IBM Tivoli Monitoring Agent for Network Devices
Version 6.2.2

User's Guide

SC27-8733-00

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Note
Before using this information and the product it supports, read the information in "Notices" on page 185.

This edition applies to version 6.2.2 of IBM Tivoli Monitoring Agent for Network Devices (product number 5724-C04) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Chapter 1. Overview of the agent

The IBM® Tivoli® Monitoring Agent for Network Devices provides you with the capability to monitor network devices. You can also use the agent to take basic actions with the network devices. IBM Tivoli Monitoring is the base software for the Network Devices agent.

IBM Tivoli Monitoring overview

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 181 for complete information about IBM Tivoli Monitoring and the Tivoli Enterprise Portal.

Functions of the monitoring agent

Monitors SNMP-enabled devices
The agent identifies and notifies you of common network problems as reported by SNMP MIB-II-enabled devices.

Network monitoring standards
SNMPv1, SNMPv2c and SNMPv3 MIB-II network monitoring standards.

Data Collection
Historical data collection for further analysis.

Event Notification
Automatic sampling of data and notification when certain conditions occur.

New in this release

For version 6.2.2 of the Network Devices agent, the following enhancements have been made since version 6.2.1.3:

- Additional supported operating systems as listed in the Prerequisites topic for the Network Devices agent in the information center
- New attribute groups
  - Port Forwarding Table: This attribute group displays information about the SNMP Bridge MIB - Port Forwarding Table.

  - Port And IF Details: This attribute group displays port details and the corresponding interface details.
- New Navigator items
  - Interface Data
  - Network Protocol Data
  - Switch Port Data
- New workspaces ()
  - Network Monitor Agent Self Monitoring
  - Interface Statistics
  - Interface Status
  - Interface Data
  - Network Protocol Data
  - Switch Port Data
- New workspace views
  - Systems Detail view: This view, which is under the Monitored Network Devices subnode, provides information about the monitored network devices such as operating system version and vendor details.
- New Take Action commands
  - StartDeviceMonitor: Use this Take Action command to add a new network device for monitoring without reconfiguring the agent.
  - StopDeviceMonitor: Use this Take Action command to stop monitoring the network device without reconfiguring the agent.
- Situations reorganized under new Navigator items ("Predefined situations" on page 125)
- A new script that tests whether the SNMP Bridge MIB is supported on a particular network device

Components of the IBM Tivoli Monitoring environment

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

This IBM 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.

IBM Tivoli Enterprise Console®
The Tivoli Enterprise Console is an optional component that acts as a central collection point for events from a variety of 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 IBM Tivoli Monitoring situations to the Tivoli Enterprise Console component.

IBM Tivoli Netcool/OMNIbus

Tivoli Netcool/OMNIbus is an optional component and an alternative to the Tivoli Enterprise Console. The Netcool/OMNIbus software is a service level management (SLM) system that delivers real-time, centralized monitoring of complex networks and IT domains. The Tivoli Netcool/OMNIbus components work together to collect and manage network event information.

Agent Management Services

You can use IBM Tivoli Monitoring Agent Management Services to manage the Network Devices 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 Network Devices 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 1 or later provides support for Agent Management Services. For more information about Agent Management Services, see the *IBM Tivoli Monitoring Administrator's Guide*, "Agent Management Services" chapter.

User interface options

Installation of the base Tivoli monitoring software and other integrated applications provides a variety of 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 IBM 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 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.

IBM Tivoli Netcool/OMNIbus event list

You can use the event list to monitor and manage alerts. An alert is created when the ObjectServer receives an event, alarm, message, or data item. Each alert is made up of columns (or fields) of information that are held 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.

Data sources

Monitoring agents collect data from specific data sources.

The IBM Tivoli Monitoring Agent for Network Devices collects data from the following sources:

SNMP

SNMP (Simple Network Management Protocol) is the network management protocol used almost exclusively in TCP/IP networks. By using SNMP, you can monitor and control network devices, and manage configurations, statistics collection, performance, and security. This agent supports SNMP V1, V2c, and V3.

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.

Before installing and configuring the agent, make sure your environment meets the requirements for the IBM Tivoli Monitoring Agent for Network Devices. See the Prerequisites topic for the agent in the the IBM Tivoli Monitoring for Virtual Environments information center.

To install and configure the Network Devices agent, use the procedures for installing monitoring agents in the *IBM Tivoli Monitoring Installation and Setup Guide* along with the agent-specific installation and configuration information.

If you are doing a silent installation by using a response file, see that information in the *IBM Tivoli Monitoring Installation and Setup Guide*.

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 6
- "Silent installation of language packs for agents" on page 6

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 following command to create a temporary directory on the computer. Make sure that the full path of the directory does not contain any spaces: `mkdir dir_name`
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 AIX® 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 for agents

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" on page 7.
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.
#  Complete all steps listed below in the response file.
#
#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.
#-----------------------------------------------------------------------------
#-----------------------------------------------------------------------------
#Force silent install mode.
#-----------------------------------------------------------------------------
INSTALLER_UI=silent
#-----------------------------------------------------------------------------
#Run add and update actions.
#-----------------------------------------------------------------------------
CHOSEN_INSTALL_SET=ADDUPD_SET
#-----------------------------------------------------------------------------
#NLS Package Folder, where the NLS Packages exist.
#For Windows:
#   Use the backslash-backslash(\\) as a file separator (for example,
```

