proxy agent. |
<table>
<thead>
<tr>
<th>System where log is located</th>
<th>File name and path</th>
<th>Description</th>
</tr>
</thead>
</table>
| On the computer that hosts the monitoring agent | The RAS1 log files are as follows:  
  - **VMware VI agent log**: hostname\_vm\_instance\_HEXtimestamp-nn.log.  
  - **VMware VI Data Provider log**: kvm_data_provider\_instance\_nn.log.  
  - **Windows**: hostname\_vm\_instance\_name\_kvmagent\_HEXtimestamp-nn.log in the install_dir\tmaitm6\logs directory  
  - **UNIX**: hostname\_vm\_instance\_name\_kvmagent\_HEXtimestamp-nn.log in the install_dir/logs directory  
  - **Linux**: hostname\_vm\_instance\_name\_kvmagent\_HEXtimestamp-nn.log in the install_dir/logs directory | Traces activity of the monitoring agent.  

These logs are in the following directories:  
- **Windows**: install_dir\tmaitm6\logs  
- **UNIX**: install_dir/logs  
- **Linux**: install_dir/logs  

On Linux systems, the following additional logs are provided:  
- hostname\_vm\_timestamp.log  
- hostname\_vm\_timestamp.pid\_nnnnn in the install_dir/logs path, where nnnnn is the process ID number |
<table>
<thead>
<tr>
<th>System where log is located</th>
<th>File name and path</th>
<th>Description</th>
</tr>
</thead>
</table>
| On the computer that hosts the monitoring agent | The agent operations log files are as follows:  
*instance_hostname*VM.LG0 is the current log created when the agent was started.  
*instance_hostname*VM.LG1 is the backup of the previous log.  
These logs are in the following directory depending on the operating system that you are using:  
- **Windows**: `install_dir\maitm6\logs`  
- **Linux**: `install_dir/logs`  
- **UNIX**: `install_dir/logs`  | Shows whether the agent could connect to the monitoring server.  
Shows which situations are started and stopped, and shows other events while the agent is running. A new version of this file is generated every time the agent is restarted.  
IBM Tivoli Monitoring generates one backup copy of the *.LG0* file with the tag .LG1. View the .LG1 tag to learn the following details regarding the previous monitoring session:  
- Status of connectivity with the monitoring server  
- Situations that were running  
- The success or failure status of Take Action commands |
| On the computer that hosts the monitoring agent | The Take Action command log files are as follows:  
*host_vm_instance_*takeactioncommand*.log  
The logs are in the following directories:  
- **Windows**: `install_dir\maitm6\logs`  
- **UNIX**: `install_dir/logs`  
- **Linux**: `install_dir/logs`  | Traces activity each time a Take Action command runs. For example, when a hypothetical **start_command** Take Action command runs, IBM Tivoli Monitoring generates a *start_command*.log file. |
| On the computer that hosts the monitoring agent | The Take Action command log files are as follows:  
*kvm_data_provider_actions_*instance_n*.log  
The logs are in the following directories:  
- **Windows**: `install_dir\maitm6\logs`  
- **UNIX**: `install_dir/logs`  
- **Linux**: `install_dir/logs`  | Traces activity each time a Take Action command runs. All predefined Take Action commands are logged into this file. |

Definitions of variables:  
- **timestamp** is a time stamp with a format that includes year (y), month (m), day (d), hour (h), and minute (m), as follows: **yyyymmdd hhmm**  
- **HEXtimestamp** is a hexadecimal representation of the time at which the process was started.  
- **install_dir** represents the directory path where you installed the IBM Tivoli Monitoring component. **install_dir** can represent a path on the computer that hosts the monitoring system, the monitoring agent, or the portal.  
- **instance** refers to the name of the database instance that you are monitoring.  
- **instance_name** refers to the name of the agent instance.  
- **hostname** refers to the name of the computer on which the IBM Tivoli Monitoring component runs.  
- **nn** represents the circular sequence in which logs are rotated. This value includes a range from 1 - 5, by default. The first is always retained because it includes configuration parameters.  
- **productcode** specifies the product code, for example, um for Universal Agent or nt for Windows systems.
For more information about the complete set of trace logs that are maintained on the monitoring server, see the *IBM Tivoli Monitoring Installation and Setup Guide*. 

### Examples: Using trace logs

You can open trace logs in a text editor to learn some basic facts about your IBM Tivoli Monitoring environment.

IBM Software Support applies specialized knowledge to analyze trace logs to determine the source of problems. The following examples are from the Tivoli Enterprise Monitoring Server log.

#### Example one

This excerpt shows the typical log for a failed connection between a monitoring agent and a monitoring server with the host name server1a:

```
(Thursday, August 11, 2005, 08:21:30-{94C}kdcl0cl.c,105,"KDCL0_ClientLookup") status=1c020006, "location server unavailable", ncs/KDC1_STC_SERVER_UNAVAILABLE
(Thursday, August 11, 2005, 08:21:35-{94C}kraarreg.cpp,1157,"LookupProxy") Unable to connect to broker at ip.pipe:: status=0, "success", ncs/KDC1_STC_OK
(Thursday, August 11, 2005, 08:21:35-{94C}kraarreg.cpp,1402,"FindProxyUsingLocalLookup") Unable to find running CMS on CT_CMSLIST <IP.PIPE:#server1a>
```

#### Example two

The following excerpts from the trace log for the monitoring server show the status of an agent, identified here as "Remote node." The name of the computer where the agent is running is SERVER5B:

```
(42C039F9.0000-6A4:kpxreqhb.cpp,649,"HeartbeatInserter") Remote node SERVER5B:VM is ON-LINE.
...
(42C3079B.0000-6A4:kpxreqhb.cpp,644,"HeartbeatInserter") Remote node SERVER5B:VM is OFF-LINE.
```

See the following key points about the preceding excerpts:

- The monitoring server appends the VM product code to the server name to form a unique name (SERVER5B:VM ) for this instance of the IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI. By using this unique name, you can distinguish multiple monitoring products that might be running on SERVER5B.
- The log shows when the agent started (ON-LINE) and later stopped (OFF-LINE) in the environment.
- For the sake of brevity, an ellipsis (...) represents the series of trace log entries that were generated while the agent was running.
- Between the ON-LINE and OFF-LINE log entries, the agent was communicating with the monitoring server.
- The ON-LINE and OFF-LINE log entries are always available in the trace log. All trace levels that are described in [“Setting RAS trace parameters by using the GUI” on page 330](#) provide these entries.

On Windows systems, you can use the following alternate method to view trace logs:

1. In the Windows **Start** menu, click **Program Files > IBM Tivoli Monitoring > Manage Tivoli Enterprise Monitoring Services**. The Manage Tivoli Enterprise Monitoring Services window is displayed.

2. Right-click a component and click **Advanced > View Trace Log** in the menu. For example, if you want to view the trace log of the IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI, right-click the name of that agent in the window. You can also use the viewer to access remote logs.

**Note:** The viewer converts time stamps in the logs to a format that is easier to read.
**Note:** The kvmviclient log is not listed in the Manage Tivoli Enterprise Monitoring Services **View Trace Log** option. Each instance of the Monitoring Agent for VMware VI creates 2 log files:

- The kvmagent log, *hostname_vm_instance_HEXtimestamp-nn.log*, shows in the Windows Manage Tivoli Enterprise Monitoring Services interface when you right-click on the Monitoring Agent for VMware VI instance and select **Advanced - View Trace Log**.
- The kvmviclient log, *hostname_vm_kvmviclient_HEXtimestamp-nn.log*, is not listed. This log is created by the VMware VI custom data provider, and typically contains the most useful information.

**RAS trace parameters**

Pinpoint a problem by setting detailed tracing of individual components of the monitoring agent and modules.

See “Overview of log file management” on page 324 to ensure that you understand log rolling and can reference the correct log files when you manage log file generation.

**Setting RAS trace parameters by using the GUI**

On Windows systems, you can use the graphical user interface to set trace options.

**About this task**

The IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI uses RAS1 tracing and generates the logs described in Table 3 on page 325. The default RAS1 trace level is ERROR.

**Procedure**

1. Open the Manage Tivoli Enterprise Monitoring Services window.
2. Select **Advanced > Edit Trace Parms**. The Tivoli Enterprise Monitoring Server Trace Parameters window is displayed.
3. Select a new trace setting in the pull-down menu in the **Enter RAS1 Filters** field or type a valid string.
   - General error tracing. **KBB_RAS1=ERROR**
   - Intensive error tracing. **KBB_RAS1=ERROR (UNIT:kvm ALL)**
   - Maximum error tracing. **KBB_RAS1=ERROR (UNIT:kvm ALL) (UNIT:kra ALL)**

   **Note:** As this example shows, you can set multiple RAS tracing options in a single statement.
4. Modify the value for Maximum Log Size Per File (MB) to change the log file size (changes LIMIT value).
5. Modify the value for Maximum Number of Log Files Per Session to change the number of log files per startup of a program (changes COUNT value).
6. Modify the value for Maximum Number of Log Files Total to change the number of log files for all startups of a program (changes MAXFILES value).
7. Optional: Click **Y** (Yes) in the **KDC_DEBUG Setting** menu to log information that can help you diagnose communications and connectivity problems between the monitoring agent and the monitoring server. The **KDC_DEBUG** setting and the **Maximum error tracing** setting can generate a large amount of trace logging. Use these settings only temporarily, while you are troubleshooting problems. Otherwise, the logs can occupy excessive amounts of hard disk space.
8. Click **OK**. You see a message reporting a restart of the monitoring agent so that your changes take effect.
What to do next

Monitor the size of the logs directory. Default behavior can generate a total of 45 - 60 MB for each agent that is running on a computer. For example, each database instance that you monitor can generate 45 - 60 MB of log data. See the "Procedure" section to learn how to adjust file size and numbers of log files to prevent logging activity from occupying too much disk space.

Regularly prune log files other than the RAS1 log files in the logs directory. Unlike the RAS1 log files that are pruned automatically, other log types can grow indefinitely, for example, the logs in Table 3 on page 325 that include a process ID number (PID).

Use collector trace logs as an additional source of troubleshooting information.

Note: The KDC_DEBUG setting and the Maximum error tracing setting can generate a large amount of trace logging. Use these settings only temporarily while you are troubleshooting problems. Otherwise, the logs can occupy excessive amounts of hard disk space.

Manually setting RAS trace parameters

You can manually edit the RAS1 trace logging parameters.

About this task

The VMware VI agent uses RAS1 tracing and generates the logs described in Table 3 on page 325. The default RAS1 trace level is ERROR.

Procedure

1. Open the trace options file:
   - Windows systems:
     `install_dir\tmaitm6\KVMENV\instance name`
   - UNIX systems:
     `install_dir /config/vm_instance name.config`

2. Edit the line that begins with **KBB_RAS1** to set trace logging preferences. For example, if you want detailed trace logging, set the Maximum Tracing option: `KBB_RAS1=ERROR (UNIT:kvm ALL) (UNIT:kra ALL)`

3. Edit the line that begins with **KBB_RAS1_LOG** to manage the generation of log files:
   - **MAXFILES**: The total number of files that are to be kept for all startups of a specific program. When this value is exceeded, the oldest log files are discarded. The default value is 9.
   - **LIMIT**: The maximum size, in megabytes (MB) of a RAS1 log file. The default value is 5.
   - **IBM Software Support might guide you to modify the following parameters:**
     - **COUNT**: The number of log files to keep in the rolling cycle of one program startup. The default is 3.
     - **PRESENCE**: The number of files that are not to be reused in the rolling cycle of one program startup. The default value is 1.

   **Note**: The **KBB_RAS1_LOG** parameter also provides for the specification of the log file directory, log file name, and the inventory control file directory and name. Do not modify these values or log information can be lost.

4. Restart the monitoring agent so that your changes take effect.

What to do next

Monitor the size of the logs directory. Default behavior can generate a total of 45 - 60 MB for each agent that is running on a computer. For example, each database instance that you monitor can generate 45 - 60
MB of log data. See the "Procedure" section to learn how to adjust file size and numbers of log files to prevent logging activity from occupying too much disk space.

Regularly prune log files other than the RAS1 log files in the logs directory. Unlike the RAS1 log files that are pruned automatically, other log types can grow indefinitely, for example, the logs in Table 3 on page 325 that include a process ID number (PID).

Use collector trace logs as an additional source of troubleshooting information.

**Note:** The KDC_DEBUG setting and the Maximum error tracing setting can generate a large amount of trace logging. Use these settings only temporarily while you are troubleshooting problems. Otherwise, the logs can occupy excessive amounts of hard disk space.

**Dynamic modification of trace settings**

You can dynamically modify the trace settings for an IBM Tivoli Monitoring component, such as, Tivoli Enterprise Monitoring Server, Tivoli Enterprise Portal Server, most monitoring agents, and other components. You can access these components, except for a few monitoring agents, from the tracing utility.

Dynamic modification of the trace settings is the most efficient method, because you can do it without restarting the component. Settings take effect immediately. Modifications by this method are not persistent.

**Note:** When the component is restarted, the trace settings are read again from the .env file. Dynamically modifying these settings does not change the settings in the .env files. To modify these trace settings permanently, modify them in the .env files.

**ras1**

Run this command to modify the trace settings for a Tivoli Monitoring component.

The syntax is as follows:

```
ras1 set|list (UNIT|COMP: class_name ANY|ALL|Detail|ERROR|Flow|INPUT|Metrics|OUTPUT|STATE)
```

You can specify more than one component class to which to apply the trace settings.

**Command options**

**set**

Turns on or off tracing depending upon the value of its parameters. If the parameter is **ANY**, it turns it off. All other parameters turn on tracing based on the specified type or level.

**list**

Displays the default level and type of tracing that is set by default.

**Parameters**

The parameters that determine the component classes to which to apply the trace settings are as follows:

**COMP: class_name**

Modifies the trace setting for the name of the component class, as specified by class_name, for example, COMP:KDH. The output contains trace for the specified class.

**UNIT: class_name**

Modifies the trace setting for any unit that starts with the specified class_name value, for example, UNIT: kra. The output contains trace for any unit that begins with the specified filter pattern.
The parameters that determine the trace level and type are as follows:

**ALL**
Displays all trace levels, including every trace point defined for the component. This setting might result in a large amount of trace, so specify other parameters to exclude unwanted trace. You might require the **ALL** parameter to isolate a problem, which is the equivalent to setting "Error Detail Flow State Input Output Metrics".

**ANY**
Turns off tracing.

**Detail**
Displays detailed information about each function.
When entered with the **list** option, the trace is tagged with **Det**.

**ERROR**
Logs internal error conditions.
When entered with the **list** option, the trace is tagged with **ER**. The output can also be tagged with **EVERYE+EVERYU+ER**.

**Flow**
Displays control flow data for each function entry and exit.
When entered with the **list** option, the trace is tagged with **Fl**.

**INPUT**
Displays input data for each function.
When entered with the **list** option, the trace is tagged with **IN**.

**Metrics**
Displays metrics on each function.
When entered with the **list** option, the trace is tagged with **ME**.

**OUTPUT**
Displays output data for each function.
When entered with the **list** option, the trace is tagged with **OUT**.

**State**
Displays the status for each function.
When entered with the **list** option, the trace is tagged with **St**.

**Example**

If you enter `rasl set (COMP:KDH ALL) (COMP:ACF1 ALL) (COMP:KDE ALL)`, the trace utility turns on all levels of tracing for all the files and functions for which KDH, ACF1, and KDE are the classes.
Turning on tracing

To use the tracing utility, you must use a local logon credential for the computer. This tracing method uses the IBM Tivoli Monitoring Service Console. Access the Service Console by using a web browser.

About this task

When you start the Service Console, information is displayed about the components that are currently running on that computer. For example, these components are listed as follows:

- Tivoli Enterprise Portal Server: cnp
- Monitoring Agent for Windows OS: nt
- Tivoli Enterprise Monitoring Server: ms

After you log on, you can type a question mark (?) to display a list of the supported commands. Use the ras1 command to modify trace settings. If you type this command in the field provided in the Service Console window and click Submit, the help for this command is displayed.

Procedure

1. Open a web browser and enter the URL to access the Service Console.
   http://hostname:1920

   where hostname is the IP address or host name of the computer on which the IBM Tivoli Monitoring component is running.

2. Click the hyperlink associated with the component for which you want to modify its trace settings.

   Note: In the previous view, if you want to modify tracing for the Tivoli Enterprise Monitoring Server, select IBM Tivoli Monitoring Service Console under Service Point: system.your host name.ms.

3. Enter a user ID and password to access the system. This ID is any valid user that has access to the system.

4. Enter the command to turn on the required level of trace for the specified component classes or units.
   ras1 set (UNIT|COMP: class_name ALL|Flow|ERROR|Detail|INPUT|Metrics|OUTPUT|STATE)
   {{(UNIT|COMP: class_name ALL|Flow|ERROR|Detail|INPUT|Metrics|OUTPUT|STATE)}}

   For example, to turn on the control flow trace for the KDE, the command is:
   ras1 (COMP:KDE Flow)

Turning off tracing

You can use the IBM Tivoli Monitoring Service Console to run the ras1 command and dynamically turn off tracing.

Procedure

1. Open a web browser and enter the URL to access the Service Console.
   http://hostname:1920

   where hostname is the IP address or host name of the computer on which the IBM Tivoli Monitoring component is running.

2. Click the hyperlink associated with the component for which you want to modify its trace settings.
3. Enter a user ID and password to access the system. This ID is any valid user that has access to the system.

4. Enter the command to turn off the required level of trace for the specified component classes or units.

   ras1 set (UNIT|COMP: class_name ANY)
   {{(UNIT|COMP: class_name ANY)}}

   For example, to turn off tracing for the kbbcr cd class of the Windows OS agent, the command is:
   ras1 set (UNIT:kbbcr cd ANY)

**Setting trace parameters for the Tivoli Enterprise Console server**

In addition to the trace information captured by IBM Tivoli Monitoring, you can also collect additional trace information for the Tivoli Enterprise Console components that gather event server metrics.

**About this task**

To collect this information, modify the .tec_diag_config file on the Tivoli Enterprise Console event server. Use the steps in the following procedure to modify the event server trace parameters.

**Procedure**

1. Open the `$BINDIR/TME/TEC/.tec_diag_config` file in an ASCII editor.
2. Locate the entries that configure trace logging for the agent components on the event server. Two entries are included, one for `tec_reception` and one for `tec_rule`:

   # to debug Agent Utils
   tec_reception Agent_Utils error /tmp/tec_reception
   SP
   # to debug Agent Utils
   tec_rule Agent_Utils error /tmp/tec_rule

3. To gather additional trace information, modify these entries to specify a trace level of `trace2`:

   # to debug Agent Utils
   tec_reception Agent_Utils trace2 /tmp/tec_reception
   SP
   # to debug Agent Utils
   tec_rule Agent_Utils trace2 /tmp/tec_rule

4. In addition, modify the `Highest_level` entries for `tec_rule` and `tec_reception`:

   tec_reception Highest_level trace2
   SP
   tec_rule Highest_level trace2

**Problems and workarounds**

The known problems and workarounds are organized into types of problems that might occur with the VMware VI agent, for example installation and configuration problems and workspace problems.

**Note:** You can resolve some problems by ensuring that your system matches the system requirements listed in the Prerequisites topic for the agent in the IBM Tivoli Monitoring for Virtual Environments Information Center.

**Note:** You can resolve some problems by ensuring that your system matches the system requirements listed in Agent installation and configuration.

For general troubleshooting information, see the *IBM Tivoli Monitoring Troubleshooting Guide*.

**Installation and configuration troubleshooting**

Problems can occur during installation, configuration, and uninstallation of the agent.
The problems and solutions in Table 4 can occur during installation, configuration, and uninstallation of the agent.

Table 4. Problems and solutions for installation and configuration

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>(UNIX only) During a command-line installation, you choose to install</td>
<td>You must exit and restart the installation process. You cannot return to the list where you selected components to install. When you run the installer again, do not attempt to install any component that is currently installed.</td>
</tr>
<tr>
<td>a component that is currently installed, and you see the following</td>
<td></td>
</tr>
<tr>
<td>warning: WARNING - you are about to install the SAME version of</td>
<td></td>
</tr>
<tr>
<td>component_name where component_name is the name of the component that</td>
<td></td>
</tr>
<tr>
<td>you are attempting to install. Note: This problem affects UNIX</td>
<td></td>
</tr>
<tr>
<td>command-line installations. If you monitor only Windows environments,</td>
<td></td>
</tr>
<tr>
<td>you see this problem if you choose to install a product component</td>
<td></td>
</tr>
<tr>
<td>(for example, a monitoring server) on a UNIX system.</td>
<td></td>
</tr>
<tr>
<td>Diagnosing problems with product browse settings (Windows systems only)</td>
<td>When you have problems with browse settings, complete the following steps:</td>
</tr>
<tr>
<td></td>
<td>1. Click Start &gt; Programs &gt; IBM Tivoli Monitoring &gt; Manage Tivoli Enterprise Monitoring Services. The Manage Tivoli Enterprise Monitoring Services window is displayed.</td>
</tr>
<tr>
<td></td>
<td>2. Right-click the Windows agent and select Browse Settings. A text window is displayed.</td>
</tr>
<tr>
<td></td>
<td>3. Click Save As and save the information in the text file.</td>
</tr>
<tr>
<td></td>
<td>If requested, you can forward this file to IBM Software Support for analysis.</td>
</tr>
<tr>
<td>A message similar to “Unable to find running CMS on CT_CMSLIST” in the</td>
<td>If a message similar to “Unable to find running CMS on CT_CMSLIST” is displayed in the log file, the agent cannot connect to the monitoring server. Confirm the following points:</td>
</tr>
<tr>
<td>log file is displayed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Do multiple network interface cards (NICs) exist on the system?</td>
</tr>
<tr>
<td></td>
<td>• If multiple NICs exist on the system, find out which one is configured for the monitoring server. Ensure that you specify the correct host name and port settings for communication in the IBM Tivoli Monitoring environment.</td>
</tr>
<tr>
<td>The system is experiencing high CPU usage.</td>
<td>Agent process: View the memory usage of the KVMCMA process. If CPU usage seems to be excessive, restart the monitoring agent.</td>
</tr>
<tr>
<td></td>
<td>Network cards: The network card configurations can decrease the performance of a system. Each stream of packets that a network card receives (assuming that it is a broadcast or destined for the under-performing system) must generate a CPU interrupt and transfer the data through the I/O bus. If the network card in question is a bus-mastering card, work can be offloaded and a data transfer between memory and the network card can continue without using CPU processing power. Bus-mastering cards are 32-bit and are based on PCI or EISA bus architectures.</td>
</tr>
</tbody>
</table>
Table 4. Problems and solutions for installation and configuration (continued)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data source certificate is lost after upgrading from version 6.1 of the VMware agent to a later version.</td>
<td>Certificates in configured data sources must be added again after upgrading to display data in the Tivoli Enterprise Portal.</td>
</tr>
<tr>
<td>While installing the VMware agent in silent mode where a candle_home directory already exists, the InstallShield application (installer) ignores the path of the installation directory mentioned in the response file (Windows systems only).</td>
<td>If any IBM Tivoli Monitoring component is already installed on a computer using Windows, all subsequent IBM Tivoli Monitoring installations go into the existing candle_home directory, regardless of what you specify.</td>
</tr>
<tr>
<td>Installation on RHEL Linux 64-bit systems uses the install.sh command script. Running this script fails with a runGSkit failure: Return error code: 99.</td>
<td>GSkit is called by install.sh and fails when runGSKit calls verifyInstall. Review the &lt;InstallDirectory&gt;/logs/candle_installation.log file and look for references to runGSKit. For example, output similar to the following might be present: runGSKit: ----- Running command: /opt/IBM/ITM/1i6243/gs/bin/private_verifyinstall /opt/IBM/ITM/1i6243/gs/bin/gsk7ver: error while loading shared libraries: libstdc++.so.5: cannot open shared object file: No such file or directory Error: Verify Failed Expected Details of gskit in /opt/IBM/ITM/1i6243/gs runGSKit: return code from command is 99 runGSKit: ----- End of running command ----- runGSKit: error Return error code: 99 runGSKit: error GSKit check failure, script: /opt/IBM/ITM/1i6243/gs/bin/private_verifyinstall runGSKit: error 1i6243 - GSK check error, verifyInstall test failed In the previous example, the 32-bit version of the libstdc++.so.5 file is not present. This file comes from the compat-libstdc++-33-3.2.3-XX.i686.rpm package, which is not installed on 64-bit RHEL systems by default. When this package is installed, the problem no longer occurs.</td>
</tr>
<tr>
<td>After installation, the VMware VI agent instance fails to start. The following message is displayed in the agent log: (4CF55620.003F-1:kbbssge.c,52,&quot;BSS1_GetEnv&quot;) KBB_SIG1=&quot;-asyncoff -syncoff -dumpoff&quot; (4CF55620.0040-1:signalmanager.cpp,170, &quot;startManagerThread&quot;) Error starting signal manager thread. Return code = 11; Resource temporarily unavailable. Use the return code and message to investigate the failure. Agent is terminating.</td>
<td>The probable cause of the problem is the public domain Korn shell, pdksh. Uninstall the pdksh shell and install the ksh rpm that is included on the Linux installation media.</td>
</tr>
</tbody>
</table>
### Table 4. Problems and solutions for installation and configuration (continued)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
</table>
| The configuration panel is blank on 64-bit Windows systems where the Tivoli Enterprise Monitoring Agent Framework (component GL) is version 06.23.00.00 or 06.23.01.00. | Check the GL component version by running `kincinfo -t GL` from a Windows command line. Example: `%CANDLE_HOME%\InstallITM\kincinfo -t GL` If the GL component version is 06.23.00.00 or 06.23.01.00, take one of the following actions:  
- **Preferred action:** Upgrade the Windows OS Agent to Version 6.2.3 Fix Pack 2.  
- **Alternate action:** Install the Agent Compatibility (AC) component from the IBM Tivoli Monitoring V6.2.3 Fix Pack 1 media. See [Installing the Agent Compatibility (AC) component](http://pic.dhe.ibm.com/infocenter/tivihelp/v15r1/topic/com.ibm.itm.doc_6.2.3fp1/itm623FP1_install199.htm#acpinstall). |
| When you run the prerequisite checker on a computer with the Linux operating system where the instance of VMware VI agent is running, the result displays the memory requirement for the VMware VI agent as 512 MB. **Note:** The expected memory requirement for the Linux operating system must be 0 MB when an instance of the VMware VI agent is running. The memory requirement for the Linux operating system must be 512 MB when the VMware VI agent instance is not running. | No solution is available for this problem. |

### Table 5. General problems and solutions for uninstallation

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
</table>
| On Windows systems, uninstallation of IBM Tivoli Monitoring fails to uninstall the entire environment. | Be sure that you follow the general uninstallation process described in the *IBM Tivoli Monitoring Installation and Setup Guide*:  
1. Remove Tivoli Enterprise Monitoring Server Application support by completing the following steps:  
   a. Use Manage Tivoli Enterprise Monitoring Services.  
   b. Select Tivoli Enterprise Monitoring Server.  
   c. Right-click and select Advanced.  
   d. Select Remove TEMS application support.  
   e. Select the agent to remove its application support.  
2. Uninstall the monitoring agents first, as in the following examples:  
   • Uninstall a single monitoring agent for a specific database.  
   -OR-  
   • Uninstall all instances of a monitoring product, such as IBM Tivoli Monitoring for Databases.  
3. Uninstall IBM Tivoli Monitoring. |
<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
</table>
| The way to remove inactive managed systems (systems whose status is OFFLINE) from the Navigator tree in the portal is not obvious. | Use the following steps to remove, but not uninstall, an offline managed system from the Navigator tree:  
1. Click the Enterprise icon in the Navigator tree.  
2. Right-click, and then click Workspace > Managed System Status.  
3. Right-click the offline managed system, and select Clear offline entry.  
To uninstall the monitoring agent, use the procedure described in the IBM Tivoli Monitoring Installation and Setup Guide. |
| IBM Tivoli Monitoring might not be able to generate a unique name for monitoring components because of the truncation of names that the product automatically generates. | If the agent supports multiple instances, IBM Tivoli Monitoring automatically creates a name for each monitoring component by concatenating the subsystem name, host name, and product code separated by colons (subsystem_name:hostname:KVM).  
**Note:** When you monitor a multinode system, such as a database, IBM Tivoli Monitoring adds a subsystem name to the concatenated name, typically a database instance name.  
The length of the name that IBM Tivoli Monitoring generates is limited to 32 characters. Truncation can result in multiple components having the same 32-character name. If this problem happens, shorten the *hostname* portion of the name as follows:  
1. Open the configuration file for the monitoring agent, which is located in the following path:  
   - **On Windows:** `install_dir\mtaitm6\Kproduct_codeCMA.INI`. For example, the product code for the Monitoring Agent for Windows OS is NT. The file name is KNTCMA.INI.  
   - **On UNIX and Linux:** `itm_home/config/product_code.ini` and `product_code.config`. For example, the file names for the Monitoring Agent for UNIX OS is ux.ini and ux.config.  
2. Find the line that begins with `CTIRA_HOSTNAME=`.  
3. Type a new name for host name that is a unique, shorter name for the host computer. The final concatenated name including the subsystem name, new host name, and KVM, cannot be longer than 32 characters.  
   **Note:** You must ensure that the resulting name is unique with respect to any existing monitoring component that was previously registered with the Tivoli Enterprise Monitoring Server.  
4. Save the file.  
5. Restart the agent. |
<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>When configuring multiple instances of the monitoring agent, multiple</td>
<td>During configuration of an instance, ensure that the instance name is unique. For example, include the host name of the system in the instance name.</td>
</tr>
<tr>
<td>instances that have the same instance name and monitor the same ESX</td>
<td></td>
</tr>
<tr>
<td>Server (directly or through a Virtual Center) do not have a unique ESX</td>
<td></td>
</tr>
<tr>
<td>subnode name created. Only one of the instances is displayed in the</td>
<td></td>
</tr>
<tr>
<td>Tivoli Enterprise Portal.</td>
<td></td>
</tr>
<tr>
<td>For example: Instance ABC on Host1 monitors ESX1. Instance ABC on</td>
<td></td>
</tr>
<tr>
<td>Host2 monitors the VC that Manages ESX1 Both instances have an ESX</td>
<td></td>
</tr>
<tr>
<td>subnode called VM:ABC-ESX1:ESX.</td>
<td></td>
</tr>
<tr>
<td>During configuration of an instance, ensure that the instance name is</td>
<td></td>
</tr>
<tr>
<td>unique. For example, include the host name of the system in the</td>
<td></td>
</tr>
<tr>
<td>instance name.</td>
<td></td>
</tr>
<tr>
<td>The software inventory tag for the agent on UNIX and Linux systems is</td>
<td>After uninstalling the agent, manually remove the file named <code>full name of agent.cmptag</code> from the <code>$CANDLEHOME/properties/version/</code> directory.</td>
</tr>
<tr>
<td>not removed during uninstallation of the agent.</td>
<td></td>
</tr>
<tr>
<td>When configuring multiple instances of the monitoring agent, multiple</td>
<td>During configuration of an instance, ensure that the instance name is unique. For example, include the host name of the system in the instance name.</td>
</tr>
<tr>
<td>instances that have the same instance name and monitor the same ESX</td>
<td></td>
</tr>
<tr>
<td>Server (directly or through a Virtual Center) do not have a unique ESX</td>
<td></td>
</tr>
<tr>
<td>subnode name created. Only one of the instances is displayed in the</td>
<td></td>
</tr>
<tr>
<td>Tivoli Enterprise Portal.</td>
<td></td>
</tr>
<tr>
<td>For example: Instance ABC on Host1 monitors ESX1. Instance ABC on</td>
<td></td>
</tr>
<tr>
<td>Host2 monitors the VC that Manages ESX1 Both instances have an ESX</td>
<td></td>
</tr>
<tr>
<td>subnode called VM:ABC-ESX1:ESX.</td>
<td></td>
</tr>
<tr>
<td>After installation, the VMware VI agent instance fails to start. The</td>
<td>The probable cause of the problem is the public domain Korn shell, <code>pdksh</code>. Uninstall the <code>pdksh</code> shell and install the <code>ksh</code> rpm that is included on the Linux installation media.</td>
</tr>
<tr>
<td>following message appears in the agent log:</td>
<td></td>
</tr>
<tr>
<td>(4CF55620.003F-1:kbbssge.c,52,&quot;BSS1_GetEnv&quot;)</td>
<td></td>
</tr>
<tr>
<td>KBB_SIG1=&quot;-asyncoff -syncoff -dumpoff&quot;</td>
<td></td>
</tr>
<tr>
<td>(4CF55620.0040-1:signalmanager.cpp,170,</td>
<td></td>
</tr>
<tr>
<td>&quot;startManagerThread&quot;) Error starting signal manager thread. Return</td>
<td></td>
</tr>
<tr>
<td>code = 11; Resource temporarily unavailable. Use the return code</td>
<td></td>
</tr>
<tr>
<td>and message to investigate the failure. Agent is terminating.</td>
<td></td>
</tr>
</tbody>
</table>
Table 5. General problems and solutions for uninstallation (continued)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
</table>
| When the agent is installed using group deployment, deploygroup was run multiple times. The group deployment starts and completes successfully, but there were multiple entries in the Deploy Status Summary workspace on the Tivoli Enterprise Portal. When the command tried to install multiple times, the additional installations were queued and then were in failed state though the agent was deployed successfully. **Note:**  
  - When the bundle group contains a single bundle and the deployment group contains more than one member (managed system of the same type as AIX or Linux), the deployment is successful on both systems.  
  - When the bundle group contains more than one bundle and the deploy group contains single or multiple members, the deployment will be executed on each group member (managed system) depending on the members present in the bundle group and deploy group.  
  - The command creates a transaction for each XX bundle for each target system; the bundle matching the operating system for the deployment member is processed successfully; and remaining transactions were in a queued or failed state. | There is no solution at this time. |

Remote deployment troubleshooting

Problems can occur with remote deployment and removal of agent software using the Agent Remote Deploy process.

Table 6 contains problems and solutions related to remote deployment.

Table 6. Remote deployment problems and solutions

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>While you are using the remote deployment feature to install the IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI, an empty command window is displayed on the target computer. This problem occurs when the target of remote deployment is a Windows computer. (For more information about the remote deployment feature, see the IBM Tivoli Monitoring Installation and Setup Guide.)</td>
<td>Do not close or modify this window. It is part of the installation process and is dismissed automatically.</td>
</tr>
<tr>
<td>The removal of a monitoring agent fails when you use the remote removal process in the Tivoli Enterprise Portal desktop or browser.</td>
<td>This problem might occur when you attempt the remote removal process immediately after you restart the Tivoli Enterprise Monitoring Server. You must allow time for the monitoring agent to refresh its connection with the Tivoli Enterprise Monitoring Server before you begin the remote removal process.</td>
</tr>
</tbody>
</table>
Table 6. Remote deployment problems and solutions (continued)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote deployment reports success, but the VMware VI agent does not connect to the Tivoli Enterprise Monitoring Server. Also, the agent is deployed to the Tivoli Enterprise Monitoring Agent, but cannot be started locally. Remote deployment in silent mode fails if Instance Name contains illegal characters. No windows are displayed and success is claimed, but the remote instance does not start. Manually restarting the agent on the remote computer gives the following error: “Unable to start service, see EventLog for information”. No trace is generated.</td>
<td>Instance names can be 1 – 32 characters in length, and only alphanumeric characters are allowed. (a-z A-Z and 0-9). No spaces, dashes, underscores, or other characters are allowed. Illegal characters in the instance name cause the deployed agent to be nonfunctional.</td>
</tr>
<tr>
<td>The remotely deployed VMware VI agent instance is deployed and the instance connects to the Tivoli Enterprise Monitoring Server, but no ESX server subnodes are discovered. The VMware VI agent is configured to communicate with the data source using SSL=YES.</td>
<td>The SSL signer certificate for the data source must be added to the kvm.truststore file on the agent system to be able to connect to the data source using SSL.</td>
</tr>
<tr>
<td>The remotely deployed VMware VI agent instance is deployed and the instance connects to the Tivoli Enterprise Monitoring Server, but no ESX server subnodes are discovered. The VMware VI agent is configured to communicate with the data source using SSL=NO.</td>
<td>By default, VMware Virtual Infrastructure only supports using the https (SSL) protocol for communication. See your VMware Virtual infrastructure documentation for details about Enabling http (non-SSL) access on the VMware Virtual Center or ESX Server.</td>
</tr>
<tr>
<td>No option is available to remotely deploy a second instance of the VMware VI agent to Windows systems through the portal.</td>
<td>Use the command line to remotely deploy a second instance of the VMware VI agent.</td>
</tr>
<tr>
<td>Remote deployment of the agent to a 64-bit Windows server fails with a time out problem. Subsequent retries fail with a file not transmitted error.</td>
<td>The 64-bit Window OS agent was installed at the endpoint using the IBM Tivoli Monitoring local installer instead createNode command. If an addSystem command is used to deploy a 64-bit agent, the installation process loops continuously. This looping is caused by a perceived 32/64 bit compatibility (AC) component not being installed correctly. The install process running at the endpoint must be manually terminated. The remote deployment can now be executed by installing the AC component either locally or remotely. The agent can now be successfully deployed by running the addSystem command. If the agent installation is done locally, a pop-up menu is displayed indicating the 32/64 compatibility component must be installed.</td>
</tr>
</tbody>
</table>

**Agent troubleshooting**

A problem can occur with the agent after it has been installed.