```
#C:\\zosgmv\\LCD7-3583-01\\nlspackage).
#For UNIX and Linux:
#   Use the slash-slash (//) as a file separator (for example,
#//installtivoli//lpsilenttest//nlspackage).
#-------------------------------------------------------------------------------
#NLS_PACKAGE_FOLDER=C:\\zosgmv\\LCD7-3583-01\\nlspackage
NLS_PACKAGE_FOLDER=//tmp//LP//nlspackage
#-------------------------------------------------------------------------------
#List the packages to process; both variables are required.
#Each variable requires that full paths are specified.
#Separate multiple entries with a semicolon (;).
#For Windows:
#           Use the backslash-backslash(\\) as a file separator.
#For Unix and Linux:
#           Use the slash-slash (//) as a file separator.
#-------------------------------------------------------------------------------
#PROD_SELECTION_PKG=C:\\zosgmv\\LCD7-3583-01\\nlspackage\\KIP_NLS.nlspkg
#BASE_AGENT_FOUND_PKG_LIST=C:\\zosgmv\\LCD7-3583-01\\nlspackage\\KIP_NLS.nlspkg
PROD_SELECTION_PKG=//tmp//LP//nlspackage//kex_nls.nlspkg;//tmp//LP//nlspackage//
koq_nls.nlspkg
BASE_AGENT_FOUND_PKG_LIST=//tmp//LP//nlspackage//kex_nls.nlspkg;//
tmp//LP//nlspackage//koq_nls.nlspkg
#-------------------------------------------------------------------------------
#List the languages to process.
#Separate multiple entries with semicolons.
#-------------------------------------------------------------------------------
LANG_SELECTION_LIST=pt_BR;fr;de;it;ja;ko;zh_CN;es;zh_TW
```

Agent-specific installation and configuration

In addition to the installation and configuration information in the *IBM Tivoli Monitoring Installation and Setup Guide*, use the agent-specific installation and configuration information to install the Network Devices agent.

Installing the agent on a Linux x86 64-bit system

You can install the Network Devices agent from package IBM Tivoli Monitoring for Virtual Environment V7.2.0.3 on a Linux x86 64-bit system.

About this task

When you install the IBM Tivoli Monitoring for Virtual Environment agents locally on a Linux x86 64-bit system, running the usual installation procedure does not complete the installation successfully. The installer recognizes the target machine as a 64-bit platform; however, the agents are 32-bit. As a result, the expected list of agents is not displayed.