Table 7 on page 343 contains problems and solutions that can occur with the agent after it is installed.
### Table 7. Agent problems and solutions

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log data accumulates too rapidly.</td>
<td>Check the RAS trace option settings, which are described in &quot;Setting RAS trace parameters by using the GUI&quot; on page 330. The trace option settings that you can set on the KBB_RAS1= and KDC_DEBUG= lines potentially generate large amounts of data.</td>
</tr>
<tr>
<td>The VMware VI agent connects to the Tivoli Enterprise Monitoring Server, and is displayed in the Tivoli Enterprise Portal navigation tree, but only the top-level nodes are displayed: VMware VI Agent, Monitored Servers, and Events. No Monitored Servers are discovered and no ESX Server subnodes are displayed in the navigation tree.</td>
<td>Verify the environment variable: 1. Verify that the KFW_TOPOLOGY_MUST_USE_FULL_NAME_AFFINITIES environment variable has been added to the Tivoli Enterprise Portal Server Environment Configuration File and the Tivoli Enterprise Portal Server has been restarted. 2. See <a href="#">Chapter 2, “Agent installation and configuration,”</a> on page 7</td>
</tr>
<tr>
<td>A row is displayed in the Agent Events table stating that an SSL error occurred in the Connection subsystem.</td>
<td>Verify SSL enablement: 1. Verify that the VMware data source certificates have been added to the certificate truststore for the agent. 2. Use the keytool -list command to see the certificates that have been added to the certificate truststore for the agent. Windows: keytool -list -v -keystore %CANDLE_HOME%\tmaitm6\kvm.truststore -storepass ITMVMWAREVI Linux: keytool -list -v -keystore install_dir/li6263/vm/etc/kvm.truststore -storepass ITMVMWAREVI See <a href="#">“Enabling SSL communication with VMware VI data sources”</a> on page 12 for additional information.</td>
</tr>
<tr>
<td>Informational log entries are displayed in the Virtual Center System Log (vxpd) when requesting data from the Virtual Center through the Virtual Infrastructure API.</td>
<td>These entries can be eliminated by selecting only log warnings and errors; otherwise, these information logs accumulate and can cause the log to wrap more than is typical.</td>
</tr>
<tr>
<td>The VMware VI agent is configured not to use SSL. No ESX Subnodes are discovered.</td>
<td>By default, VMware Virtual infrastructure only supports using the https (SSL) protocol for communication. See your VMware Virtual infrastructure documentation for details on Enabling http (non-SSL) access.</td>
</tr>
<tr>
<td>The log for the Monitoring Agent for VMware VI has many occurrences of &quot;Received a NULL SNTEntry for subnode ESX Managed System Name: Skipping.&quot;</td>
<td>This message is an indication that data was received from a Virtual Center for an ESX Server that is no longer connected. You can eliminate this message by ensuring that ESX Servers that are no longer managed by a Virtual Center are “removed” from the Virtual Center.</td>
</tr>
<tr>
<td>Problem</td>
<td>Solution</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>The Tivoli Enterprise Portal suddenly shows ESX Servers as offline.</td>
<td>The Monitoring Agent for VMware VI might query the VMware Virtual Center or VMware ESX Server for large amounts of data, depending on the size of the VMware environment. Keep the number of Monitoring Agent for VMware VI instances that is configured for the same VMware Virtual Center or VMware ESX Server data source to a minimum, preferably one. Keeping this number to a minimum keeps the VMware servers from running out of connection resources. In large VMware environments, it might be necessary to increase the number of ephemeral ports available to the VMware Virtual Center application, and decrease the TIMED_WAIT value for TCP connections. KB 1003679 describes this problem that occurs with the 2.0.2 Virtual Center and has been fixed in the 2.5 version.</td>
</tr>
<tr>
<td>The Monitoring Agent for VMware VI cannot connect, or can no longer connect to an ESX Server data source.</td>
<td>The ESX Server hostd process might have gone down. If so, restart the hostd process using the <code>service vmware-mgmt restart</code> command. VMware SR 1102374551 describes this problem.</td>
</tr>
<tr>
<td>The IBM Systems Director workspace might not render IBM Systems Director web UI scrollbars correctly.</td>
<td>This problem occurs when a Systems Director dialog box is displayed in front of a base view and causes a dialog box (foreground) scroll bar to render on top of the base (background) scroll bar. In this scenario, the foreground scroll bar actions are passed to the background view. Moving the foreground dialog box so these scroll bars are no longer on top of each other resolves this situation. It might be necessary to resize the Tivoli Enterprise Portal window to ensure that the dialog box can be moved far enough.</td>
</tr>
<tr>
<td>The Monitoring Agent for VMware VI is not configured to connect to its data source using SSL. No ESX subnodes are discovered.</td>
<td>Check the RAS trace option settings, which are described in “Setting RAS trace parameters by using the GUI” on page 330. The trace options settings that you can set on the KBB_RAS1= and KDC_DEBUG= lines potentially generate large amounts of data. Setting the data provider log level to FINE, FINER, FINEST, or ALL can create this problem.</td>
</tr>
<tr>
<td>When using the <code>itmcmd agent</code> commands to start or stop this monitoring agent, you receive the following error message: MKCIIN0201E Specified product is not configured.</td>
<td>Include the command option <code>-o</code> to specify the instance to start or stop. The instance name must match the name used for configuring the agent. For example: <code>./itmcmd agent -o Test1 start vm</code> For more information about using the <code>itmcmd</code> commands, see the IBM Tivoli Monitoring Command Reference.</td>
</tr>
</tbody>
</table>
A configured and running instance of the monitoring agent is not displayed in the Tivoli Enterprise Portal, but other instances of the monitoring agent on the same system are displayed in the portal.

IBM Tivoli Monitoring products use Remote Procedure Call (RPC) to define and control product behavior. RPC is the mechanism that a client process uses to make a subroutine call (such as GetTimeOfDay or ShutdownServer) to a server process somewhere in the network. Tivoli processes can be configured to use TCP/UDP, TCP/IP, SNA, and SSL as the protocol (or delivery mechanism) for RPCs that you want.

IP.PIPE is the name given to Tivoli TCP/IP protocol for RPCs. The RPCs are socket-based operations that use TCP/IP ports to form socket addresses. IP.PIPE implements virtual sockets and multiplexes all virtual socket traffic across a single physical TCP/IP port (visible from the `netstat` command).

A Tivoli process derives the physical port for IP.PIPE communications based on the configured, well-known port for the hub Tivoli Enterprise Monitoring Server. (This well-known port or BASE_PORT is configured by using the 'PORT:' keyword on the `KDC_FAMILIES / KDE_TRANSPORT` environment variable and defaults to ‘1918’.)

The physical port allocation method is defined as (BASE_PORT + 4096*N), where N=0 for a Tivoli Enterprise Monitoring Server process and N={1, 2, ..., 15} for another type of monitoring server process. Two architectural limits result as a consequence of the physical port allocation method:

- No more than one Tivoli Enterprise Monitoring Server reporting to a specific Tivoli Enterprise Monitoring Server hub can be active on a system image.
- No more than 15 IP.PIPE processes can be active on a single system image.

A single system image can support any number of Tivoli Enterprise Monitoring Server processes (address spaces) if each Tivoli Enterprise Monitoring Server on that image reports to a different hub. By definition, one Tivoli Enterprise Monitoring Server hub is available per monitoring enterprise, so this architecture limit has been reduced to one Tivoli Enterprise Monitoring Server per system image.

No more than 15 IP.PIPE processes or address spaces can be active on a single system image. With the first limit expressed earlier, this second limitation refers specifically to Tivoli Enterprise Monitoring Agent processes: no more than 15 agents per system image.

Continued on next row.
Table 7. Agent problems and solutions (continued)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continued from previous row.</td>
<td>This limitation can be circumvented (at current maintenance levels, IBM Tivoli Monitoring V6.1, Fix Pack 4 and later) if the Tivoli Enterprise Monitoring Agent process is configured to use the EPHEMERAL IP.PIPE process. (This process is IP.PIPE configured with the 'EPHEMERAL:Y' keyword in the KDC_FAMILIES / KDE_TRANSPORT environment variable). The number of ephemeral IP.PIPE connections per system image has no limitation. If ephemeral endpoints are used, the Warehouse Proxy agent is accessible from the Tivoli Enterprise Monitoring Server associated with the agents using ephemeral connections either by running the Warehouse Proxy agent on the same computer or by using the Firewall Gateway feature. (The Firewall Gateway feature relays the Warehouse Proxy agent connection from the Tivoli Enterprise Monitoring Server computer to the Warehouse Proxy agent computer if the Warehouse Proxy agent cannot coexist on the same computer.)</td>
</tr>
<tr>
<td>I cannot find my queries.</td>
<td>Agents that include subnodes display their queries within the element in the Query Editor list that represents the location of the attribute group. The queries are most often found under the name of the subnode, not the name of the agent.</td>
</tr>
</tbody>
</table>

**Workspace troubleshooting**

Problems can occur with general workspaces and agent-specific workspaces.

[Table 8 on page 347](#) contains problems and solutions related to workspaces.
<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
</table>
| The process application components are available, but the Availability status shows PROCESS_DATA_NOT_AVAILABLE. | This problem occurs because the PerfProc performance object is disabled. When this condition exists, IBM Tivoli Monitoring cannot collect performance data for this process. Use the following steps to confirm that this problem exists and to resolve it:  
1. In the Windows Start menu, click Run.  
2. Type perfmon.exe in the Open field of the Run window. The Performance window is displayed.  
3. Click the plus sign (+) in the toolbar. The Add Counters window is displayed.  
4. Look for Process in the Performance object menu.  
5. Complete one of the following actions:  
   - If you see Process in the menu, the PerfProc performance object is enabled and the problem is coming from a different source. You might need to contact IBM Software Support.  
   - If you do not see Process in the menu, use the Microsoft utility from the Microsoft.com Operations website to enable the PerfProc performance object. The Process performance object becomes visible in the Performance object menu of the Add Counters windows, and IBM Tivoli Monitoring is able to detect Availability data.  
6. Restart the monitoring agent. |
<p>| The name of the attribute does not display in a bar chart or graph view. | When a chart or graph view that includes the attribute is scaled to a small size, a blank space is displayed instead of a truncated name. To see the name of the attribute, expand the view of the chart until sufficient space is available to display all characters of the attribute name. |
| At the end of each view, you see the following Historical workspace KFWITM220E error: Request failed during execution. | Ensure that you configure all groups that supply data to the view. In the Historical Configuration view, ensure that data collection is started for all groups that supply data to the view. |</p>
<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>You start collection of historical data but the data cannot be seen.</td>
<td>Use the following managing options for historical data collection:</td>
</tr>
<tr>
<td></td>
<td>- Basic historical data collection populates the Warehouse with raw data. This type of data collection is turned off by default. For information about managing this feature including how to set the interval at which data is collected, see Managing historical data in the IBM Tivoli Monitoring Administrator’s Guide. By setting a more frequent interval for data collection, you reduce the load on the system incurred every time data is uploaded.</td>
</tr>
<tr>
<td></td>
<td>- Use the Summarization and Pruning agent to collect specific amounts and types of historical data. Historical data is not displayed until the Summarization and Pruning monitoring agent begins collecting the data. By default, this agent begins collection at 2 a.m. daily. At that point, data is visible in the workspace view. For information about how to modify the default collection settings, see Managing historical data in the IBM Tivoli Monitoring Administrator’s Guide.</td>
</tr>
<tr>
<td>Historical data collection is unavailable because of incorrect queries in the Tivoli Enterprise Portal.</td>
<td>The Sort By, Group By, and First/Last functions column are not compatible with the historical data collection feature. Use of these advanced functions makes a query ineligible for historical data collection. Even if data collection has started, you cannot use the time span feature if the query for the chart or table includes column functions or advanced query options (Sort By, Group By, First / Last). To ensure support of historical data collection, do not use the Sort By, Group By, or First/Last functions in your queries. For information about the historical data collection function, see Managing historical data in the IBM Tivoli Monitoring Administrator’s Guide or the Tivoli Enterprise Portal online help.</td>
</tr>
<tr>
<td>When you use a long process name in the situation, the process name is truncated.</td>
<td>Truncation of process or service names for situations in the Availability table in the portal display is the expected behavior. The maximum name length is 100 bytes.</td>
</tr>
<tr>
<td>Regular (non-historical) monitoring data fails to be displayed.</td>
<td>Check the formation of the queries you use to gather data. For example, look for invalid SQL statements.</td>
</tr>
<tr>
<td>The VMware VI agent does not display aggregate metrics for CPU on SMP virtual machines.</td>
<td>VMware Virtual Infrastructure does not provide detailed aggregate virtual machine CPU metrics.</td>
</tr>
<tr>
<td></td>
<td>The OS agents provide aggregated CPU metrics for SMP systems. You can install the IBM Tivoli Monitoring OS agent on the virtual machine to get these metrics.</td>
</tr>
<tr>
<td>Problem</td>
<td>Solution</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>The Virtual Center Events view in the Events Workspace does not return data.</td>
<td>If the VMware VI agent instance is configured with only ESX Server data sources, no data is returned in the Virtual Center Events view. Only VMware Events and Alarms related to a Virtual Center are displayed in this view. ESX Server Events and Alarms are displayed in the Events view in the ESX Server workspace.</td>
</tr>
<tr>
<td>The Virtual Machine Partitions View in the Disk workspace shows only one partition on a Linux Virtual machine.</td>
<td>The VMware VI agent appears to return only data for physical, non-removable devices for this property. The agent displays only the data returned from VMware. Install the IBM Tivoli Monitoring: Linux OS Agent on the Linux Virtual System for access to complete File System metrics.</td>
</tr>
<tr>
<td>The workspace for the VMware VI Agent Navigator node is undefined.</td>
<td>When multiple instances of the VMware VI agent are defined on a system, the top-level node becomes VMware VI Agent. The VMware VI Agent workspace is undefined at this node. A node for each instance is created called <code>Instance:Hostname:VM</code>. A workspace that is called <code>Instance:Hostname:VM</code> is associated with the instance node. This workspace is comparable to the VMware VI Agent workspace.</td>
</tr>
<tr>
<td>No ESX Server subnodes are displayed in the navigation tree.</td>
<td>See <a href="#">Table 7 on page 343</a>.</td>
</tr>
<tr>
<td>The dynamic links that connect to the OS agent workspaces are disabled.</td>
<td>When the OS type cannot be determined for the virtual machine, VMware Tools might not be installed or running. Ensure that VMware Tools is installed on the virtual machine. On Linux systems, the VMware Tools do not start until at least the first login to the virtual machine, so ensure that you have logged in to the virtual machine.</td>
</tr>
<tr>
<td>Clicking a dynamic link returns the following message: KFWITMO81E: The link target cannot be found. The link definition might be incorrect or the target is unavailable.</td>
<td>Ensure that the appropriate OS monitoring agent (on Windows or Linux systems) is installed on the targeted virtual machine. Next, verify that the OS monitoring agent is running and that it is configured to connect to the same Tivoli Enterprise Monitoring Server to which the VMware VI agent is connected. You can navigate to the OS monitoring agent for the virtual machines directly in the same Tivoli Enterprise Portal from which you access the VMware VI agent.</td>
</tr>
<tr>
<td>Problem</td>
<td>Solution</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>A delay occurs in seeing workspace data when the VMware VI agent is first started.</td>
<td>When the VMware VI agent is first started, it collects information about the hierarchy and organization of the virtualized environments it monitors. This information includes which ESX servers, virtual machines, resource pools, data stores, and clusters are available and how they are related to one another. This information is referred to as the data source inventory. Depending on the size of the monitored environment, network bandwidth and the computational power of the agent system, and the VMware data source, this initial collection of the inventory can take anywhere from a few seconds to a few minutes. After initial collection is complete, a message displays in the data provider log stating how long initial inventory collection took, and attribute group data collection can proceed. Collecting inventory information when the agent is started significantly decreases the amount of time subsequent data collections take and also reduces the overall network utilization of the agent.</td>
</tr>
<tr>
<td>A metric value on a workspace is suddenly unavailable.</td>
<td>At times, not all requested ESX server properties are returned by the Virtual Center. This issue has been limited to a particular ESX Server and is not a persistent condition.</td>
</tr>
<tr>
<td>When different versions of the VMware VI agent are configured to the same Tivoli Enterprise Monitoring Server, certain workspace links might not function as expected.</td>
<td>This problem is a limitation in VMware VI V6.1.2. All links function as expected for 6.2.1 versions of the agent.</td>
</tr>
<tr>
<td>Problem</td>
<td>Solution</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>Workspace links for the Linux OS agent running on ESX hosts return an error even though a Linux OS agent is installed and running on the ESX server and the Linux OS agent is listed as ONLINE in the Managed System list shown in the Tivoli Enterprise Portal client from which the VMware VI agent is visible. The following error is displayed: KFWITM881E The link target cannot be found. The link definition might be incorrect or the target is unavailable.</td>
<td>If you have installed a version of the IBM Tivoli Monitoring: Linux OS agent before IBM Tivoli Monitoring V6.2.0, you might encounter truncated Managed System names. If so, you can either uninstall the earlier Linux OS agent and reinstall the 6.2.0 version, or use the following instructions to restore the expected Managed System name for the truncated Managed System name of the Linux OS agent. IBM Tivoli Monitoring might not be able to generate a unique name for monitoring components because of the truncation of names that the product automatically generates. IBM Tivoli Monitoring automatically creates a name for each monitoring component by concatenating the host name and product code separated by colons (hostname:LZ). Note: When you monitor a multinode system, such as a database, IBM Tivoli Monitoring adds a subsystem name to the concatenated name, typically a database instance name. The length of the name that IBM Tivoli Monitoring generates is limited to 32 characters. Truncation can result in multiple components having the same 32-character name. If this problem happens, shorten the hostname portion of the name as follows: 1. Open the configuration file for the monitoring agent, which is located in the following path: install_dir/config/lz.ini. Note: When you modify the lz.ini file, your configuration changes affect only the instance of the Monitoring Agent for Linux OS that is running on the computer. If you want your configuration changes to affect all agents that run on the computer, modify the install_dir/config/env.config file. 2. Find the line that begins with CTIRA_HOSTNAME=. 3. Type a new name for the host name that is a unique, shorter name for the host computer. The final concatenated name including the subsystem name, new host name, and LZ cannot be longer than 32 characters. Note: You must ensure that the resulting name is unique with respect to any existing monitoring component that was previously registered with the Tivoli Enterprise Monitoring Server. 4. Save the file and restart the agent. If you cannot find the CTIRA_HOSTNAME environment variable, you must add it to the configuration file of the monitoring agent: • On Windows systems, use the Advanced &gt; Edit Variables option. • On UNIX and Linux systems, add the variable to the config/product_code.ini file.</td>
</tr>
</tbody>
</table>
### Table 8. Workspace problems and solutions (continued)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigator items and workspace titles are labeled with internal names</td>
<td>Ensure that application support has been added on the monitoring server, portal server, and portal client.</td>
</tr>
<tr>
<td>such as Kxx:KXX0000 instead of the correct names (such as Disk), where</td>
<td>For more information about installing application support, see Installing and enabling application support in the IBM Tivoli Monitoring Installation and Setup Guide.</td>
</tr>
<tr>
<td>XX and xx represent the two-character agent code.</td>
<td></td>
</tr>
</tbody>
</table>

### Situation troubleshooting

Problems can occur with situations and situation configuration.

Table 9 contains problems and solutions for situations.

### Table 9. Situation problems and solutions

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring activity requires too much disk space.</td>
<td>Check the RAS trace logging settings that are described in Setting RAS trace parameters by using the GUI on page 330. For example, trace logs grow rapidly when you apply the ALL logging option.</td>
</tr>
<tr>
<td>Monitoring activity requires too many system resources.</td>
<td>Disk capacity planning for historical data on page 287 describes the performance impact of specific attribute groups. If possible, decrease your use of the attribute groups that require greater system resources.</td>
</tr>
<tr>
<td>A formula that uses mathematical operators appears to be incorrect.</td>
<td>This formula is incorrect because situation predicates support only logical operators. Your formulas cannot have mathematical operators. Note: The Situation Editor provides alternatives to math operators.</td>
</tr>
<tr>
<td>For example, if you were monitoring a Linux system, the formula that</td>
<td></td>
</tr>
<tr>
<td>calculates when Free Memory falls under 10 percent of Total Memory</td>
<td></td>
</tr>
<tr>
<td>does not work: LT '#Linux_VM_Stats.Total_Memory' / 10</td>
<td></td>
</tr>
<tr>
<td>You want to change the appearance of situations when they are</td>
<td>1. Right-click an item in the navigation tree.</td>
</tr>
<tr>
<td>displayed in the navigation tree.</td>
<td>2. Click Situations in the menu. The Situation Editor window is displayed.</td>
</tr>
<tr>
<td></td>
<td>3. Select the situation that you want to modify.</td>
</tr>
<tr>
<td></td>
<td>4. Use the State menu to set the status and appearance of the Situation when it triggers.</td>
</tr>
<tr>
<td></td>
<td>Note: The State setting is not related to severity settings in the Tivoli Enterprise Console.</td>
</tr>
<tr>
<td>The VMware VI agent group in the Situation Editor is empty.</td>
<td>The VMware VI node in the Situation Editor contains all the default KVM situations because they use attributes from the attribute groups that are associated with the VMware VI subnodes. By default, the VMware VI agent node in the Situation Editor is empty because no default KVM situations use attributes from the attribute groups that are associated with the VMware VI agent subnodes.</td>
</tr>
<tr>
<td>When a situation is triggered in the Event Log attribute group, it</td>
<td>A timeout occurs on the cache of events for the NT Event Log group. Increase the cache time of Event Log collection to meet your requirements by adding the following variable and timeout value to the KpcENV file for the agent (where pc is the two-letter product code): CDP_NT_EVENT_LOG_CACHE_TIMEOUT=3600</td>
</tr>
<tr>
<td>remains in the Situation Event Console as long as the event ID entry</td>
<td>This variable determines how long events from the NT Event Log are kept.</td>
</tr>
<tr>
<td>is present in the Event Log workspace. When this event ID entry is</td>
<td></td>
</tr>
<tr>
<td>removed from the Event Log workspace on the Tivoli Enterprise Portal,</td>
<td></td>
</tr>
<tr>
<td>the situation is also cleared even if the actual problem that caused</td>
<td></td>
</tr>
<tr>
<td>the event is not resolved, and the event ID entry is also present in</td>
<td></td>
</tr>
<tr>
<td>the Windows Event Viewer.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 9. Situation problems and solutions (continued)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>For a situation that uses the ‘MISSING’ operator and is distributed to a remote agentless monitoring subnode, no indication is displayed in the Tivoli Enterprise Portal or in the Situation Event Console when the situation becomes true.</td>
<td>The MISSING predicate is currently not supported on subnodes. If a situation with a MISSING predicate is distributed to a subnode, the agent cannot tell which subnode or node the event is occurring on. It inserts the system name as the origin node for the event and returns. When the event reaches the Tivoli Enterprise Portal Server, the origin node does not match the system name of the subnode where the situation is associated, so the event is dropped.</td>
</tr>
<tr>
<td>The situation for a specific agent is not visible in the Tivoli Enterprise Portal.</td>
<td>Open the Situation Editor. Access the All managed servers view. If the situation is not displayed, confirm that the monitoring server has been seeded for the agent. If not, seed the server, as described in the <a href="https://www.ibm.com">IBM Tivoli Monitoring Installation and Setup Guide</a>.</td>
</tr>
<tr>
<td>The monitoring interval is too long.</td>
<td>Access the Situation Editor view for the situation that you want to modify. Check the <strong>Sampling interval</strong> area in the <strong>Formula</strong> tab. Adjust the time interval as required.</td>
</tr>
</tbody>
</table>
| The situation did not activate at startup.                            | Manually recycle the situation as follows:  
  1. Right-click the situation and select **Stop Situation**.  
  2. Right-click the situation and select **Start Situation**.  
   **Note:** You can permanently avoid this problem by selecting the **Run at Startup** check box of the Situation Editor view for a specific situation. |
<p>| The situation is not displayed.                                       | Click the <strong>Action</strong> tab and check whether the situation has an automated corrective action. This action can occur directly or through a policy. The situation might be resolving so quickly that you do not see the event or the update in the graphical user interface. |
| An Alert event did not occur even though the predicate was correctly specified. | Check the logs, reports, and workspaces. |
| A situation fires on an unexpected managed object.                    | Confirm that you distributed and started the situation on the correct managed system. |
| The product did not distribute the situation to a managed system.      | Click the <strong>Distribution</strong> tab and check the distribution settings for the situation. |</p>
<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
</table>
| The situation does not fire. | This problem can be caused when incorrect predicates are present in the formula that defines the situation. For example, the managed object shows a state that normally triggers a monitoring event, but the situation is not true because the wrong attribute is specified in the formula. In the **Formula** tab, analyze predicates as follows: 1. Click the **fx** icon in the **Formula** area. The **Show formula** window is displayed.  
   a. Confirm the following details in the **Formula** area of the window:  
      - The attributes that you intend to monitor are specified in the formula.  
      - The situations that you intend to monitor are specified in the formula.  
      - The logical operators in the formula match your monitoring goal.  
      - The numeric values in the formula match your monitoring goal.  
   b. (Optional) Select the **Show detailed formula** check box to see the original names of attributes in the application or operating system that you are monitoring.  
   c. Click **OK** to dismiss the **Show formula** window.  
2. (Optional) In the **Formula** area of the **Formula** tab, temporarily assign numeric values that immediately trigger a monitoring event. The triggering of the event confirms that other predicates in the formula are valid.  
   **Note:** After you complete this test, you must restore the numeric values to valid levels so that you do not generate excessive monitoring data based on your temporary settings. For additional information about situations that do not fire, see *Situations are not firing* in the *IBM Tivoli Monitoring Troubleshooting Guide*. |
| Situation events are not displayed in the Events Console view of the workspace. | Associate the situation with a Navigator item.  
   **Note:** The situation does not need to be displayed in the workspace. It is sufficient that the situation is associated with any Navigator item. |
| You do not have access to a situation. | **Note:** You must have administrator privileges to complete these steps.  
1. Click **Edit > Administer Users** to access the Administer Users window.  
2. In the **Users** area, select the user whose privileges you want to modify.  
3. In the **Permissions** tab, **Applications** tab, and **Navigator Views** tab, select the permissions or privileges that correspond to the user role.  
4. Click **OK**. |
Table 9. Situation problems and solutions (continued)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
</table>
| A managed system seems to be offline.                                  | 1. Select Physical View and click the Enterprise Level of the navigator tree.  
|                                                                        | 2. Click View > Workspace > Managed System Status to see a list of managed systems and their status.  
|                                                                        | 3. If a system is offline, check network connectivity and the status of the specific system or application. |
| When the KVM_Server_VMotion_Event situation is triggered and you click | Upgrade IBM Tivoli Monitoring to IBM Tivoli Monitoring V6.3.                                                                          |
| the link for the situation to view the situation details, the situation |                                                                                                                                           |
| does not open in the Tivoli Enterprise Portal.                        |                                                                                                                                           |

**Take Action commands troubleshooting**

Problems can occur with Take Action commands.

**Table 10** contains problems and solutions that can occur with Take Action commands.

When each Take Action command runs, it generates a log file listed in **Table 3 on page 325**.

**Table 10. Take Action commands problems and solutions**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take Action commands often require several minutes to complete.</td>
<td>Allow several minutes. If you do not see a message advising you of completion, try to run the command manually.</td>
</tr>
</tbody>
</table>
| Situations fail to trigger Take Action commands.                       | Attempt to manually run the Take Action command in the Tivoli Enterprise Portal. If the Take Action command works, look for configuration problems in the situation.  
|                                                                        | See ‘Situation troubleshooting’ on page 352. If the Take Action command fails, for general information about troubleshooting Take Action commands, see the IBM Tivoli Monitoring Troubleshooting Guide. |

**Discovery Library Adapter for the agent troubleshooting**

Problems can occur when using the Discovery Library Adapter for the VMware VI agent.

**Table 11** contains problems and solutions that can occur when using the Discovery Library Adapter for IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI. For additional information about troubleshooting for the Discovery Library Adapter, see the IBM Tivoli Application Dependency Discovery Manager Information Center (http://publib.boulder.ibm.com/infocenter/tivihelp/v10r1/topic/com.ibm.taddm.doc_7.2/welcome_page/welcome.html).

**Table 11. Discovery Library Adapter for VMware VI agent problems and solutions**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importing DLA into a clear (no data) IBM Tivoli Application Dependency</td>
<td>DLAs do not create the logical relationships required to populate the Application Infrastructure Topology. To create logical relationships, run the appropriate sensor to discover or create them in TADDM.</td>
</tr>
<tr>
<td>Discovery Manager (TADDM) server does not create the relationship and</td>
<td></td>
</tr>
<tr>
<td>associations between the Virtual Center and the ESX servers. The</td>
<td></td>
</tr>
<tr>
<td>Application Infrastructure Topology does not show the ESX Servers.</td>
<td></td>
</tr>
</tbody>
</table>
Table 11. Discovery Library Adapter for VMware VI agent problems and solutions  (continued)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>When running the <code>loadidlml</code> command to load the DLA book into TADDM when the DLA book is generated for a VMware agent running on Windows 2000, the command fails with a parsing error.</td>
<td>If you are monitoring Windows 2000 systems with non-OS agents that have DLA templates, you cannot use the IBM Tivoli Monitoring DLA.</td>
</tr>
<tr>
<td>When running the <code>loadidlml</code> command to load the DLA book into TADDM when the DLA book is generated for a VMware agent running on a system other than Windows 2000, the command fails with a parsing error.</td>
<td>You must have an OS agent installed and running on the same system on which the VMware agent is installed.</td>
</tr>
<tr>
<td>After loading the IDML book for the VMware VI agent into Tivoli Business Service Manager, the VMware entities are not automatically displayed in the Tivoli Business Service Manager console.</td>
<td>CDM classes for the VMware VI agent are currently not available in Tivoli Business Service Manager V4.2.1 Fix Pack 1. As a result, after loading the IDML book for the VMware VI agent into Tivoli Business Service Manager, the VMware entities are not automatically displayed in the Tivoli Business Service Manager console, but require that you add VMware VI agent classes to Tivoli Business Service Manager manually as follows:</td>
</tr>
<tr>
<td></td>
<td>1. Open the Tivoli Business Service Manager console, click <strong>Administration &gt; Service Configuration</strong>, and select the Service Component Repository from the drop-down list in the right panel.</td>
</tr>
<tr>
<td></td>
<td>2. In the Service Navigation panel, click <strong>Component Registry &gt; Servers &gt; Clusters</strong>.</td>
</tr>
<tr>
<td></td>
<td>3. Click <strong>Clusters</strong>.</td>
</tr>
<tr>
<td></td>
<td>4. In the Service Editor panel, click the <strong>Additional</strong> tab and edit the <code>classnamefilter</code> text box to add comma-separated fields for the VMware classes you want to add. The string might look something like the following:</td>
</tr>
<tr>
<td></td>
<td>5. Click <strong>Save</strong> to save the setting changes. The VMware entities (such as clusters, virtual centers, and virtual machines) are displayed in the Tivoli Business Service Manager console.</td>
</tr>
</tbody>
</table>

Support information

If you have a problem with your IBM software, you want to resolve it quickly.

IBM provides the following ways for you to obtain the support you need:

**Online**
The following websites contain troubleshooting information:

- Go to the [IBM Software Support website](http://www.ibm.com/support/entry/portal/software) and follow the instructions.
- Go to the [Application Performance Management Wiki](http://www.ibm.com/developerworks/servicemanagement/apm/index.html). Feel free to contribute to this wiki.

**IBM Support Assistant**
The IBM Support Assistant (ISA) is a free local software serviceability workbench that helps you
resolve questions and problems with IBM software products. The ISA provides quick access to support-related information and serviceability tools for problem determination. To install the ISA software, go to the [IBM Support Assistant website](http://www.ibm.com/software/support/isa).

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**Informational, warning, and error messages overview**

Messages relay information about how the system or application is performing and can alert you to exceptional conditions when they occur.

Messages are sent to an output destination, such as a file, database, or console screen.

If you receive a warning or error message, you can do one of the following actions:
- Follow the instructions listed in the Detail window of the message if this information is included there.
- Consult the message details listed in this topic to see what action you can take to correct the problem.
- Consult the message log for message ID, text, time, and date of the message, as well as other data you can use to diagnose the problem.

**Message format**

The message format contains a message ID and text, an explanation, and an operator response.

IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI messages have the following format:

Message ID and text
Explanation
Operator Response

The message ID has the following format:

`CCC###severity`

where:

- **CCC** Prefix that indicates the component to which the message applies. The following components are used:
  - **KVM** General VMware VI agent messages
  - `###` Number of the message
- **severity** Severity of the message. Three levels of severity are used:
  - **I** Informational messages provide feedback about something that happened in the product or system that might be important. These messages can provide guidance when you are requesting a specific action from the product.
  - **W** Warning messages call your attention to an exception condition. The condition might not be an error but can cause problems if not resolved.
  - **E** Error messages indicate that an action cannot be completed because of a user or system error. These messages require user response.

The **Text** of the message provides a general statement regarding the problem or condition that occurred. The **Explanation** provides additional information about the message and the possible cause for the condition. The **Operator Response** provides actions to take in response to the condition, particularly for error messages (messages with the "E" suffix).
Note: Many message texts and explanations contain variables, such as the specific name of a server or application. Those variables are represented in this topic as symbols, such as "&1." Actual messages contain values for these variables.

Agent messages
The following messages apply to IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI.

KVM5001I
The request to power on the virtual machine was sent successfully.

Explanation:
The virtual machine was successfully powered on, or it is in the process of powering on.

Operator response:
None.

KVM5002I
The virtual machine is already powered on.

Explanation:
The virtual machine is already powered on.

Operator response:
None.

KVM5003E
Could not perform the requested power on action.

Explanation:
The task could not be performed as requested.

Operator response:
Check whether one or both of these connections exist: the Virtual Center has a connection to the ESX Server, or there is a network connection between the monitoring agent and the Virtual Center or ESX Server.

KVM5004I
The request to power off the virtual machine was sent successfully.

Explanation:
The virtual machine was successfully powered off, or it is in the process of powering off.

Operator response:
None.

KVM5005I
The virtual machine is powered off.

Explanation:
The virtual machine is powered off.

Operator response:
None.

KVM5006E
Could not perform the requested power off action.

Explanation:
The task could not be performed as requested.

Operator response:
Check whether one or both of these connections exist: the Virtual Center has a connection to the ESX Server, or there is a connection between the agent and the Virtual Center or ESX Server.
KVM5007E
The ESX server name specified is invalid or could not be found.

Explanation:
The task could not be performed as requested.

Operator response:
Check the name of the ESX server and ensure that it is specified correctly when executing this action.

KVM5008E
One of the required parameters for this action was not specified.

Explanation:
The task could not be performed as requested.

Operator response:
Check that both the ESX server name and the name of the virtual machine were specified.

KVM5009E
An unknown action was specified for this request.

Explanation:
The task could not be performed as requested.

Operator response:
Check that the action was specified correctly.

KVM5040E
Data source not found in the environment.

Explanation:
At least one data source must be defined or configured.

Operator response:
Check the configuration of the agent and restart.

KVM5041E
Unable to log in to data source.

Explanation:
The user ID or password supplied were not authenticated by the data source.

Operator response:
Check the user ID and password in the agent configuration and restart.

KVM5042E
The data source host could not be found on the network or a connection could not be made.

Explanation:
A connection could not be made to a data source configured for data collection.

Operator response:
Check the host name of the data sources configured for the agent. Ensure that a good network connection exists.

KVM5043E
Monitored server unavailable.

Explanation:
A data collection request was issued for a server that is no longer available.

Operator response:
This condition is typically temporary and clears itself. If it does not clear, contact your support representative.
KVM5044E
Data provider is recovering from a communications error.

Explanation:
A communications error occurred with a data source. The agent is resetting.

Operator response:
None.

KVM5045E
The specified virtual machine was not found.

Explanation:
The task could not be performed as requested.

Operator response:
Check that the name of the virtual machine was specified correctly.
Appendix A. Event mapping

The Tivoli Event Integration Facility (EIF) interface is used to forward situation events to Tivoli Netcool/OMNIbus or Tivoli Enterprise Console.

EIF events specify an event class, and the event data is specified as name-value pairs that identify the name of an event slot and the value for the slot. An event class can have subclasses. IBM Tivoli Monitoring provides the base event class definitions and a set of base slots that are included in all monitoring events. Agents extend the base event classes to define subclasses that include agent-specific slots. For VMware VI agent events, the event classes correspond to the agent attribute groups, and the agent-specific slots correspond to the attributes in the attribute group.

The situation editor in the Tivoli Enterprise Portal can be used to perform custom mapping of data to EIF slots instead of using the default mapping described in this topic. For more information about EIF slot customization, see the Tivoli Enterprise Portal User's Guide.

Tivoli Enterprise Console requires that event classes and their slots are defined in BAROC (Basic Recorder of Objects in C) files. Each agent provides a BAROC file that contains event class definitions for the agent and is installed on the Tivoli Enterprise Monitoring Server in the TECLIB directory (install_dir/cms/TECLIB for Windows systems and install_dir/tables/TEMS_hostname/TECLIB for UNIX systems) when application support for the agent is installed. The BAROC file for the agent and the base BAROC files provided with Tivoli Monitoring must also be installed onto the Tivoli Enterprise Console. For details, see “Setting up event forwarding to Tivoli Enterprise Console” in the IBM Tivoli Monitoring Installation and Setup Guide.

Each of the event classes is a child of KVM_Base and is defined in the kvm.baroc (version 7.2 Fix Pack 2) file. The KVM_Base event class can be used for generic rules processing for any event from the IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI.