This task helps you successfully install the agent and is applicable to all IBM Tivoli Monitoring for Virtual Environment agents.

Procedure

1. Install the agent on the target machine as usual until you are prompted with Installer initial questions.
2. Enter `6` to select `Other operating systems`.
3. Enter `2` to select `Linux Intel R2.6 R3.0 (32 bit)`.
4. In the prompted list of agents that can be installed on the machine, enter `3` to install the agent.

Configuring the agent by using the GUI

You can use the GUI to configure the Network Devices agent.

About this task

Note: During agent installation, agents can be configured with the default option so that no device will be monitored:

- On Windows systems, the Managed System Configuration window is displayed (Figure 3 on page 11). Do not enter any values in this window. Click **OK** to complete the default agent configuration.
- On Linux systems, select all default values during configuration.

To configure the agent to monitor devices in your environment, use the procedure in this topic.

Procedure

1. In the Navigator tree, right-click **Network Devices Monitoring Agent**; then click **Configure** (Figure 1).

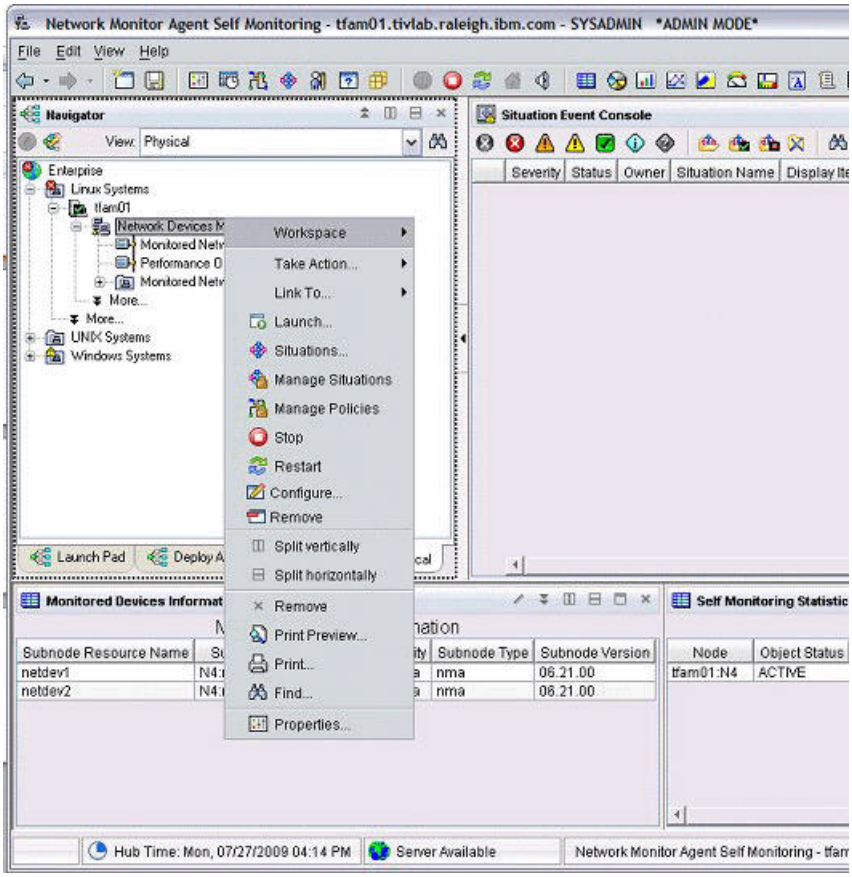

Figure 1. Accessing the Managed System Configuration window

2. In the SNMP Connection Details window, click **Next**.

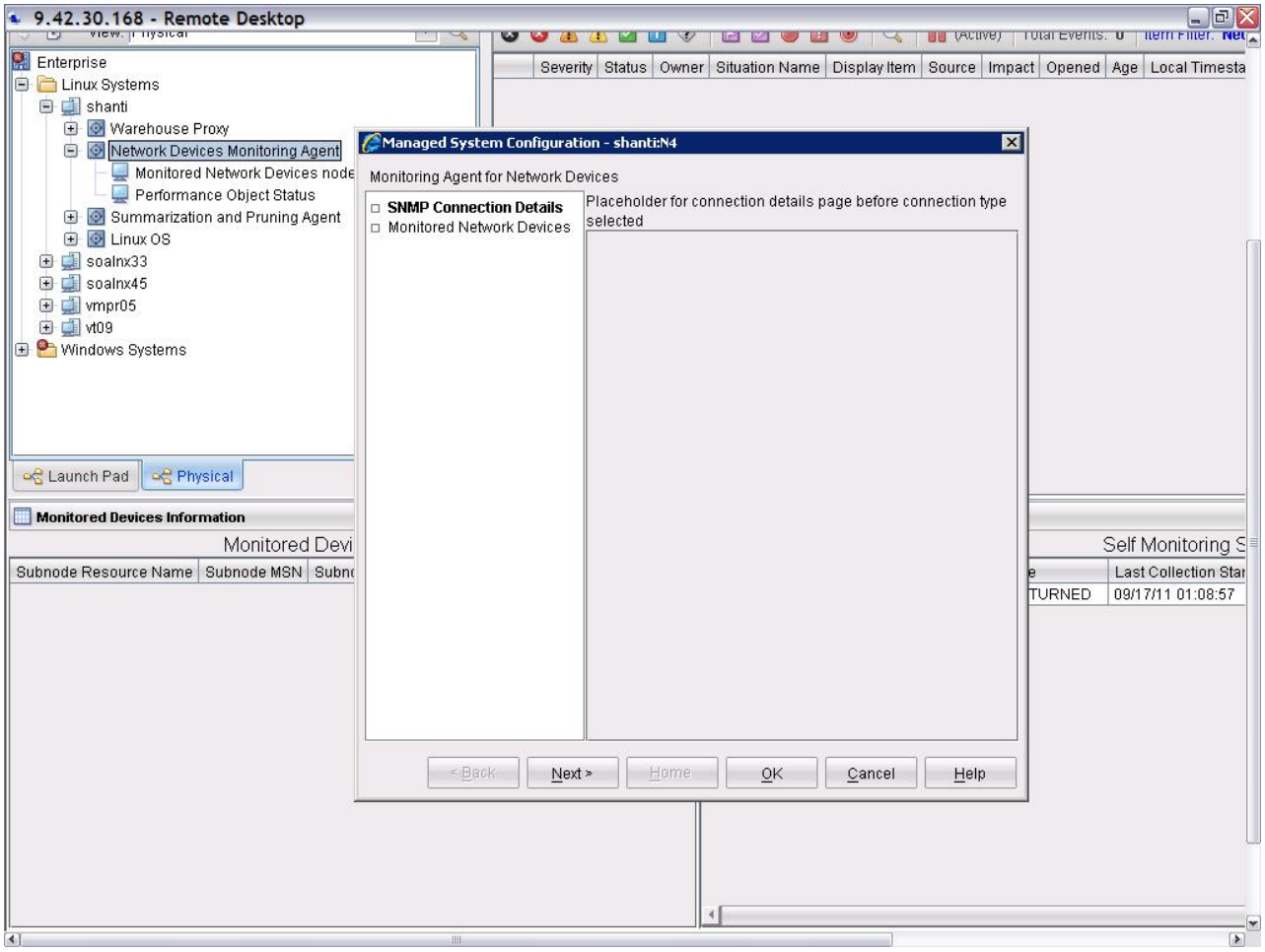

Figure 2. SNMP Connection Details window

3. In the Managed System Configuration window (Figure 3 on page 11), specify the SNMP information for the device to be monitored. The first section that is displayed contains the initial values for all the rest of the sections. If you have a few computers with similar information, enter that information here. Any changes to this first section changes all of the fields, even for subsequent deployments. See "Configuration values" on page 15 for information about each of the fields in the Managed System Configuration window.

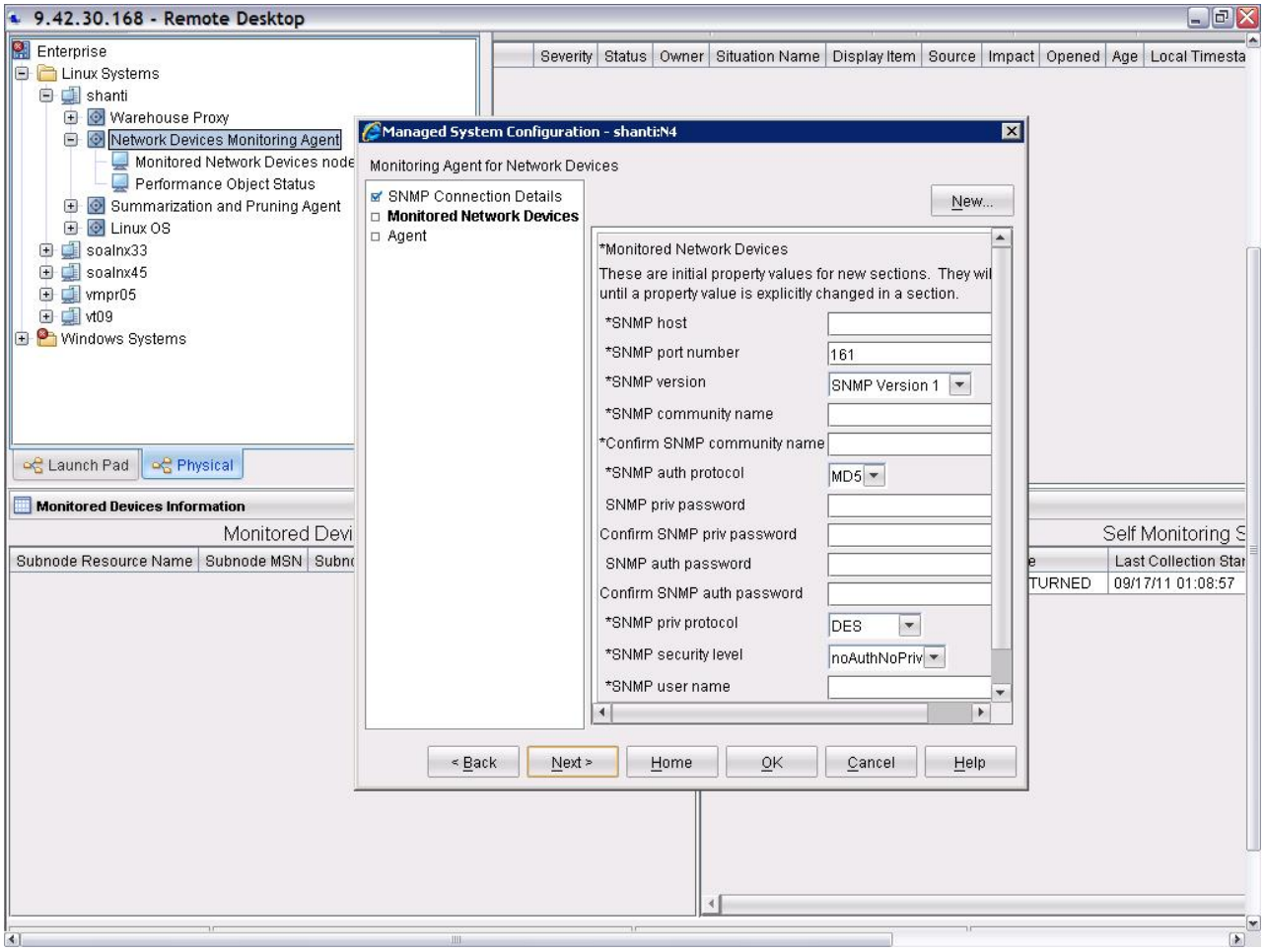

Figure 3. Managed System Configuration window

4. When you have completed the fields in the Managed System Configuration window, click **New**.
5. In the next Managed System Configuration window, click **New** for each new system that you want to monitor. The new sections are initially populated with the data from the first section (Figure 4 on page 12).