For events that are generated by situations in the Active Tasks attribute group, events are sent by using the ITM_KVM_ACTIVE_TASKS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- source_hostname: STRING
- source_hostname_enum: STRING
- name: STRING
- name_enum: STRING
- target_entity: STRING
- target_entity_enum: STRING
- kvm_status: STRING
- kvm_status_enum: STRING
- initiated_by: STRING
- initiated_by_enum: STRING
- cancelable: INTEGER
- cancelable_enum: STRING
- queue_time: STRING
- queue_time_enum: STRING
- start_time: STRING
For events that are generated by situations in the Agent Events attribute group, events are sent by using the ITM_KVM_AGENT_EVENTS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- kvm_source: STRING
- managed_system: STRING
- subsystem: INTEGER
- subsystem_enum: STRING
- kvm_severity: INTEGER
- kvm_severity_enum: STRING
- message: INTEGER
- message_enum: STRING

For events that are generated by situations in the Cluster DRS Faults attribute group, events are sent by using the ITM_KVM_CLUSTER_DRS_FAULTS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- kvm_source: STRING
- kvm_source_enum: STRING
- datacenter: STRING
- datacenter_enum: STRING
- cluster: STRING
- cluster_enum: STRING
- fault_name: STRING
- fault_name_enum: STRING
- reason: STRING
- reason_enum: STRING
- fault_message: STRING
- fault_message_enum: STRING
- source_hostname: STRING
- source_hostname_enum: STRING
- target_hostname: STRING
- target_hostname_enum: STRING
- virtual_machine: STRING
- virtual_machine_enum: STRING
- ft_virtual_machine: STRING
- ft_virtual_machine_enum: STRING
- drs_type: STRING
- drs_type_enum: STRING

For events that are generated by situations in the Clustered Datastores attribute group, events are sent by using the ITM_KVM_CLUSTERED_DATASTORES event class. This event class contains the following slots:
For events that are generated by situations in the Clustered Resource Pools attribute group, events are sent by using the ITM_KVM_CLUSTEROED_RESOURCE_POOLS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- datacenter: STRING
- datacenter_enum: STRING
- cluster: STRING
- cluster_enum: STRING
- datastore: STRING
- datastore_enum: STRING
- overall_status: STRING
- overall_status_enum: STRING
- accessible: INTEGER
- accessible_enum: STRING
- capacity: INTEGER
- capacity_enum: STRING
- percent_used: INTEGER
- percent_used_enum: STRING
- type: STRING
- type_enum: STRING
- remote_host_address: STRING
- remote_host_address_enum: STRING
- remote_path: STRING
- remote_path_enum: STRING
- msn: STRING
- msn_enum: STRING
- nodeid: STRING
- nodeid_enum: STRING
- connected_hosts: INTEGER
- connected_hosts_enum: STRING
- connected_vms: INTEGER
- connected_vms_enum: STRING
- connected_vms: INTEGER
- max_cpu_usage: INTEGER
- max_cpu_usage_enum: STRING
- cpu_usage: INTEGER
- cpu_usage_enum: STRING
- max_memory_usage: INTEGER
For events that are generated by situations in the Clustered Servers attribute group, events are sent using the ITM_KVM_CLUSTERED_SERVERS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- datacenter: STRING
- datacenter_enum: STRING
- cluster_name: STRING
- cluster_name_enum: STRING
- server_hostname: STRING
- server_hostname_enum: STRING
- server_cpu_utilization: INTEGER
- server_cpu_utilization_enum: STRING
- server_memory_utilization: INTEGER
- server_memory_utilization_enum: STRING
- cpu_effective_contribution: INTEGER
- cpu_effective_contribution_enum: STRING
- cpu_total_contribution: INTEGER
- cpu_total_contribution_enum: STRING
- cpu_effective_utilization: INTEGER
- cpu_effective_utilization_enum: STRING
- cpu_total_utilization: INTEGER
- cpu_total_utilization_enum: STRING
- mem_effective_contribution: INTEGER
- mem_effective_contribution_enum: STRING
- mem_total_contribution: INTEGER
- mem_total_contribution_enum: STRING
- memory_effective_utilization: INTEGER
- memory_effective_utilization_enum: STRING
- memory_total_utilization: INTEGER
- memory_total_utilization_enum: STRING
- msn_name: STRING
- msn_name_enum: STRING
- overall_status: STRING
- overall_status_enum: STRING
- nodetype: STRING
For events that are generated by situations in the Clustered Virtual Apps attribute group, events are sent by using the ITM_KVM_CLUSTERED_VIRTUAL_APPS event class. This event class contains the following slots:

- overall_status_enum: STRING
- nodeid: STRING

For events that are generated by situations in the Clustered Virtual Machines attribute group, events are sent by using the ITM_KVM_CLUSTERED_VIRTUAL_MACHINES event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- datacenter: STRING
- datacenter_enum: STRING
- cluster_name: STRING
- cluster_name_enum: STRING
- virtual_app_name: STRING
- virtual_app_name_enum: STRING
- virtual_machine_name: STRING
- virtual_machine_name_enum: STRING
- destroy_with_parent: INTEGER
- destroy_with_parent_enum: STRING
- waiting_for_guest: INTEGER
- waiting_for_guest_enum: STRING
- start_action: STRING
- start_action_enum: STRING
- stop_action: STRING
- stop_action_enum: STRING
- start_delay: INTEGER
- start_delay_enum: STRING
- stop_delay: INTEGER
- stop_delay_enum: STRING
- start_order: INTEGER
- start_order_enum: STRING
- moref: STRING
- moref_enum: STRING
- nodeid: STRING
- cpu_utilization: INTEGER
• cpu_utilization_enum: STRING
• memory_utilization: INTEGER
• memory_utilization_enum: STRING
• msn_name: STRING
• msn_name_enum: STRING
• overall_status: STRING
• overall_status_enum: STRING
• nodeid: STRING

For events that are generated by situations in the Clusters attribute group, events are sent by using the
ITM_KVM_CLUSTERS event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• datacenter: STRING
• datacenter_enum: STRING
• cluster_name: STRING
• cluster_name_enum: STRING
• drs_enabled: INTEGER
• drs_enabled_enum: STRING
• ha_enabled: INTEGER
• ha_enabled_enum: STRING
• number_servers: INTEGER
• number_servers_enum: STRING
• effective_servers: INTEGER
• effective_servers_enum: STRING
• number_cpus: INTEGER
• number_cpus_enum: STRING
• total_memory: REAL
• total_memory_enum: STRING
• effective_memory: REAL
• effective_memory_enum: STRING
• total_cpu: REAL
• total_cpu_enum: STRING
• effective_cpu: REAL
• effective_cpu_enum: STRING
• number_vmotions: INTEGER
• number_vmotions_enum: STRING
• overall_status: STRING
• overall_status_enum: STRING
• cpu_utilization: REAL
• cpu_utilization_enum: STRING
• memory_utilization: REAL
• memory_utilization_enum: STRING
• cpu_00_10: INTEGER
• cpu_00_10_enum: STRING
• cpu_10_20: INTEGER
• cpu_10_20_enum: STRING
• cpu_20_30: INTEGER
• cpu_20_30_enum: STRING
• cpu_30_40: INTEGER
• cpu_30_40_enum: STRING
• cpu_40_50: INTEGER
• cpu_40_50_enum: STRING
• cpu_50_60: INTEGER
• cpu_50_60_enum: STRING
• cpu_60_70: INTEGER
• cpu_60_70_enum: STRING
• cpu_70_80: INTEGER
• cpu_70_80_enum: STRING
• cpu_80_90: INTEGER
• cpu_80_90_enum: STRING
• cpu_90_100: INTEGER
• cpu_90_100_enum: STRING
• memory_00_10: INTEGER
• memory_00_10_enum: STRING
• memory_10_20: INTEGER
• memory_10_20_enum: STRING
• memory_20_30: INTEGER
• memory_20_30_enum: STRING
• memory_30_40: INTEGER
• memory_30_40_enum: STRING
• memory_40_50: INTEGER
• memory_40_50_enum: STRING
• memory_50_60: INTEGER
• memory_50_60_enum: STRING
• memory_60_70: INTEGER
• memory_60_70_enum: STRING
• memory_70_80: INTEGER
• memory_70_80_enum: STRING
• memory_80_90: INTEGER
• memory_80_90_enum: STRING
• memory_90_100: INTEGER
• memory_90_100_enum: STRING
• percent_effective_servers: INTEGER
• percent_effective_servers_enum: STRING
• percent_effective_cpu: INTEGER
• percent_effective_cpu_enum: STRING
• percent_effective_memory: INTEGER
• percent_effective_memory_enum: STRING
• number_vms: INTEGER
• number_vms_enum: STRING
• number_vms_on: INTEGER
• number_vms_on_enum: STRING
• datacenter_moref: STRING
• datacenter_moref_enum: STRING
• cluster_moref: STRING
• cluster_moref_enum: STRING
• datastores_total_space: INTEGER
• datastores_total_space_enum: STRING
• datastores_total_free_space: INTEGER
• datastores_total_free_space_enum: STRING
• nodeid: STRING
• servers_in_maintenance_mode: INTEGER
• servers_in_maintenance_mode_enum: STRING
• total_vm_configured_memory: REAL
• total_vm_configured_memory_enum: STRING
• total_vm_provisioned_space: REAL
• total_vm_provisioned_space_enum: STRING
• physical_nics: INTEGER
• physical_nics_enum: STRING
• physical_nics_down: INTEGER
• physical_nics_down_enum: STRING

For events that are generated by situations in the Datacenters attribute group, events are sent by using the ITM_KVM_DATACENTERS event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• datacenter: STRING
• total_servers: INTEGER
• total_servers_enum: STRING
• effective_servers: INTEGER
• effective_servers_enum: STRING
• percent_effective_servers: REAL
• percent_effective_servers_enum: STRING
• total_memory: INTEGER
• total_memory_enum: STRING
• effective_memory: INTEGER
• effective_memory_enum: STRING
• memory_utilization: REAL
• memory_utilization_enum: STRING
• total_cpu: INTEGER
• total_cpu_enum: STRING
• effective_cpu: INTEGER
• effective_cpu_enum: STRING
• cpu_utilization: REAL
For events that are generated by situations in the Datastore Cluster attribute group, events are sent by using the ITM_KVM_DATASTORE_CLUSTER event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- datacenter: STRING
- datacenter_enum: STRING
- datastore_cluster: STRING
- datastore_cluster_enum: STRING
- config_status: STRING
- config_status_enum: STRING
- overall_status: STRING
- overall_status_enum: STRING
- default_intravm_affinity: INTEGER
- default_intravm_affinity_enum: STRING
- io_load_balance_enabled: INTEGER
- io_load_balance_enabled_enum: STRING
- load_balance_interval: INTEGER
- load_balance_interval_enum: STRING
- datastore_count: INTEGER
- datastore_count_enum: STRING

For events that are generated by situations in the Datastore Host Disks attribute group, events are sent by using the ITM_KVM_DATASTORE_HOST_DISKS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- datacenter: STRING
- datacenter_enum: STRING
- host: STRING
- host_enum: STRING
- datastore: STRING
- datastore_enum: STRING
- disk: STRING
- disk_enum: STRING
- nodeid: STRING

For events that are generated by situations in the Datastore Topology attribute group, events are sent by using the ITM_KVM_DATASTORE_TOPOLOGY event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- nodename: STRING
- nodeid: STRING
For events that are generated by situations in the Datastores attribute group, events are sent by using the ITM_KVM_DATASTORES event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- name: STRING
- name_enum: STRING
- datacenter: STRING
- datacenter_enum: STRING
- type: STRING
- type_enum: STRING
- overall_status: STRING
- overall_status_enum: STRING
- accessible: INTEGER
- accessible_enum: STRING
- remote_host_address: STRING
- remote_host_address_enum: STRING
- remote_path: STRING
- remote_path_enum: STRING
- url: STRING
- url_enum: STRING
- capacity: INTEGER
- capacity_enum: STRING
- used_space: INTEGER
- used_space_enum: STRING
- free_space: INTEGER
- free_space_enum: STRING
- percent_used: INTEGER
- percent_used_enum: STRING
- percent_free: INTEGER
- percent_free_enum: STRING
- maximum_file_size: INTEGER
- maximum_file_size_enum: STRING
- connected_hosts: INTEGER
- connected_hosts_enum: STRING
- connected_vms: INTEGER
- connected_vms_enum: STRING
• connected_clusters: INTEGER
• connected_clusters_enum: STRING
• msn: STRING
• msn_enum: STRING
• total_read_kbps: INTEGER
• total_read_kbps_enum: STRING
• total_write_kbps: INTEGER
• total_write_kbps_enum: STRING
• total_io_kbps: INTEGER
• total_io_kbps_enum: STRING
• datastore_moref: STRING
• datastore_moref_enum: STRING
• netapp_volume_name: STRING
• netapp_volume_name_enum: STRING
• overcommitted: INTEGER
• overcommitted_enum: STRING
• percent_overcommitted: REAL
• percent_overcommitted_enum: STRING
• nodeid: STRING
• snapshot_storage_consumed: REAL
• snapshot_storage_consumed_enum: STRING
• percent_snapshot_storage_consumed: REAL
• percent_snapshot_storage_consumed_enum: STRING
• datastore_cluster: STRING
• datastore_cluster_enum: STRING

For events that are generated by situations in the Director attribute group, events are sent by using the ITM_KVM_DIRECTOR event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• directorserver: STRING
• directorport: STRING
• usetepcredential: STRING

For events that are generated by situations in the Distributed Virtual Portgroups attribute group, events are sent by using the ITM_KVM_DISTRIBUTED_VIRTUAL_PORTGROUPS event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• datacenter: STRING
• datacenter_enum: STRING
• switch_name: STRING
• switch_name_enum: STRING
• portgroup_name: STRING
• portgroup_name_enum: STRING
• overall_status: STRING
• overall_status_enum: STRING
• type: STRING
• type_enum: STRING
• blocked: STRING
• blocked_enum: STRING
• inbound_shaping_enabled: STRING
• inbound_shaping_enabled_enum: STRING
• inbound_shaping_average_bandwidth: INTEGER
• inbound_shaping_average_bandwidth_enum: STRING
• inbound_shaping_burst_size: INTEGER
• inbound_shaping_burst_size_enum: STRING
• inbound_shaping_peak_bandwidth: INTEGER
• inbound_shaping_peak_bandwidth_enum: STRING
• outbound_shaping_enabled: STRING
• outbound_shaping_enabled_enum: STRING
• outbound_shaping_average_bandwidth: INTEGER
• outbound_shaping_average_bandwidth_enum: STRING
• outbound_shaping_burst_size: INTEGER
• outbound_shaping_burst_size_enum: STRING
• outbound_shaping_peak_bandwidth: INTEGER
• outbound_shaping_peak_bandwidth_enum: STRING
• vlan_type: STRING
• vlan_type_enum: STRING
• vlan_id: INTEGER
• vlan_id_enum: STRING

For events that are generated by situations in the Distributed Virtual Switches attribute group, events are sent by using the ITM_KVM_DISTRIBUTED_VIRTUAL_SWITCHES event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• datacenter: STRING
• datacenter_enum: STRING
• switch_name: STRING
• switch_name_enum: STRING
• overall_status: STRING
• overall_status_enum: STRING
• number_of_portgroups: INTEGER
• number_of_portgroups_enum: STRING
• number_of_uplinks: INTEGER
• number_of_uplinks_enum: STRING
• number_of_hosts: INTEGER
• number_of_hosts_enum: STRING
• number_of_vms: INTEGER
• number_of_vms_enum: STRING
• number_of_ports: INTEGER
For events that are generated by situations in the Distributed Virtual Uplinks attribute group, events are sent by using the ITM_KVM_DISTRIBUTED_VIRTUAL_UPLINKS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- datacenter: STRING
- datacenter_enum: STRING
- switch_name: STRING
- switch_name_enum: STRING
- portgroup_name: STRING
- portgroup_name_enum: STRING
- uplink_name: STRING
- uplink_name_enum: STRING
- overall_status: STRING
- overall_status_enum: STRING
- component_state: STRING
- component_state_enum: STRING
- host_system: STRING
- host_system_enum: STRING
- nic: STRING
- nic_enum: STRING
- transmitted: INTEGER
- transmitted_enum: STRING
- received: INTEGER
- received_enum: STRING
- usage: INTEGER
- usage_enum: STRING
- link_status: STRING
- link_status_enum: STRING
- link_speed: INTEGER
- link_speed_enum: STRING
- duplex: STRING
- duplex_enum: STRING
- subnode_msn: STRING
- subnode_msn_enum: STRING
- link_utilization: REAL
For events that are generated by situations in the ESX Performance Object Status attribute group, events are sent by using the ITM_KVM_ESX_PERFORMANCE_OBJECT_STATUS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- query_name: STRING
- object_name: STRING
- object_type: INTEGER
- object_type_enum: STRING
- object_status: INTEGER
- object_status_enum: STRING
- error_code: INTEGER
- error_code_enum: STRING
- last_collection_start: STRING
- last_collection_start_enum: STRING
- last_collection_finished: STRING
- last_collection_finished_enum: STRING
- last_collection_duration: REAL
- average_collection_duration: REAL
- average_collection_duration_enum: STRING
- refresh_interval: INTEGER
- number_of_collections: INTEGER
- cache_hits: INTEGER
- cache_misses: INTEGER
- cache_hit_percent: REAL
- intervals_skipped: INTEGER

For events that are generated by situations in the Events attribute group, events are sent by using the ITM_KVM_EVENTS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- source_hostname: STRING
- source_hostname_enum: STRING
- event_seq_number: INTEGER
- event_seq_number_enum: STRING
- userid: STRING
- userid_enum: STRING
- event_time: STRING
- event_time_enum: STRING
- event: STRING
- event_enum: STRING
- compute_resource: STRING
- compute_resource_enum: STRING
- datacenter: STRING
For events that are generated by situations in the Monitored Servers attribute group, events are sent by using the ITM_KVM_MONITORED_SERVERS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- subnode_msn: STRING
- subnode_affinity: STRING
- subnode_type: STRING
- subnode_resource_name: STRING
- subnode_version: STRING

For events that are generated by situations in the Networked Servers attribute group, events are sent by using the ITM_KVM_NETWORKED_SERVERS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- datacenter: STRING
- datacenter_enum: STRING
- network: STRING
- network_enum: STRING
- switch: STRING
- switch_enum: STRING
- server_hostname: STRING
- server_hostname_enum: STRING
- transmitted: INTEGER
- transmitted_enum: STRING
- received: INTEGER
- received_enum: STRING
For events that are generated by situations in the Networked Virtual Machines attribute group, events are sent by using the ITM_KVM_NETWORKED_VIRTUAL_MACHINES event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- datacenter: STRING
- datacenter_enum: STRING
- network: STRING
- network_enum: STRING
- switch: STRING
- switch_enum: STRING
- server_hostname: STRING
- server_hostname_enum: STRING
- virtual_machine: STRING
- virtual_machine_enum: STRING
- vm_nic: STRING
- vm_nic_enum: STRING
- transmitted: INTEGER
- transmitted_enum: STRING
- received: INTEGER
- received_enum: STRING
- usage: INTEGER
- usage_enum: STRING
- subnode_msn: STRING
- subnode_msn_enum: STRING

For events that are generated by situations in the Networked Virtual Switches attribute group, events are sent by using the ITM_KVM_NETWORKED_VIRTUAL_SWITCHES event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- datacenter: STRING
- datacenter_enum: STRING
- server_hostname: STRING
- server_hostname_enum: STRING
- switch: STRING
- switch_enum: STRING
- network: STRING
- network_enum: STRING
- number_of_nics: INTEGER
- number_of_nics_enum: STRING
• transmitted: INTEGER
• transmitted_enum: STRING
• received: INTEGER
• received_enum: STRING
• usage: INTEGER
• usage_enum: STRING
• subnode_msn: STRING
• subnode_msn_enum: STRING

For events that are generated by situations in the Networks attribute group, events are sent by using the ITM_KVM_NETWORKS event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• datacenter: STRING
• datacenter_enum: STRING
• network: STRING
• network_enum: STRING
• overall_status: STRING
• overall_status_enum: STRING
• network_type: STRING
• network_type_enum: STRING
• number_of_hosts: INTEGER
• number_of_hosts_enum: STRING
• number_of_vms: INTEGER
• number_of_vms_enum: STRING
• distributed_switch: STRING
• distributed_switch_enum: STRING

For events that are generated by situations in the Performance Object Status attribute group, events are sent by using the ITM_KVM_PERFORMANCE_OBJECT_STATUS event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• query_name: STRING
• object_name: STRING
• object_type: INTEGER
• object_type_enum: STRING
• object_status: INTEGER
• object_status_enum: STRING
• error_code: INTEGER
• error_code_enum: STRING
• last_collection_start: STRING
• last_collection_start_enum: STRING
• last_collection_finished: STRING
• last_collection_finished_enum: STRING
• last_collection_duration: REAL
• average_collection_duration: REAL
• average_collection_duration_enum: STRING
• refresh_interval: INTEGER
• number_of_collections: INTEGER
• cache_hits: INTEGER
• cache_misses: INTEGER
• cache_hit_percent: REAL
• intervals_skipped: INTEGER

For events that are generated by situations in the Resource Pool CPU attribute group, events are sent by using the ITM_KVMRESOURCE_POOL_CPU event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• server_hostname: STRING
• server_hostname_enum: STRING
• parent_name: STRING
• parent_name_enum: STRING
• pool_name: STRING
• pool_name_enum: STRING
• expandable: INTEGER
• expandable_enum: STRING
• limit: INTEGER
• limit_enum: STRING
• reservation: INTEGER
• reservation_enum: STRING
• share_level: STRING
• share_level_enum: STRING
• shares: INTEGER
• shares_enum: STRING
• max_usage: INTEGER
• max_usage_enum: STRING
• cpu_usage: INTEGER
• cpu_usage_enum: STRING
• reservation_used: INTEGER
• reservation_used_enum: STRING
• reservation_used_vm: INTEGER
• reservation_used_vm_enum: STRING
• unreserved: INTEGER
• unreserved_enum: STRING
• unreserved_vm: INTEGER
• unreserved_vm_enum: STRING
• percent_reserved_vms: INTEGER
• percent_reserved_vms_enum: STRING
• percent_overall_usage: INTEGER
• percent_overall_usage_enum: STRING
For events that are generated by situations in the Resource Pool General attribute group, events are sent by using the ITM_KVM_RESOURCE_POOL_GENERAL event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- server_hostname: STRING
- server_hostname_enum: STRING
- parent_name: STRING
- parent_name_enum: STRING
- pool_name: STRING
- pool_name_enum: STRING
- number_vms: INTEGER
- number_vms_enum: STRING
- number_vms_on: INTEGER
- number_vms_on_enum: STRING
- number_child_pools: INTEGER
- number_child_pools_enum: STRING
- cpu_usage: INTEGER
- cpu_usage_enum: STRING
- memory_usage: INTEGER
- memory_usage_enum: STRING
- kvm_status: STRING
- kvm_status_enum: STRING
- nodeid: STRING

For events that are generated by situations in the Resource Pool Memory attribute group, events are sent by using the ITM_KVMRESOURCE_POOL_MEMORY event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- server_hostname: STRING
- server_hostname_enum: STRING
- parent_name: STRING
- parent_name_enum: STRING
- pool_name: STRING
- pool_name_enum: STRING
- expandable: INTEGER
- expandable_enum: STRING
- limit: INTEGER
- limit_enum: STRING
- reservation: INTEGER
- reservation_enum: STRING
- share_level: STRING
- share_level_enum: STRING
For events that are generated by situations in the Server attribute group, events are sent by using the ITM_KVM_SERVER event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- server_hostname: STRING
- server_hostname_enum: STRING
- system_up_time: INTEGER
- system_up_time_enum: STRING
- connection_state: STRING
- connection_state_enum: STRING
- product: STRING
- product_enum: STRING
- build_number: STRING
- build_number_enum: STRING
- version: STRING
- version_enum: STRING
- vmotion_enabled: STRING
- vmotion_enabled_enum: STRING
- overall_status: STRING
- overall_status_enum: STRING
- number_vms: INTEGER
- number_vms_enum: STRING
- number_vms_on: INTEGER
- number_vms_on_enum: STRING
- physical_cpus: INTEGER
- physical_cpus_enum: STRING
- nics: INTEGER
- nics_enum: STRING
- physical_memory: INTEGER
- physical_memory_enum: STRING
- overall_cpu_util: INTEGER
- overall_cpu_util_enum: STRING
- overall_memory_util: INTEGER
- overall_memory_util_enum: STRING
- avg_vm_cpu_percent_rdy: REAL
- avg_vm_cpu_percent_rdy_enum: STRING
- uuid: STRING
- uuid_enum: STRING
- datacenter: STRING
- datacenter_enum: STRING
- datacenter_enum: STRING
- datacenter_moref: STRING
- datacenter_moref_enum: STRING
- total_cpu_mhz: INTEGER
- total_cpu_mhz_enum: STRING
- cluster: STRING
- cluster_enum: STRING
- datastore_space: INTEGER
- datastore_space_enum: STRING
- used_datastore: INTEGER
- used_datastore_enum: STRING
- maintenance_mode: INTEGER
- maintenance_mode_enum: STRING
- nodeid: STRING
- total_vm_configured_memory: REAL
- total_vm_configured_memory_enum: STRING
- total_vm_provisioned_space: REAL
- total_vm_provisioned_space_enum: STRING
- fully_qualified_name: STRING
- fully_qualified_name_enum: STRING
- cpu_packages: INTEGER
- cpu_packages_enum: STRING
- processor_family: STRING
- processor_family_enum: STRING
- system_vendor: STRING
- system_vendor_enum: STRING
- system_model: STRING
- system_model_enum: STRING
- bios_date: STRING
- bios_date_enum: STRING
- hyperthreading_enabled: INTEGER
For events that are generated by situations in the Server CPU attribute group, events are sent by using the ITM_KVM_SERVER_CPU event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- server_hostname: STRING
- server_hostname_enum: STRING
- cpu_number: INTEGER
- cpu_number_enum: STRING
- cpu_utilization: INTEGER
- cpu_utilization_enum: STRING
- nodeid: STRING
- core_utilization: REAL
- core_utilization_enum: STRING

For events that are generated by situations in the Server DataStore attribute group, events are sent by using the ITM_KVM_SERVER_DATASTORE event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
server_hostname: STRING
server_hostname_enum: STRING
name: STRING
name_enum: STRING
free_space: INTEGER
free_space_enum: STRING
used_space: INTEGER
used_space_enum: STRING
maximum_file_size: INTEGER
maximum_file_size_enum: STRING
capacity: INTEGER
capacity_enum: STRING
percent_used: INTEGER
percent_used_enum: STRING
percent_free: INTEGER
percent_free_enum: STRING
type: STRING
type_enum: STRING
datastore_moref: STRING
datastore_moref_enum: STRING
datacenter: STRING
datacenter_enum: STRING
overall_status: STRING
overall_status_enum: STRING
nodeid: STRING
read_latency: INTEGER
read_latency_enum: STRING
write_latency: INTEGER
write_latency_enum: STRING

For events that are generated by situations in the Server Disk attribute group, events are sent by using the ITM_KVM_SERVER_DISK event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- server_hostname: STRING
- server_hostname_enum: STRING
disk_name: STRING
disk_name_enum: STRING
read: INTEGER
read_enum: STRING
write: INTEGER
write_enum: STRING
number_read: INTEGER
number_read_enum: STRING
number_write: INTEGER
For events that are generated by situations in the Server HBA attribute group, events are sent by using the ITM_KVM_SERVER_HBA event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
• server_hostname: STRING
• server_hostname_enum: STRING
• bus: INTEGER
• bus_enum: STRING
• device: STRING
• device_enum: STRING
• driver: STRING
• driver_enum: STRING
• model: STRING
• model_enum: STRING
• pci_id: STRING
• pci_id_enum: STRING
• kvm_status: STRING
• kvm_status_enum: STRING
• nodeid: STRING
• read: INTEGER
• read_enum: STRING
• write: INTEGER
• write_enum: STRING
• read_latency: INTEGER
• read_latency_enum: STRING
• write_latency: INTEGER
• write_latency_enum: STRING
• speed: INTEGER
• speed_enum: STRING
• current_link_speed: INTEGER
• current_link_speed_enum: STRING
• max_link_speed: INTEGER
• max_link_speed_enum: STRING
• storage_adapter_throughput_usage: INTEGER
• storage_adapter_throughput_usage_enum: STRING
• hba_type: STRING
• hba_type_enum: STRING

For events that are generated by situations in the Server Health attribute group, events are sent by using the ITM_KVM_SERVER_HEALTH event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• server_hostname: STRING
• server_hostname_enum: STRING
• sensor_type: STRING
• sensor_type_enum: STRING
• sensor_name: STRING
• sensor_name_enum: STRING
• sensor_status: STRING
For events that are generated by situations in the Server Memory attribute group, events are sent by using the ITM_KVM_SERVER_MEMORY event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- server_hostname: STRING
- server_hostname_enum: STRING
- physical_memory: INTEGER
- physical_memory_enum: STRING
- memory_usage: INTEGER
- memory_usage_enum: STRING
- service_console: INTEGER
- service_console_enum: STRING
- memory_utilization: INTEGER
- memory_utilization_enum: STRING
- active_memory: INTEGER
- active_memory_enum: STRING
- granted_memory: INTEGER
- granted_memory_enum: STRING
- swap_used: INTEGER
- swap_used_enum: STRING
- free_memory: INTEGER
- free_memory_enum: STRING
- balloon_used: INTEGER
- balloon_used_enum: STRING
- swap_in_rate: INTEGER
- swap_in_rate_enum: STRING
- swap_out_rate: INTEGER
- swap_out_rate_enum: STRING
- swap_total_rate: INTEGER
- swap_total_rate_enum: STRING
- nodeid: STRING
- active_write: INTEGER
- active_write Enum: STRING
- swap_in_rate_host_cache: INTEGER
- swap_in_rate_host_cache_enum: STRING
- swap_out_rate_host_cache: INTEGER
- swap_out_rate_host_cache_enum: STRING
- low_free_threshold: INTEGER
• low_free_threshold_enum: STRING
• granted_max_memory: INTEGER
• granted_max_memory_enum: STRING
• granted_min_memory: INTEGER
• granted_min_memory_enum: STRING

For events that are generated by situations in the Server Network attribute group, events are sent by using the ITM_KVM_SERVER_NETWORK event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• server_hostname: STRING
• server_hostname_enum: STRING
• nic_name: STRING
• nic_name_enum: STRING
• usage: INTEGER
• usage_enum: STRING
• transmitted: INTEGER
• transmitted_enum: STRING
• received: INTEGER
• received_enum: STRING
• pkts_received: INTEGER
• pkts_received_enum: STRING
• pkts_transmitted: INTEGER
• pkts_transmitted_enum: STRING
• kvm_status: STRING
• kvm_status_enum: STRING
• link_speed: INTEGER
• link_speed_enum: STRING
• duplex: STRING
• duplex_enum: STRING
• virtual_switch: STRING
• virtual_switch_enum: STRING
• link_utilization: REAL
• link_utilization_enum: STRING
• nodeid: STRING
• datacenter: STRING
• datacenter_enum: STRING
• cluster: STRING
• cluster_enum: STRING
• transmit_pkts_dropped: INTEGER
• transmit_pkts_dropped_enum: STRING
• receive_pkts_dropped: INTEGER
• receive_pkts_dropped_enum: STRING
• pkts_dropped: INTEGER
• pkts_dropped_enum: STRING
• physical_addr: STRING
• physical_addr_enum: STRING

For events that are generated by situations in the Server SAN attribute group, events are sent by using the ITM_KVM_SERVER_SAN event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• disk_name: STRING
• disk_name_enum: STRING
• datastore: STRING
• datastore_enum: STRING
• paths: INTEGER
• paths_enum: STRING
• broken_paths: INTEGER
• broken_paths_enum: STRING
• disabled_paths: INTEGER
• disabled_paths_enum: STRING
• path_selection_policy: STRING
• path_selection_policy_enum: STRING
• nodeid: STRING

For events that are generated by situations in the Server Virtual Switches attribute group, events are sent by using the ITM_KVM_SERVER_VIRTUAL_SWITCHES event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• datacenter: STRING
• datacenter_enum: STRING
• server_hostname: STRING
• server_hostname_enum: STRING
• switch: STRING
• switch_enum: STRING
• network: STRING
• network_enum: STRING
• number_of_nics: INTEGER
• number_of_nics_enum: STRING
• transmitted: INTEGER
• transmitted_enum: STRING
• received: INTEGER
• received_enum: STRING
• usage: INTEGER
• usage_enum: STRING

For events that are generated by situations in the Server VM Datastore Utilization attribute group, events are sent by using the ITM_KVM_SERVER_VM_DATASTORE_UTILIZATION event class. This event class contains the following slots:
• node: STRING
For events that are generated by situations in the SubNode Events attribute group, events are sent by using the ITM_KVM_SUBNODE_EVENTS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- server_hostname: STRING
- server_hostname_enum: STRING
- event_seq_number: INTEGER
- event_seq_number_enum: STRING
- userid: STRING
- userid_enum: STRING
- event_time: STRING
- event_time_enum: STRING
- event: STRING
- event_enum: STRING
- compute_resource: STRING
- compute_resource_enum: STRING
- datacenter: STRING
- datacenter_enum: STRING
- virtual_machine: STRING
- virtual_machine_enum: STRING
- virtual_machine_uuid: STRING
- virtual_machine_uuuid_enum: STRING
- esx_server_uuuid: STRING
- esx_server_uuid_enum: STRING
- category: STRING
- category_enum: STRING
For events that are generated by situations in the Tasks attribute group, events are sent by using the ITM_KVM_TASKS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- source_hostname: STRING
- source_hostname_enum: STRING
- name: STRING
- name_enum: STRING
- target_entity: STRING
- target_entity_enum: STRING
- kvm_status: STRING
- kvm_status_enum: STRING
- initiated_by: STRING
- initiated_by_enum: STRING
- queue_time: STRING
- queue_time_enum: STRING
- start_time: STRING
- start_time_enum: STRING
- completed_time: STRING
- completed_time_enum: STRING
- target_entity_type: STRING
- target_entity_type_enum: STRING
- error_message: STRING
- error_message_enum: STRING

For events that are generated by situations in the Thread Pool Status attribute group, events are sent by using the ITM_KVM_THREAD_POOL_STATUS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- thread_pool_size: INTEGER
- thread_pool_size_enum: STRING
- thread_pool_max_size: INTEGER
- thread_pool_max_size_enum: STRING
- thread_pool_active_threads: INTEGER
- thread_pool_active_threads_enum: STRING
- thread_pool_avg_active_threads: REAL
- thread_pool_avg_active_threads_enum: STRING

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• thread_pool_min_active_threads: INTEGER
• thread_pool_min_active_threads_enum: STRING
• thread_pool_max_active_threads: INTEGER
• thread_pool_max_active_threads_enum: STRING
• thread_pool_queue_length: INTEGER
• thread_pool_queue_length_enum: STRING
• thread_pool_avg_queue_length: REAL
• thread_pool_avg_queue_length_enum: STRING
• thread_pool_min_queue_length: INTEGER
• thread_pool_min_queue_length_enum: STRING
• thread_pool_max_queue_length: INTEGER
• thread_pool_max_queue_length_enum: STRING
• thread_pool_avg_job_wait: REAL
• thread_pool_avg_job_wait_enum: STRING
• thread_pool_total_jobs: INTEGER
• thread_pool_total_jobs_enum: STRING

For events that are generated by situations in the Topological Events attribute group, events are sent by using the ITM_KVM_TOPOLOGICAL_EVENTS event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• entity_type: STRING
• entity_type_enum: STRING
• event_type: STRING
• event_type_enum: STRING
• host_uuid: STRING
• host_uuid_enum: STRING
• vm_uuid: STRING
• vm_uuid_enum: STRING
• msn: STRING
• msn_enum: STRING
• name: STRING
• name_enum: STRING
• datastore_uuid: STRING
• datastore_uuid_enum: STRING
• server_hostname: STRING
• server_hostname_enum: STRING

For events that are generated by situations in the Topology attribute group, events are sent by using the ITM_KVM_TOPOLOGY event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• nodename: STRING
• nodeid: STRING
• nodetype: STRING
• nodestatus: STRING
For events that are generated by situations in the Triggered Alarms attribute group, events are sent by using the ITM_KVM_TRIGGERED_ALARMS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- datacenter: STRING
- datacenter_enum: STRING
- alarm_status: STRING
- alarm_status_enum: STRING
- alarm_triggered_time: STRING
- alarm_triggered_time_enum: STRING
- alarm_name: STRING
- alarm_name_enum: STRING
- description: STRING
- description_enum: STRING
- triggered_entity: STRING
- triggered_entity_enum: STRING
- affected_entity: STRING
- affected_entity_enum: STRING

For events that are generated by situations in the vCenters attribute group, events are sent by using the ITM_KVM_VCENTERS event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- configured_address: STRING
- fqdn: STRING
- fqdn_enum: STRING
- ip_address: STRING
- ip_address_enum: STRING
- web_services_port: INTEGER
- web_services_port_enum: STRING
- agent_connection: INTEGER
- agent_connection_enum: STRING
- type: STRING
- type_enum: STRING
- inventory_age: REAL
- inventory_age_enum: STRING
- current_cu_execution_time: REAL
- current_cu_execution_time_enum: STRING
- average_cu_execution_time: REAL
For events that are generated by situations in the Virtual Machines attribute group, events are sent by using the ITM_KVM_VIRTUAL_MACHINES event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- vm_name: STRING
- vm_name_enum: STRING
- vm_server_name: STRING
- vm_server_name_enum: STRING
- power_status: STRING
- power_status_enum: STRING
- up_time: INTEGER
- up_time_enum: STRING
- heartbeats: INTEGER
- heartbeats_enum: STRING
- guestos_name: STRING
- guestos_name_enum: STRING
- guest_state: STRING
- guest_state_enum: STRING
- ip_address: STRING
- ip_address_enum: STRING
- kvm_hostname: STRING
- kvm_hostname_enum: STRING
- num_cpus: INTEGER
- num_cpus_enum: STRING
- resource_pool: STRING
- resource_pool_enum: STRING
- memory_size: INTEGER
- memory_size_enum: STRING
- memory_limit: INTEGER
- memory_limit_enum: STRING
- tools_status: STRING
- tools_status_enum: STRING
- vm_os_type: INTEGER
For events that are generated by situations in the Virtual Switches attribute group, events are sent by using the ITM_KVM_VIRTUAL_SWITCHES event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• datacenter: STRING
• datacenter_enum: STRING
• server_hostname: STRING
• server_hostname_enum: STRING
• switch: STRING
• switch_enum: STRING
• number_of_nics: INTEGER
• number_of_nics_enum: STRING
• transmitted: INTEGER
• transmitted_enum: STRING
• received: INTEGER
• received_enum: STRING
• usage: INTEGER
• usage_enum: STRING
• subnode_msn: STRING
• subnode_msn_enum: STRING