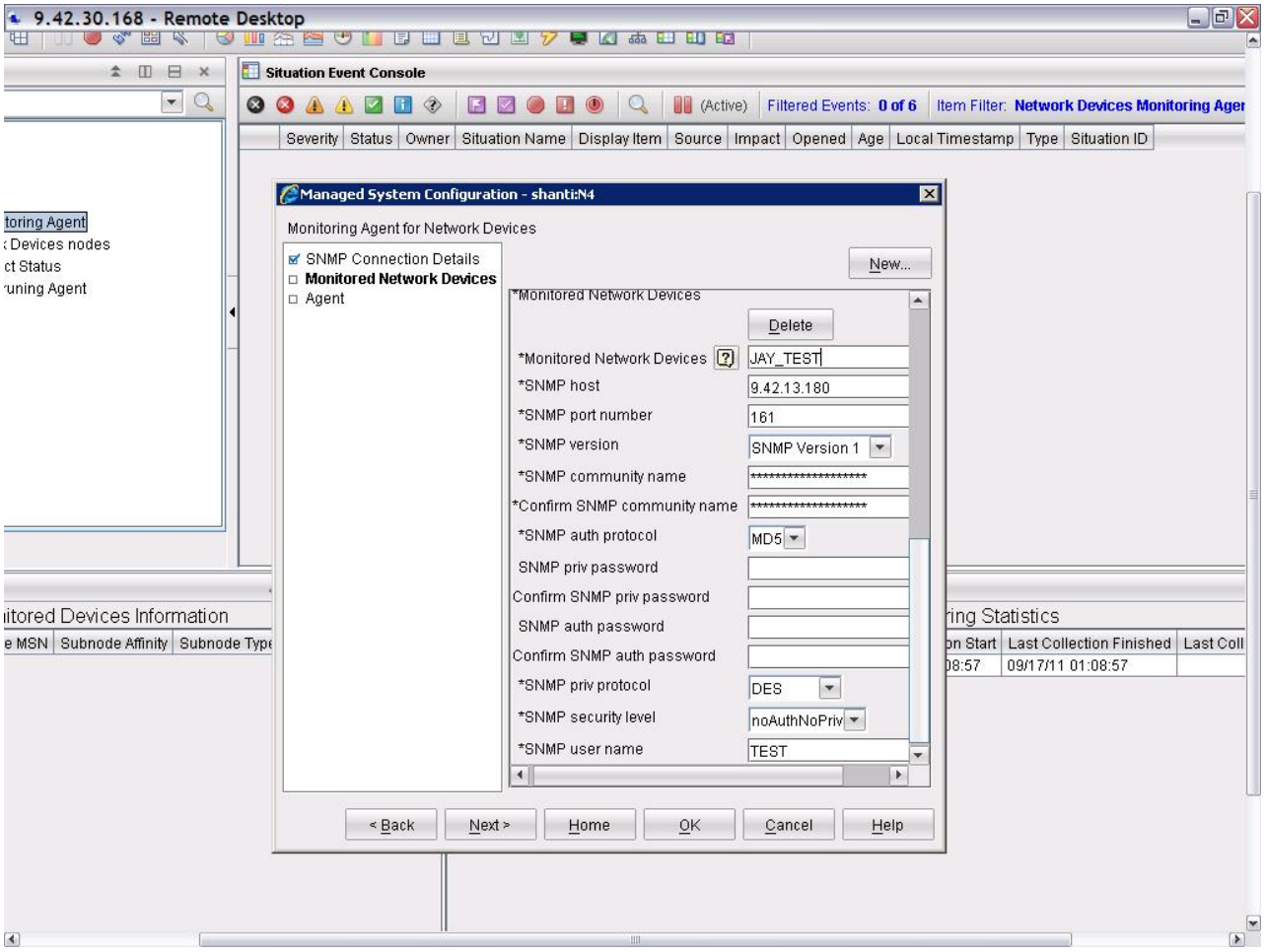

Figure 4. Adding a new system to monitor

6. In the Managed System Configuration window, complete the appropriate fields in all sections. The fields with **bold** titles are required. The value entered in the **Monitored Network Devices** field is displayed under the Monitored Network Devices node in the Navigator tree, and therefore must be unique across all sections in the interface.
7. After you have completed all the sections with the appropriate information, click **OK** to start configuration.
8. When a window confirming the configuration operation is displayed, click **OK** to dismiss the window, or click **View Status Workspace** to access the Deployment Status Summary workspace where you can verify that the configuration is in progress.

What to do next

During the deployment, the Network Monitoring agent is restarted and disabled for a short time. After deployment is complete, an update pending indicator is displayed in the Navigator. Click the indicator to update the Navigator view with the new monitored network device under the target system.

If the wrong credentials are entered, no error is displayed. The agent proceeds as normal, but no data is returned.

After monitoring has been deployed to a device, the device is listed in the Network Agents Currently Deployed table.

Adding a network device using a Take Action command

You can use the StartDeviceMonitor Take Action command to add a new network device for monitoring without reconfiguring the Network Devices agent.

About this task

In addition to the procedure, see "StartDeviceMonitor action" on page 132 for additional information.

Procedure

1. Log on to the Tivoli Enterprise Portal.
2. Right-click **Network Devices Monitoring Agent**, select **Take Action**
3. In the Take Action window **Name** list, select **StartDeviceMonitor**.
4. In the Edit Argument Values window, enter the values for the following mandatory arguments:
   - **Subnode_Resource_Name**

     The name that appears in the Tivoli Enterprise Portal Navigator tree for this network device. The name must be unique across all instances of this agent.
   - **SNMP_Host**

     IP Address of the network device.