For events that are generated by situations in the VM CPU attribute group, events are sent by using the ITM_KVM_VM_CPU event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• vm_name: STRING
• vm_name_enum: STRING
• vm_server_name: STRING
• vm_server_name_enum: STRING
• cpu_number: INTEGER
• cpu_number_enum: STRING
• wait_time: INTEGER
• wait_time_enum: STRING
• used_time: INTEGER
• used_time_enum: STRING
• ready_time: INTEGER
• ready_time_enum: STRING
• sys_time: INTEGER
• sys_time_enum: STRING
• utilization: INTEGER
• utilization_enum: STRING
• percent_rdy: INTEGER
• percent_rdy_enum: STRING
• vm_name_rdy_enum: STRING
• vm_name_rdy_enum: STRING
• user_time: INTEGER
• user_time_enum: STRING
For events that are generated by situations in the VM Datastore Utilization attribute group, events are
sent by using the ITM_KVM_VM_DATASTORE_UTILIZATION event class. This event class contains the
following slots:

- node: STRING
- timestamp: STRING
- name: STRING
- name_enum: STRING
- datacenter: STRING
- datacenter_enum: STRING
- virtual_machine: STRING
- virtual_machine_enum: STRING
- committed: REAL
- committed_enum: STRING
- uncommitted: REAL
- uncommitted_enum: STRING
- provisioned: REAL
- provisioned_enum: STRING
- unshared: REAL
- unshared_enum: STRING
- percent_committed: REAL
- percent_committed_enum: STRING
- total_read_kbps: INTEGER
- total_read_kbps_enum: STRING
- total_write_kbps: INTEGER
- total_write_kbps_enum: STRING
- total_io_kbps: INTEGER
- total_io_kbps_enum: STRING
- nodeid: STRING

For events that are generated by situations in the VM Disk attribute group, events are sent by using the
ITM_KVM_VM_DISK event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- vm_name: STRING
- vm_name_enum: STRING
- vm_server_name: STRING
- vm_server_name_enum: STRING
- description: STRING
- description_enum: STRING
- access: STRING
access_enum: STRING
capacity: INTEGER
capacity_enum: STRING
removable: STRING
removable_enum: STRING
connected: STRING
connected_enum: STRING
vm_hostname: STRING
vm_hostname_enum: STRING
vm_os_type: INTEGER
vm_os_type_enum: STRING
disk_shares: INTEGER
disk_shares_enum: STRING
backing_datastore: STRING
backing_datastore_enum: STRING
nodeid: STRING

For events that are generated by situations in the VM Disk Performance attribute group, events are sent by using the ITM_KVM_VM_DISK_PERFORMANCE event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- virtual_machine: STRING
- virtual_machine_enum: STRING
- disk_name: STRING
- disk_name_enum: STRING
- read: INTEGER
- read_enum: STRING
- write: INTEGER
- write_enum: STRING
- number_read: INTEGER
- number_read_enum: STRING
- number_write: INTEGER
- number_write_enum: STRING
- moref: STRING
- moref_enum: STRING

For events that are generated by situations in the VM Memory attribute group, events are sent by using the ITM_KVM_VM_MEMORY event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- vm_name: STRING
- vm_name_enum: STRING
- vm_server_name: STRING
- vm_server_name_enum: STRING
- total_size: INTEGER
For events that are generated by situations in the VM Network attribute group, events are sent by using the ITM_KVM_VM_NETWORK event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- vm_name: STRING
- vm_name_enum: STRING
- vm_server_name: STRING
- vm_server_name_enum: STRING
For events that are generated by situations in the VM Orphaned Disk attribute group, events are sent by using the ITM_KVM_VM_ORPHANED_DISK event class. This event class contains the following slots:

- node: STRING
- timestamp: STRING
- kvm_source: STRING
- kvm_source_enum: STRING
- datacenter: STRING
- datacenter_enum: STRING
- datastore_cluster: STRING
- datastore_cluster_enum: STRING
- datastore: STRING
- datastore_enum: STRING
- file_path: STRING
- file_path_enum: STRING
- file_size: INTEGER
- file_size_enum: STRING
- last_modified: STRING
- last_modified_enum: STRING
- owner: STRING
• owner_enum: STRING

For events that are generated by situations in the VM Partition attribute group, events are sent by using the ITM_KVM_VM_PARTITION event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• vm_name: STRING
• vm_name_enum: STRING
• vm_server_name: STRING
• vm_server_name_enum: STRING
• description: STRING
• description_enum: STRING
• capacity: INTEGER
• capacity_enum: STRING
• free_space: INTEGER
• free_space_enum: STRING
• used_space: INTEGER
• used_space_enum: STRING
• percent_used: INTEGER
• percent_used_enum: STRING
• percent_free: INTEGER
• percent_free_enum: STRING
• vm_hostname: STRING
• vm_hostname_enum: STRING
• vm_os_type: INTEGER
• vm_os_type_enum: STRING
• nodeid: STRING

For events that are generated by situations in the VM Snapshot attribute group, events are sent by using the ITM_KVM_VM_SNAPSHOT event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING

For events that are generated by situations in the VM SnapshotFileLayout attribute group, events are sent by using the ITM_KVM_VM_SNAPSHOTFILELAYOUT event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING

For events that are generated by situations in the VM Snapshots attribute group, events are sent by using the ITM_KVM_VM_SNAPSHOTS event class. This event class contains the following slots:
• node: STRING
• timestamp: STRING
• snapshot_name: STRING
• snapshot_name_enum: STRING
• vm_name: STRING
• vm_name_enum: STRING
• creation_time: STRING
• creation_time_enum: STRING
• description: STRING
• description_enum: STRING
• vm_state: STRING
• vm_state_enum: STRING
• space_consumed: INTEGER
• space_consumed_enum: STRING
• snapshot_moref: STRING
• snapshot_moref_enum: STRING
Appendix B. Discovery Library Adapter for the VMware VI agent

The Tivoli Management Services Discovery Library Adapter (DLA) discovers resources and relationships, and creates a Discovery Library Book file for the agent.

About the DLA

The Book file follows the Discovery Library IdML schema and is used to populate the Configuration Management Database (CMDB) and Tivoli Business Service Manager products. The Tivoli Management Services DLA discovers VMware Virtual Center resources. For all VMware systems that are active and online at the Tivoli Enterprise Portal Server, information is included in the discovery book for those resources. The Tivoli Management Services DLA discovers active resources. It is run on demand and can be run periodically to discover resources that were not active during previous discoveries.

The DLA discovers VMware Virtual Center components.

More information about DLAs

The following sources contain additional information about using the DLA program with all monitoring agents:

- The IBM Tivoli Monitoring Administrator’s Guide contains information about using the Tivoli Management Services Discovery Library Adapter.
- For information about using a DLA with Tivoli Application Dependency Discovery Manager (TADDM), see the TADDM Information Center (http://publib.boulder.ibm.com/infocenter/tivihelp/v10r1/topic/com.ibm.taddm.doc_7.2/welcome_page/welcome.html).

DLA data model class types represented in CDM

The source application data objects map to classes in the Common Data Model (CDM) for the VMware VI agent.

The following information is provided for each class:

- **CDM class name**
  - Class name for which the agent is providing information

- **Relationships**
  - CDM relationships (hierarchical) between currently identified model objects

- **CDM attributes, agent attributes, descriptions, and examples**
  - CDM and agent attributes that are required to create an instance of a resource, descriptions of the attributes, and examples of the attributes

DLA data model classes for VMware VI agent

Each agent that uses the Discovery Library Adapter has DLA data model classes defined for the agent.

The VMware VI agent has the following Discovery Library Adapter data model classes:

- Virtual Center
- Primary SAP
- IpV4Adress
Virtual Center class

A Virtual Center manages multiple data centers and clusters.

CDM class name

sys.vmware.virtualcenter

Relationships

contains

- Source: kvm-KVMVCENTER.IP_ADDRESS-VirtualCenter
- Target: kvm-KVMVCENTER.IP_ADDRESS-KVMCLUSTRT.DATACENTER-DataCenter
- Example: contains source="kvm-9.42.17.191-VirtualCenter" target="kvm-9.42.17.191-Bld-510-DataCenter"

accessedVia

- Source: kvm-KVMVCENTER.IP_ADDRESS-VirtualCenter
- Target: kvm-KVMVCENTER.IP_ADDRESS-PrimarySAP
- Example: accessedVia source="kvm-9.42.17.191-VirtualCenter" target="kvm-9.42.17.191-PrimarySAP"

CDM attributes, agent attributes, descriptions, and examples

- CDM attribute: KeyName
  Agent attribute: Not applicable (hardcoded value)
  Description: Always Virtual Center, with no quotation marks
  Example: Virtual Center

- CDM attribute: WebServiceHttpPort
  Agent attribute: Not applicable (hardcoded value)
  Description: Port for Web service on HTTP
  Example: 80

- CDM attribute: ManagedSystemName
  Agent attribute: INODES.NODE
  Description: Name of the IBM Tivoli Monitoring component that provides data for the management of the VMware VI agent instance
  Example: kb2kas:ANDREA:VM

- CDM attribute: Label
  Agent attribute: KVMVCENTER.FQDN:80
  Description: String that represents the name of this Virtual Center.
  Example: kb2kas.tivlab.raleigh.ibm.com:80

Primary SAP class

The Primary SAP class represents an IP address and port combination.
CDM class name
net.BindAddress

Relationships
bindsTo
- Source: kvm-KVMVCENTER.IP_ADDRESS-PrimarySAP
- Target: kvm-KVMVCENTER.IP_ADDRESS-IpV4Address
- Example: bindsTo source="kvm-9.42.17.191-PrimarySAP" target="kvm-9.42.17.191-IpV4Address"

bindsAsPrimary
- Source: kvm-KVMVCENTER.IP_ADDRESS-PrimarySAP
- Target: kvm-KVMVCENTER.IP_ADDRESS-IpV4Address
- Example: bindsAsPrimary source="kvm-9.42.17.191-PrimarySAP" target="kvm-9.42.17.191-IpV4Address"

CDM attributes, agent attributes, descriptions, and examples
- CDM attribute: PortNumber
  - Agent attribute: Not applicable (hardcoded value)
  - Description: Web service http port number
  - Example: 80
- CDM attribute: Path
  - Agent attribute: Not applicable (hardcoded value)
  - Description: Path set to (none)
  - Example: (none)

IpV4Adress class
The IpV4Adress class represents the Virtual Center IP V4 address.

CDM class name
net.IpV4Adress

Relationships
This class has no relationships.

CDM attributes, agent attributes, descriptions, and examples
- CDM attribute: StringNotation
  - Agent attribute: KVMVCENTER.IP_ADDRESS
  - Description: IP address in string form
  - Example: 9.42.17.191
- CDM attribute: DotNotation
  - Agent attribute: KVMVCENTER.IP_ADDRESS
  - Description: IPv4 address in string form
  - Example: 9.42.17.191

Fqdn class
The Fqdn class represents the fully qualified domain name (FQDN) attribute of an IpAddress.

CDM class name
net.Fqdn

Relationships
assignedTo
- Source: kvm-KVMVCENTER.IP_ADDRESS-Fqdn
- Target: kvm-KVMVCENTER.IP_ADDRESS-IpV4Address
- Example: assignedTo source="kvm-9.42.17.191-Fqdn" target="kvm-9.42.17.191-IpV4Address"

CDM attributes, agent attributes, descriptions, and examples

- CDM attribute: Fqdn
  Agent attribute: KVMVCENTER.FQDN
  Description: Virtual Center fully qualified domain name (FQDN)
  Example: kb2kas.tivlab.raleigh.ibm.com

Data Center class
The Data Center class represents a grouping of individual ESX hosts or clusters.

CDM class name
sys.VMware.DataCenter

Relationships
contains
- Source: kvm-KVMVCENTER.IP_ADDRESS-KVMCLUSTRT.DATACENTER-DataCenter
- Target: kvm-KVMVCENTER.IP_ADDRESS-KVMCLUSTRT.DATACENTER-KVMCLUSTRT.CN-Cluster
- Example: contains source="kvm-9.42.17.191-Bld-510-DataCenter" target="kvm-9.42.17.191-Bld-510-Cluster E-Cluster"

federates
- Source: kvm-KVMVCENTER.IP_ADDRESS-KVMCLUSTRT.DATACENTER-DataCenter
- Target: kvm-KVMDAG.SN_RES-ESXServer
- Example: federates source="kvm-9.42.17.191-Bld-510-DataCenter" target="kvm-itm64vm6.tivlab.raleigh.ibm.com-ESXServer"

contains
- Source: kvm-KVMVCENTER.IP_ADDRESS-KVMCLUSTRT.DATACENTER-DataCenter
- Target: kvm-KVMVCENTER.IP_ADDRESS-KVMCLUSTRT.DATACENTER-KVMDSSTORES.NAME-DataStore
- Example: contains source="kvm-9.42.17.191-Bld-510-DataCenter" target="kvm-9.42.17.191-Bld-510-itm64vm6:storage1-DataStore"

CDM attributes, agent attributes, descriptions, and examples

- CDM attribute: Name
  Agent attribute: KVMVCLUSTRT.DM
  Description: Unique managed object ID that represents this entity
  Example: datacenter-2

- CDM attribute: Label
  Agent attribute: KVMVCLUSTRT.DATACENTER
  Description: User-specified string that represents the name of this entity, unique relative to its parent (Virtual Center)
  Example: dBld-510

Cluster class
A Cluster is a group of ESX hosts that hierarchically share CPU and memory resources among their virtual machines.

CDM class name
sys.VMware.VMWareCluster

Relationships
federates
- Source: kvm-KVMVCENTER.IP_ADDRESS-KVMCLUSTRT.DATACENTER-KVMCLUSTRT.CN-Cluster
• Target: kvm-KVMDAG_SN.RES-ESXServer
  Example: federates source="kvm-9.42.17.191-Bld-510-Cluster A-Cluster"
          target="kvm-itm64vm2.tivlab.raleigh.ibm.com-ESXServer"

CDM attributes, agent attributes, descriptions, and examples
• CDM attribute: Name
  Agent attribute: KVMVCLUSTRT.DM
  Description: Unique managed object ID that represents this entity
  Example: domain-c455
• CDM attribute: Label
  Agent attribute: KVMVCLUSTRT.CN
  Description: User-specified string that represents the name of this entity, unique relative to
  its parent (Data Center)
  Example: Cluster A

Data store class
A Data Store can be viewed as a storage appliance that serves up storage space for many virtual
machines across multiple physical hosts.

CDM class name
 sys.VMware.VMWareDataStore

Relationships
  basedOn
  • Source: kvm-KVMDAG_SN.RES-KVMSERVROS_NAME-DataStore
  • Target: kvm-KVMVCENTER.IP_ADDRESS-KVMSERVROS.DATACENTER-KVMDSTORES.NAME-DataStore
  • Example: basedOn source="kvm-itm64vm4.tivlab.raleigh.ibm.com-iSCSI Disk 1-DataStore"
          target="kvm-9.42.17.191-Bld-510-iSCSI Disk 1-DataStore"

CDM attributes, agent attributes, descriptions, and examples
• CDM attribute: Name
  Agent attribute: KVMDSTORES.DM
  Description: Unique managed object ID that represents this entity
  Example: datastore-13
• CDM attribute: Label
  Agent attribute: KVMDSTORES.NAME
  Description: User-specified string that represents the name of this entity
  Example: iSCSI Disk 1
• CDM attribute: Type
  Agent attribute: KVMDSTORES.TYPE
  Description: Type of volume (NFS or VMFS)
  Example: VMFS
• CDM attribute: DataStoreURL
  Agent attribute: KVMDSTORES.URL
  Description: Unique locator of the data store. Used for managing virtual disks and data
  stores through virtualdiskmanager, which takes data store path as one of the parameters.
  Example: sanfs://vmfs_uuid:46715901-25a31b06-3cf6-000e0c42b828
• CDM attribute: Capacity
  Agent attribute: KVMDSTORES.CAPACITY
  Description: Storage capacity of the data store
  Example: 476672
• CDM attribute: FreeSpace
  Agent attribute: KVMDSTORES.FREE_SPACE
  Description: Amount of available storage for this data store
Example: 152240

- CDM attribute: IsAccessible
  Agent attribute: KVMDSTORES.ACCESSIBLE
  Description: Connectivity status of this data store
  Example: 1

**ESX Server class**

The ESX Server class represents the core hypervisor where virtual machines are running.

**CDM class name**

sys.VmwareUnitaryComputerSystem

**Relationships**

contains

- Source: kvm-KVMSERVERG.SH-ESXServer
- Target: kvm-KVMDAG.SH_RES-KVMSERVRS.DS.NAME-DataStore
- Example: contains source="kvm-itm64vm4.tivlab.raleigh.ibm.com-ESXServer" target="kvm-itm64vm4.tivlab.raleigh.ibm.com-iSCSI Disk 1-DataStore"

contains

- Source: kvm-KVMSERVERG.SH-ESXServer
- Target: kvm-KVMSERVERG.SH-ESXServer-Memory

**CDM attributes, agent attributes, descriptions, and examples**

- CDM attribute: Name
  Agent attribute: KVMSERVERG.SH
  Description: A name for the computer system as it is commonly known in the datacenter
  Example: itm64vm4.tivlab.raleigh.ibm.com

- CDM attribute: Label
  Agent attribute: KVMSERVERG.SH
  Description: User-specified string used when displaying a managed element
  Example: itm64vm4.tivlab.raleigh.ibm.com

- CDM attribute: UUID
  Agent attribute: KVMSERVERG.UUID
  Description: Attribute to store the UUID (universally unique identifier) of a VMware virtual machine
  Example: 7255E89D-634E-38DB-8D28-D0C083FBDC98

- CDM attribute: SystemBoardUUID
  Agent attribute: KVMSERVERG.UUID
  Description: Burned-in Globally Unique Identifier (GUID) of the motherboard in the computer
  Example: 7255E89D-634E-38DB-8D28-D0C083FBDC98

- CDM attribute: Fqdn
  Agent attribute: KVMSERVERG.SH
  Description: Fully qualified host name of the computer system
  Example: itm64vm4.tivlab.raleigh.ibm.com

- CDM attribute: NumCPUs
  Agent attribute: KVMSERVERG.PC
  Description: Count of CPU instances contained by the computer system
  Example: 4

- CDM attribute: CPUCoresInstalled
Agent attribute: KVMSERVERG.PC
Description: Number of CPUCore instances
Example: 4

• CDM attribute: MemorySize
  Agent attribute: KVMSERVERG.PM (converted to bytes)
  Description: Size of physical memory present in the computer system
  Example: 8588886016

• CDM attribute: ServiceConsoleMemorySize
  Agent attribute: KVMDSTORES.ACCESSIBLE (converted to bytes)
  Description: Amount of memory reserved for the service console
  Example: 285212672

• CDM attribute: VmotionEnabled
  Agent attribute: KVMSERVERG.VE
  Description: Indicates whether VMotion is enabled for this host
  Example: true

• CDM attribute: ManagedSystemName
  Agent attribute: INODESTS.NODE
  Description: Name of the IBM Tivoli Monitoring component that provides data for the
management of the VMware VI agent instance
  Example: VM:kb2kas-itm64vm4.tivlab:ESX

**VMwareESX class**

VMware ESX is the virtualization operating system that supports a virtual infrastructure within a single
physical device, or across multiple physical devices. This operating system currently supports the ability
to run on the x86-compatible platform.