   - **SNMP_Community**

     Community string used to connect to the device. SNMP Version 1 is used by default. The following values are permissible: SNMPV1, SNMPV2, or SNMPV3.

Stopping the monitoring of a network device

You can use the StopDeviceMonitor Take Action command to stop monitoring a network device without reconfiguring the Network Devices agent.

About this task

In addition to the procedure, see "StopDeviceMonitor action" on page 135 for additional information.

Procedure

1. Log on to the Tivoli Enterprise Portal.
2. Right-click **Network Devices Monitoring Agent**, select **Take Action**
3. In the Take Action window **Name** list, select **StopDeviceMonitor**.
4. In the Edit Argument Values window, enter the name of the device for which you want to stop monitoring.

Using a script to test support for the SNMP Bridge MIB

A script tests whether the SNMP Bridge MIB is supported on a particular network device.

About this task

This task validates that the target network device can be successfully monitored by the Network Devices agent. Validation of the devices support of the Bridge MIB OIDs is included.

After the agent is installed on a Linux operating system, the **NMA_SNMP_Validate.sh** script is installed in `/opt/IBM/ITM/li6263/n4/bin`, where */opt/IBM/ITM* is the CANDLE_HOME.

On a Windows operating system, the **NMA_SNMP_Validate.bat** script is located under CANDLE_HOME\TMAITM6.

Procedure

On Linux systems, invoke the script by entering **/opt/IBM/ITM/li6263/n4/bin/NMA_SNMP_Validate.sh** or **/NMA_SNMP_Validate.sh** from the directory where the script is located.

Results

Executing the script with no options provides the following information: `shanti:/opt/IBM/ITM/li6263/n4/bin # ./NMA_SNMP_Validate.sh Usage:./NMA_SNMP_Validate.sh IP1:commStr1 [IP2:commStr2] ... ex:./NMA_SNMP_Validate.sh 9.12.12.12:public 9.12.12.13:public1 ...`

Sample scripts

The examples include the script input and output for several cases.

Note: Some vendors use a prefix on the community string to reference virtual LANs (or VLANs) by using the Bridge MIB as shown in the example. This technique is vendor-specific. See the vendor documentation to determine how Vlans are supported for the Bridge MIB.

- **Case 1: Correct VLAN ID and community string is provided**