**CDM class name**
sys.VMware.VmwareESX

**Relationships**

runsOn
• Source: kvm-KVMSERVER.G.SH-ESX
• Target: kvm-KVMSERVER.G.SH-ESXServer
• Example: runsOn source="kvm-itm64vm4.tivlab.raleigh.ibm.com-ESX" target="kvm-itm64vm4.tivlab.raleigh.ibm.com-ESXServer"

installedOn
• Source: kvm-KVMSERVER.G.SH-ESX
• Target: kvm-KVMSERVER.G.SH-ESXServer
• Example: installedOn source="kvm-itm64vm4.tivlab.raleigh.ibm.com-ESX" target="kvm-itm64vm4.tivlab.raleigh.ibm.com-ESXServer"

**CDM attributes, agent attributes, descriptions, and examples**

• CDM attribute: Name
  Agent attribute: Not applicable (hardcoded value)
  Description: Name of the operating system
  Example: Vmnnix

• CDM attribute: OSName
  Agent attribute: String representation of the operating system name.
  Description: Not applicable (hardcoded value)
  Example: Vmnnix

• CDM attribute: Label
  Agent attribute: KVMSERVERG.SH
  Description: User-specified string used when displaying a managed element
Example: itm64vm4.tivlab.raleigh.ibm.com

- CDM attribute: OSVersion
  Agent attribute: KVMSERVERG.PRODUCT KVMSERVERG.VERSION build-
  KVMSERVERG.BN
  Description: Raw text representation of the Operating System version, as reported by the
  operating system instance using the operating system-specific command to get the version
  of the operating system.
  Example: VMware ESX Server 3.5.0 build-199239

ESX Server Memory class
The ESX Server Memory class represents the memory configuration of an ESX Server.

CDM class name
sys.Memory

Relationships
This class has no relationships.

CDM attributes, agent attributes, descriptions, and examples

- CDM attribute: MemorySize
  Agent attribute: KVMSERVERG.PM
  Description: Amount of memory reserved
  Example: 8588886016

Virtual Machine class
The Virtual Machine class represents a software implementation of a computer that executes programs
like a physical machine.

CDM class name
DosUnitaryComputerSystem sys.freebsd.
FreeBSDUnitaryComputerSystem sys.linux.LinuxUnitaryComputerSystem
SunSPARCUnitaryComputerSystem sys.windows.
WindowsComputerSystem

Relationships
virtualizes

- Source: kvm-KVMVM_GEN.VSN-KVMVM_GEN.VM_NAME-VirtualMachine
- Target: kvm-KVMVM_GEN.VSN-ESXServer
- Example: virtualizes source="kvm-itm64vm4.tivlab.raleigh.ibm.com-vi4win2k3-
  VirtualMachine" target="kvm-itm64vm4.tivlab.raleigh.ibm.com-ESXServer"

CDM attributes, agent attributes, descriptions, and examples

- CDM attribute: Name
  Agent attribute: KVMVM_GEN.VM_NAME
  Description: Name for the computer system as it is commonly known in the data center
  Example: vi4win2k3

- CDM attribute: Label
  Agent attribute: KVMVM_GEN.VM_NAME
  Description: User-specified string used when displaying a managed element
  Example: vi4win2k3

- CDM attribute: UUID
  Agent attribute: KVMVM_GEN.UUID
  Description: Attribute to store UUID (universally unique identifier) of a VMware virtual
  machine
  Example: 410
• CDM attribute: SystemBoardUUID
  Agent attribute: KVMVM_GEN.UUID
  Description: Burned-in globally unique identifier (GUID) of the motherboard in the computer

• CDM attribute: MemoryLimit
  Agent attribute: KVMVM_GEN.ML
  Description: Maximum memory that can be used by this virtual machine even if more memory or CPU is available in the resource pool
  Example: 1

• CDM attribute: MemoryReservation
  Agent attribute: KVMVM_GEN.MIN_ALLOC
  Description: Memory guaranteed for this virtual machine.
  Example: 0

• CDM attribute: MemorySharedValue
  Agent attribute: KVMVM_GEN.MS0 (MB)
  Description: Actual value of memory shares (used only when level of memory or CPU shares is set to Custom).
  Example: 2560

• CDM attribute: MemorySize
  Agent attribute: KVMVM_GEN.MS0 (converted to bytes)
  Description: Size of physical memory present in the computer system
  Example: Ex - 2684354560

• CDM attribute: CPUSharedValue
  Agent attribute: KVMVM_GEN.CPU_SHARES
  Description: Actual value of CPU shares (used only when level of memory or CPU shares is set to Custom)
  Example: 2000

TMSAgent class
The TMSAgent class represents the Tivoli Management Services agent.

CDM class name
app.TMSAgent

Relationships
This class has no relationships.

CDM attributes, agent attributes, descriptions, and examples
• CDM attribute: ManagedObjectName
  Agent attribute: INODESTS.NODE
  Description: Name of the IBM Tivoli Monitoring component that provides data for the management of the VMware VI agent instance
  Example: p@kb2kas:ANDREA:VM

• CDM attribute: SoftwareVersion
  Agent attribute: INODESTS.VERSION
  Description: Version of the VMware VI agent
  Example: 06.22.01

• CDM attribute: ProductCode
  Agent attribute: INODESTS.PRODUCT
  Description: Product code of the VMware VI agent
  Example: VM

• CDM attribute: Affinity
Agent attribute: INODESTS.AFFINITIES
Description: Affinity of the VMware VI agent
Example: 000100000000000000000000000000000G0003yw0a7

• CDM attribute: Label
  Agent attribute: INODESTS.NODE - VMware
  Description: Label of the VMware VI agent
  Example: kb2kas:ANDREA:VM - VMware
Appendix C. Integration with Tivoli Business Service Manager

VMware VI agent provides data to create, update the status of, and view IBM Tivoli Business Service Manager services.

The Tivoli Management Services Discovery Library Adapter (DLA) and Discovery Library Toolkit provides data for the Tivoli Business Service Manager service models. The Tivoli Integration Facility (EIF) probe updates the status of these services, and you use the Tivoli Enterprise Portal to view the data for the services. To implement the integration of the agent with Tivoli Business Service Manager, perform the integration tasks.

Components for integrating with Tivoli Business Service Manager

The data for integrating with Tivoli Business Service Manager is supplied through the following components: Tivoli Management Services Discovery Library Adapter (DLA) and Discovery Library Toolkit, Tivoli Integration Facility (EIF) probe, and Tivoli Enterprise Portal.

Tivoli Management Services Discovery Library Adapter (DLA) and Discovery Library Toolkit

By using data from the Tivoli Management Services Discovery Library Adapter, you can build Tivoli Business Service Manager service models that include resources monitored by the VMware VI agent.

The DLA files can be imported directly into Tivoli Business Service Manager using the Discovery Library Toolkit or they can be loaded into IBM Tivoli Application Dependency Discovery Manager (TADDM) and then fed into Tivoli Business Service Manager using the Discovery Library Toolkit.

See the following sources for more information about the DLA and Discovery Library Toolkit:

- Resources and relationships that are discovered by the VMware VI agent and included in Tivoli Management Services DLA files: Appendix B, “Discovery Library Adapter for the VMware VI agent,” on page 403
- Using the Tivoli Management Services DLA: IBM Tivoli Monitoring Administrator’s Guide
- Using the Discovery Library Toolkit: Tivoli Business Service Manager Customization Guide

Tivoli Integration Facility (EIF) probe

Situation events detected by the VMware VI agent can update the status of services in Tivoli Business Service Manager.

The situation events are forwarded from IBM Tivoli Monitoring to the Netcool/OMNiBus Probe for the Tivoli Event Integration Facility. The VMware VI agent provides a probe rules file that updates its events with information to identify the affected service in Tivoli Business Service Manager. The EIF probe then forwards the events to the Netcool/OMNiBus ObjectServer. Tivoli Business Service Manager monitors the Netcool/OMNiBus ObjectServer for new events and updates the status of affected services.

See the following sources for more information about event integration:

- Installation (using an existing EIF probe and Netcool/OMNiBus ObjectServer installation or using Tivoli Business Service Manager to install these components): Netcool/OMNiBus Information Center or the Tivoli Business Service Manager Installation Guide.
- Setting up event integration between IBM Tivoli Monitoring, the EIF probe, and the Netcool/OMNiBus ObjectServer: IBM Tivoli Monitoring Installation and Setup Guide.
Configuring the EIF probe to use the VMware VI agent rules file after the EIF probe has been installed and configured for event integration with IBM Tivoli Monitoring: "Configuring the Tivoli Event Integration Facility (EIF) probe to enrich events"

Tivoli Enterprise Portal

You can use the integration of the Tivoli Enterprise Portal with Tivoli Business Service Manager to view the services in the Tivoli Business Service Manager console.

For more detailed examination and analysis, you can easily link from the Tivoli Business Service Manager console to the Tivoli Enterprise Portal to view the data within the VMware VI agent.

 Tasks to integrate the agent with Tivoli Business Service Manager

To integrate the VMware VI agent with Tivoli Business Service Manager, you must install and configure the required components. Then, you can view the data in the Tivoli Integrated Portal.

To integrate the VMware VI agent with Tivoli Business Service Manager and view the data, complete the following tasks:

- Install the Discovery Library Toolkit on the Tivoli Business Service Manager server.
- Configure the Tivoli Event Integration Facility (EIF) probe to enrich VMware VI agent events.
- Create a service in the Tivoli Business Service Manager console that you want to monitor.
- Create a data source mapping for each data source that you want to access within the Tivoli Business Service Manager.
- Configure an additional IBM Tivoli Monitoring web service for each Tivoli Enterprise Portal Server.
- View data in the Tivoli Enterprise Portal for the services that you have created to monitor through Tivoli Business Service Manager.

Installing the Discovery Library Toolkit on the Tivoli Business Service Manager

You must install the Discovery Library Toolkit on the Tivoli Business Service Manager server.

The Discovery Library Toolkit imports data from the DLA files and TADDM, which includes information about the hardware and the applications that are discovered by the source.

See “Installing the Discovery Library Toolkit” in the Tivoli Business Service Manager Installation Guide.

Configuring the Tivoli Event Integration Facility (EIF) probe to enrich events

The Netcool/OMNibus Probe for Tivoli Event Integration Facility (EIF) forwards the VMware VI agent events that are received from IBM Tivoli Monitoring to the Netcool/OMNibus ObjectServer. Tivoli Business Service Manager monitors the Netcool/OMNibus ObjectServer for new events, and updates the status of affected services. The VMware VI agent provides a probe rules include file that updates its events with information to identify the affected service in Tivoli Business Service Manager.

Before you begin

Install and configure the Netcool/OMNibus ObjectServer and EIF probe and set up event integration between IBM Tivoli Monitoring and Netcool/OMNibus.

About this task

To enable event enrichment, configure the EIF probe to use the rules file for the agent.
**Procedure**

1. Locate the VMware VI agent rules file (kvm_tbsm.rules) on a computer system where the VMware VI agent, Tivoli Enterprise Monitoring Server, or Tivoli Enterprise Portal Server is installed. The file is in the following locations:
   - **On Windows systems**
     The file is in the `installdir\cm\TECLIB` directory of the monitoring server, in the `installdir\cnps\TECLIB` directory of the portal server, the `installdir\TMAITM6\EIFLIB` directory of the agent, or the `installdir\TMAITM6_x64\EIFLIB` directory of the agent, where `installdir` is the IBM Tivoli Monitoring or Tivoli Monitoring for Virtual Environments installation directory.
   - **On Linux and UNIX systems**
     The file is in the `installdir/tables/cicatrsq/TECLIB` directory of the monitoring server or in the `installdir/platform/xx/TECLIB` directory of the agent, where `installdir` is the IBM Tivoli Monitoring or Tivoli Monitoring for Virtual Environments directory, `platform` is the architecture directory for the agent, and `xx` is the product code for the agent.

2. Copy the kvm_tbsm.rules file to the following directory on the computer system where the EIF probe is installed:
   - **On Windows systems**
     `%OMNIHOME%\probes\arch`
   - **On UNIX systems**
     `$OMNIHOME/probes/arch`

   Where:

   - **OMNIHOME**
     System-defined variable defining the installation location of Netcool/OMNIbus
   - **arch** Operating system directory where the probe is installed; for example, `solaris2` when running on a Solaris system, and `win32` for a Windows system.

3. Edit the tivoli_eif.rules file and uncomment the include statement for kvm_tbsm.rules. (The tivoli_eif.rules file is located in the same directory as the kvm_tbsm.rules file.) If you are using a version of the tivoli_eif.rules file without an include statement for kvm_tbsm.rules, add the following line after the include statement for itm_event.rules:
   ```
   include "kvm_tbsm.rules"
   ```

4. Restart the EIF probe.

**Creating a service in Tivoli Business Service Manager**

You must create a service in the Tivoli Business Service Manager console for each service that you want to monitor.

To create the services that you want to monitor in the Tivoli Business Service Manager console, see “Configuring services” in the IBM Tivoli Business Service Manager Service Configuration Guide.

**Creating a data source mapping for each data source**

You can create a data source mapping for each data source that you want to access within Tivoli Business Service Manager.

Also, you can create the data fetchers and use the data to create incoming status rules that are populated in your service templates.

For more information, see “Data sources” and “Data fetchers” in the IBM Tivoli Business Service Manager Service Configuration Guide.
Configuring additional IBM Tivoli Monitoring web services
You can configure additional IBM Tivoli Monitoring web services for each Tivoli Enterprise Portal Server.

To configure an additional IBM Tivoli Monitoring web service for each Tivoli Enterprise Portal server, see “Configure TBSM charts” in the IBM Tivoli Business Service Manager Scenarios Guide.

Viewing data in the Tivoli Enterprise Portal
From Tivoli Business Service Manager, you can open the Tivoli Enterprise Portal and view the VMware VI agent.

You can also launch Tivoli Business Service Manager from the Tivoli Enterprise Portal.

For more information about launching applications, see “Launching to and from applications” in the Tivoli Business Service Manager Customization Guide.
Appendix D. Documentation library

Various publications are relevant to the use of the IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI.

For information about how to access and use the publications, see [Using the publications](http://pic.dhe.ibm.com/infocenter/tivihelp/v61r1/topic/com.ibm.itm.doc_6.3/common/using_publications.htm).

To find publications from the previous version of a product, click Previous versions under the name of the product in the Contents pane.

IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI library

The documentation for this agent and other product components is in the [IBM Tivoli Monitoring for Virtual Environments Information Center](http://pic.dhe.ibm.com/infocenter/tivihelp/v61r1/topic/com.ibm.tivoli.itmvs.doc_7.2/welcome_ve72.htm).

One document is specific to the VMware VI agent. The IBM Tivoli Monitoring for Virtual Environments Agent for VMware VI User’s Guide provides agent-specific information for configuring, using, and troubleshooting the VMware VI agent.

The Prerequisites topic in the information center contains information about the prerequisites for each component.

Use the information in the user’s guide for the agent with the Tivoli Enterprise Portal User’s Guide to monitor VMware Virtual Center resources.

Prerequisite publications

To use the information in this publication effectively, you must have some prerequisite knowledge.

See the following publications to gain the required prerequisite knowledge:

- IBM Tivoli Monitoring Administrator’s Guide
- IBM Tivoli Monitoring Agent Builder User’s Guide
- IBM Tivoli Monitoring Command Reference
- IBM Tivoli Monitoring Installation and Setup Guide
- IBM Tivoli Monitoring High Availability Guide for Distributed Systems
- IBM Tivoli Monitoring: Messages
- IBM Tivoli Monitoring Troubleshooting Guide
- IBM Tivoli Monitoring: IBM i OS Agent User’s Guide
- IBM Tivoli Monitoring: Linux OS Agent User’s Guide
- IBM Tivoli Monitoring: UNIX OS Agent User’s Guide
- IBM Tivoli Monitoring: Windows OS Agent User’s Guide
- Tivoli Enterprise Portal User’s Guide
- IBM Tivoli Performance Analyzer User’s Guide
- IBM Tivoli Warehouse Proxy Agent User’s Guide
- IBM Tivoli Warehouse Summarization and Pruning Agent User’s Guide

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Related publications

The publications in related information centers provide useful information.

See the following information centers, which you can find by accessing Tivoli Documentation Central (http://www.ibm.com/tivoli/documentation):

- Tivoli Monitoring
- Tivoli Netcool/OMNIbus
- Tivoli Application Dependency Discovery Manager
- Tivoli Business Service Manager
- Tivoli Common Reporting
- Tivoli Enterprise Console

Other sources of documentation

You can obtain additional technical documentation about monitoring products from other sources.

See the following sources of technical documentation about monitoring products:

- Service Management Connect (SMC)
  For introductory information about SMC, see IBM Service Management Connect (http://www.ibm.com/developerworks/servicemanagement/).
  For information about Tivoli products, see the Application Performance Management community on SMC (http://www.ibm.com/developerworks/servicemanagement/apm/index.html).
  Connect, learn, and share with Service Management professionals. Get access to developers and product support technical experts who provide their perspectives and expertise. You can use SMC for these purposes:
  - Become involved with transparent development, an ongoing, open engagement between external users and developers of Tivoli products where you can access early designs, sprint demos, product roadmaps, and pre-release code.
  - Connect one-on-one with the experts to collaborate and network about Tivoli and Integrated Service Management.
  - Benefit from the expertise and experience of others using blogs.
  - Collaborate with the broader user community using wikis and forums.
- IBM Integrated Service Management Library (http://www.ibm.com/software/brandcatalog/ismlibrary/) is an online catalog that contains integration documentation as well as other downloadable product extensions.
- IBM Redbook publications (http://www.redbooks.ibm.com/) include Redbooks® publications, Redpapers, and Redbooks technotes that provide information about products from platform and solution perspectives.
- Technotes (http://www.ibm.com/support/entry/portal/software), which are found through the IBM Software Support website, provide the latest information about known product limitations and workarounds.
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