  ```
  shanti:/opt/IBM/ITM/li6263/n4/bin # ./NMA_SNMP_Validate.sh 9.12.12.12:abcd@400

  SNMP tracer service is ready. 9.12.12.12 SUMMARY(1/1) OK abcd@400 9.12.12.12 OID sysDes
  1.3.6.1.2.1.1.1.0 OK [Cisco IOS Software, C2960 Software (C2960- LANBASEK9-M), Version
  12.2(53)SE1, RELEASE SOFTWARE (fc2) Technical Support: http://www.cisco.com/techsupport
  Copyright (c) 1986-2010 by Cisco Systems, Inc. Compiled Fri 12-Mar-10 17:38 by prod_rel_team]
  9.12.12.12 OID dot1dBasePort 1.3.6.1.2.1.17.1.4.1.1 OK 9.12.12.12 OID dot1dBasePortIfIndex
  1.3.6.1.2.1.17.1.4.1.2 OK 9.12.12.12 OID dot1dTpFdbAddress 1.3.6.1.2.1.17.4.3.1.1 OK
  9.12.12.12 OID dot1dTpFdbPort 1.3.6.1.2.1.17.4.3.1.2 OK 9.12.12.12OID dot1dTpFdbStatus
  1.3.6.1.2.1.17.4.3.1.3 OK
  ```

  This output indicates that the following Bridge MIB - OIDs are accessible and providing data: dot1dTpFdbAddress, dot1dTpFdbPort, and dot1dTpFdbStatus.

- **Case 2: Correct community string is provided but VLAN ID is not provided**

  ```
  shanti:/opt/IBM/ITM/li6263/n4/bin # ./NMA_SNMP_Validate.sh 9.12.12.12:abcd

  SNMP tracer service is ready. 9.12.12.12 SUMMARY(1/1) ERROR t1vl1bn1tr1ck1n 9.12.12.12 OID
  sysDes 1.3.6.1.2.1.1.1.0 OK [Cisco IOS Software, C2960 Software (C2960- LANBASEK9-M), Version
  12.2(53)SE1, RELEASE SOFTWARE (fc2) Technical Support: http://www.cisco.com/techsupport
  Copyright (c) 1986-2010 by Cisco Systems, Inc. Compiled Fri 12-Mar-10 17:38 by prod_rel_team]
  9.12.12.12 OID dot1dBasePort 1.3.6.1.2.1.17.1.4.1.1 OK 9.12.12.12 OID dot1dBasePortIfIndex
  1.3.6.1.2.1.17.1.4.1.2 OK 9.12.12.12 OID dot1dTpFdbAddress 1.3.6.1.2.1.17.4.3.1.1
  NO_DATA_RECEIVED 9.12.12.12 OID dot1dTpFdbPort 1.3.6.1.2.1.17.4.3.1.2 NOT_TESTED 9.12.12.12
  OID dot1dTpFdbStatus 1.3.6.1.2.1.17.4.3.1.3 NOT_TESTED
  ```

  This output indicates that the tool cannot test the Bridge MIB OID because of some missing input. In this case, the VLAN ID has not been provided.

- **Case 3: Community string is incorrect:**

  ```
  shanti:/opt/IBM/ITM/li6263/n4/bin # ./NMA_SNMP_Validate.sh 9.42.13.13:abc
  SNMP tracer service is ready.

  9.42.13.13 SUMMARY(1/1) ERROR abc 9.42.13.13 OID sysDes 1.3.6.1.2.1.1.1.0 ERROR [Timeout]
  9.42.13.13 OID dot1dBasePort 1.3.6.1.2.1.17.1.4.1.1 NOT_TESTED 9.42.13.13 OID
  dot1dBasePortIfIndex 1.3.6.1.2.1.17.1.4.1.2 NOT_TESTED 9.42.13.13 OID dot1dTpFdbAddress
  1.3.6.1.2.1.17.4.3.1.1 NOT_TESTED 9.42.13.13 OID dot1dTpFdbPort 1.3.6.1.2.1.17.4.3.1.2
  NOT_TESTED 9.42.13.13 OID dot1dTpFdbStatus 1.3.6.1.2.1.17.4.3.1.3 NOT_TESTED
  ```

Importing the agent bundle on a Linux x86 64-bit system

You can import the agent bundle on a Linux x86 64-bit system.

About this task

If you run the `/opt/IBM/ITM/bin/tacmd addbundles -i <inst_media>/ITMfVE_Agents/unix` command to import the whole bundle for all agents, the import fails with the following message:

```
Unable to find bundle prerequisite: ci 06.22.04.000 li6263.
```

The import fails because the Network Devices agent has old prerequisites for shared components, including `ax`, `ui`, `gs`, and `jr`. These components are not part of the IBM Tivoli Monitoring for Virtual Environment bundle.

This task helps you successfully import the Network Devices agent bundle. The procedure in this task applies to all agents that have the same problem as the Network Devices agent. The `dsc` file names vary according to different agents.

Procedure

1. Run the `tacmd viewdepot` command to verify whether all prerequisites are already present in your depot. The agent must have the following prerequisites:

   ```
   Product Code : n4
   Deployable : True
   Version : 062200000
   Description : Monitoring Agent for Network Devices
   Host Type : li6263
   Host Version : li6263,lx8266
   Prerequisites: ci:062204000 la:ipaddr05400 gs:074027000 jr:051201000 ui:062204000
   ax:062204000
   ```

2. Add missing prerequisites to your depot by using one of the following options:
   - Retrieve and add missing prerequisites into the depot from other IBM Tivoli Monitoring installation packages.
   - In the `dsc` file, change the level of the components that are required by the agent to match the level delivered with the bundle.

     Because IBM Tivoli Monitoring for Virtual Environment 7.2.0.3 delivers CI component at level 06.30.05.000, you need to change the values in the following rows in file `n4li6263.dsc` as follows:

     ```
     <PrereqProdCode>ci</PrereqProdCode>
     <PrereqVersion>
     <Version>06</Version>
     <Release>30</Release>
     <Mod>05</Mod>
     <Level>000</Level>
     ```

3. Run the `/opt/IBM/ITM/bin/tacmd addbundles -i <inst_media>/ITMfVE_Agents/unix -t <agent code> -n` command to import the agent bundle. The `-n` flag indicates that the prerequisites are ignored.

Configuration values

For both local and remote configuration, you provide the configuration values for the agent to operate.

When you are configuring an agent, a panel is displayed so you can enter each value. When a default value exists, 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 you type are not displayed to help maintain the security of these values.

The configuration for this agent is organized into the following groups:

SNMP Version 2c (KQZ_SNMPV2)
The SNMP version 2c parameters.

The configuration elements defined in this group appear only if the corresponding value is selected in a previous group.

This group defines information that applies to the entire agent.

SNMP community name (SNMP_COMMUNITY)
The SNMP server community name. Use this parameter only with SNMPv2c and SNMPv3.

The type is password.

This value is required.

Default value: None

Monitored Network Devices (nma)
This group represents information about a network device to be monitored.

The configuration elements defined in this group are always present in the agent's configuration.

Use the information in this group to create additional subnodes.

Monitored Network Devices (Monitored Network Devices)
The name that shows in the Tivoli Enterprise Portal Navigator tree for this network device. The value entered in the Monitored Network Devices field is displayed under the Monitored Network Devices node in the Navigator tree, and therefore must be unique across all instances of this agent.

The type is string.

This value is required.

Default value: None

SNMP auth password (SNMP_AUTH_PASSWORD)
The authorization password for connecting to the SNMP agent. If authorization is not being used (the SNMP security level parameter is set to noAuthNoPriv), then this value is ignored. Use this parameter only with SNMPv2c and SNMPv3.

The type is password.

This value is optional.

Default value: None

SNMP auth protocol (SNMP_AUTH_PROTOCOL)
The authorization protocol used to connect to the SNMP agent. If authorization is not being used (both this parameter and the SNMP auth password parameter are used) then this value is ignored. Use this parameter only with SNMPv2c and SNMPv3.

The type is one of the following values: "MD5", "SHA".

This value is required.

Default value: None

SNMP community name (SNMP_COMMUNITY)
The SNMP server community name.

The type is password.

This value is required.

Default value: None

SNMP host (SNMP_HOST)
The fully qualified host name or IPv4 address of the SNMP server.

The type is string.

This value is required.

Default value: None

SNMP port number (SNMP_PORT)
The port number of the SNMP server.

The type is numeric.

This value is required.

Default value: 161

SNMP priv password (SNMP_PRIV_PASSWORD)
The privacy password for connecting to the SNMP agent. If privacy is not being used (the SNMP security level parameter is set to noAuthNoPriv or authNoPriv), then this value is ignored. Use this parameter only with SNMPv2c and SNMPv3.

The type is password.

This value is optional.

Default value: None

SNMP priv protocol (SNMP_PRIV_PROTOCOL)
The privacy protocol used to connect to the SNMP agent. If authorization is not being used (both this parameter and the SNMP priv password parameter are used) then this value is ignored.

The type is one of the following values: "DES", "CBC DES".

This value is required.

Default value: None

SNMP security level (SNMP_SECURITY_LEVEL)
The security level used to connect to the SNMP agent.

The type is one of the following values: "noAuthNoPriv", "authNoPriv", "authPriv".

This value is required.

Default value: None

SNMP user name (SNMP_USER_NAME)
The user name for connecting to the SNMP agent.

The type is string.

This value is required.

Default value: None

SNMP version (SNMP_VERSION)
The SNMP version to use to make the connection.

The type is one of the following values: "SNMP Version 1", "SNMP Version 2c", "SNMP Version 3".

This value is required.

Default value: None

Remote installation and configuration

You can install the monitoring agent remotely from the Tivoli Enterprise Portal or from the command line.

When installing the agent remotely, you must provide the configuration values for the agent to operate. See “Configuration values” on page 15.

To install from the portal, see the *IBM Tivoli Monitoring Installation and Setup Guide*.

To remotely install or configure an agent through the Tivoli Enterprise Portal, you must have installed the application support for that agent (Tivoli Enterprise Monitoring Server, Tivoli Enterprise Portal Server, and Tivoli Enterprise Portal). You must also have installed the agent bundle into the Remote Deploy Depot.

See the "tacmd describeSystemType" section in the *IBM Tivoli Monitoring Command Reference* for information about displaying the configuration options that are available to use with the **configureSystem** or **addSystem** commands.

If you are using the command line, the following command is an example of remote installation and configuration for Windows operating systems:

```
tacmd addSystem -t N4 -n Primary:sample.node.name:NT
-p  KQZ_SNMP_VERSION_DETAILS_PLACEHOLDER.KQZ_SNMP_PLACEHOLDER_TEXT=value
 Monitored Network Devices.Monitored Network Devices=None
 nma.SNMP_AUTH_PASSWORD=value
 nma.SNMP_AUTH_PROTOCOL=value
 nma.SNMP_COMMUNITY=value
 nma.SNMP_HOST=value
 nma.SNMP_PORT=161
 nma.SNMP_PRIV_PASSWORD=value
 nma.SNMP_PRIV_PROTOCOL=value
 nma.SNMP_SECURITY_LEVEL=value
 nma.SNMP_USER_NAME=value
 nma.SNMP_VERSION=value
```

Chapter 3. Workspaces reference

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

About workspaces

Use the Navigator tree that is displayed at the left of the workspace to select the workspace you want to see. As part of the application window, the right side of 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 Agent for Network Devices provides various default workspaces. These workspaces are displayed in the Navigator tree under the following nodes and subnodes for this monitoring agent:

Network Devices (N4 node)
Corresponds to a Network Devices instance and contains agent instance-level workspaces.

Monitored Network Devices (nma subnode)
Contains the network monitored devices.

When a single instance of the monitoring agent is defined on a system, the top-level node is Network Devices - *Instance*::N4. The Network Devices workspace is defined at this node.

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 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 25.

Predefined workspaces

The IBM Tivoli Monitoring Agent for Network Devices provides predefined workspaces, which are organized by Navigator item.

Agent-level navigator items

- Network Devices Navigator item
  - Network Devices workspace
  - Network Monitor Agent Self Monitoring workspace
- Monitored Network Devices nodes Navigator item
  - Monitored Network Devices nodes workspace
- Performance Object Status Navigator item
  - Performance Object Status workspace

Monitored Network Devices (nma) subnode

- Monitored Network Devices Navigator item
  - Monitored Network Devices workspace
  - Interface Statistics workspace
  - Interface Status workspace
- Interface Data Navigator item
  - Interface Data workspace
- Network Protocol Data Navigator item
  - Network Protocol Data workspace
- nma Performance Object Status Navigator item
  - nma Performance Object Status workspace
- Switch Port Data Navigator item
  - Switch Port Data 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.

Network Devices Navigator item

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

Network Devices workspace

The Network Devices workspace contains information that reflects the health of your actively monitored network devices and your Network Devices agent.

This workspace contains the following views:

Situation Event Console

This view displays the situation events reported by all network devices that are being monitored. Each event might indicate a potential network device health problem, and must be reviewed and processed.

Monitored Devices Information

This view lists the network devices actively monitored by the Network Devices agent, and also provides the version of the monitored device.

Self Monitoring Statistics
This view displays the self-monitoring information about the performance of the Network Devices agent. You can find out if the agent has encountered errors, when the last data collection was performed, and how many data collections the agent has performed.

Network Monitor Agent Self Monitoring workspace
The Network Monitor Agent Self-Monitoring workspace is the root workspace of the Network Devices agent. This workspace contains information that reflects the health of your actively monitored network devices and your Network Devices agent.

This workspace contains the following views:

Situation Event Console
This view displays the situation events reported by all network devices that are being monitored. Each event might indicate a potential network device health problem, and must be reviewed and processed.

Monitored Devices Information
This view lists the network devices actively monitored by the Network Devices agent, and also provides the version of the monitored device.

Self Monitoring Statistics
This view displays the self-monitoring information about the performance of the Network Devices agent. You can find out if the agent has encountered errors, when the last data collection was performed, and how many data collections the agent has performed.

Monitored Network Devices nodes Navigator item

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

Monitored Network Devices nodes workspace
This workspace lists all the network devices that are actively monitored by the Network Devices agent.

This workspace contains the following view:

Monitored Network Devices nodes
This view lists the network devices actively monitored by the Network Devices agent, and also provides the version of the monitored device.

Performance Object Status Navigator item

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

Performance Object Status workspace
This workspace displays the overall health of the application.

This workspace contains the following view:

Data Collection Status
Displays the status of the collection of data from the application. Normally this will display NO ERROR indicating that the agent is collecting application data correctly. If some of the agent's other views are empty this view will help isolate the cause of the failure. SNMP objects will display a descriptive name of the MIB object and NO INSTANCES RETURNED if it receives an answer but no instances are present, NO RESPONSE RECEIVED if the the SNMP agent does not answer, AUTHENTICATION FAILED if a version 3 authorization failure occurs, or GENERAL RESPONSE ERROR if the received data has the error flag set.

Monitored Network Devices subnode

This section contains descriptions of predefined workspaces. The workspaces are organized by the Navigator item to which the workspaces are relevant.

Monitored Network Devices Navigator item

Monitored Network Devices workspace

The Monitored Network Devices workspace contains system details of the monitored network device.

This workspace contains the following view:

System Details

This view displays the operating system version and vendor details about the monitored network device.

Interface Statistics workspace

The default workspace for the Monitored Network Devices node is the Interface Statistics workspace. This workspace contains information about the network interfaces in the monitored node. Network interface throughput data is plotted for easy inspection.

This workspace contains the following views:

Current Interface Throughput

This view plots a chart that visualizes interface throughput information. Only interfaces that have an operation status of up (ifOperStatus) are included. Interface bandwidth (ifSpeed) is drawn as a bar chart and additional lines show the inbound packet rate (ifInOctetsPerSec) and the outbound packet rate (ifOutOctetsPerSec) information.

Cumulative Rate of Transmission

This view plots a chart that summarizes the inbound packet rate (ifInOctetsPerSec) and the outbound packet rate (ifOutOctetsPerSec) from all network interfaces.

Interface Statistics Table

This view displays the information about the network interface. All information collected pertaining to the network interface is displayed in the table.

System Details

This view displays operating system version and vendor details about the monitored network device.

Interface Status workspace

The Interface Status workspace displays all network interface performance data with an emphasis on operation status and IP addresses.

This workspace contains the following views:

Interfaces Status

This view displays a chart that shows the number of interfaces that are currently operational and non-operational.

Interface to IP Address Mapping

This view displays a list that shows the mapping between the network interfaces and IP addresses. The net mask and interface type are also displayed.

Interface Status Table

This view displays the information about the network interface. All information collected pertaining to the network interface is displayed in the table.

Interface Data Navigator item

Interface Data workspace

The Interface Data workspace displays information about all the network interfaces.

This workspace contains the following view:

Interface Data

This view displays details about the SNMP IfTable.

Network Protocol Data Navigator item

Network Protocol Data workspace

This workspace contains information about critical SNMP Data Objects that are grouped togther for data and error monitoring.

This workspace contains the following views:

SNMP Data

This view displays details about SNMP Data Object SNMP.

TCP Data

This view displays details about SNMP Data Object TCP.

UDP Data

This view displays details about SNMP Data Object UDP.

IP Data

This view displays details about SNMP Data Object IP.

nma Performance Object Status Navigator item

nma Performance Object Status workspace

This workspace displays the overall health of the application.

This workspace contains the following view:

Data Collection Status

Displays the status of the collection of data from the application. Normally this will display NO ERROR indicating that the agent is collecting application data correctly. If some of the agent's other views are empty this view will help isolate the cause of the failure. SNMP objects will display a descriptive name of the MIB object and NO INSTANCES RETURNED if it receives an answer but no instances are present, NO RESPONSE RECEIVED if the the SNMP agent does not answer, AUTHENTICATION FAILED if a version 3 authorization failure occurs, or GENERAL RESPONSE ERROR if the received data has the error flag set.

Switch Port Data Navigator item

Switch Port Data workspace

The Switch Port Data workspace contains detailed information about the device ports.

This workspace contains the following views:

Port Forwarding Table

This view displays information about the SNMP Bridge-MIB Port Forwarding Table.

Port And IF Details

This view displays information about device port details and the corresponding interface details.

Chapter 4. Attributes reference

Attributes are the application properties that are being measured and reported by the IBM Tivoli Monitoring Agent for Network Devices.

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 have assigned to the situation attributes are compared with the values collected by the Network Devices 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 27.

Attribute groups for the monitoring agent

The IBM Tivoli Monitoring Agent for Network Devices 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: dot1dBasePortTable
  - Table name: KN4DOT1DBA
  - Warehouse table name: KN4_DOT1DBASEPORTTABLE or KN4DOT1DBA
- Attribute group name: IfTable
  - Table name: KN4IFTABLE
  - Warehouse table name: KN4_IFTABLE
- Attribute group name: IfToIpMap
  - Table name: KN4IFTOIPM
  - Warehouse table name: KN4_IFTOIPMAP or KN4IFTOIPM
- Attribute group name: Interfaces

  - Table name: KN4INTERFA
  - Warehouse table name: KN4_INTERFACES or KN4INTERFA
- Attribute group name: IP
  - Table name: KN4IP
  - Warehouse table name: KN4_IP
- Attribute group name: IpAddrTable
  - Table name: KN4IPADDRT
  - Warehouse table name: KN4_IPADDRTABLE or KN4IPADDRT
- Attribute group name: IpRouteTable
  - Table name: KN4IPROUTE
  - Warehouse table name: KN4_IPROUTETABLE or KN4IPROUTE
- Attribute group name: Monitored Network Devices nodes
  - Table name: KN4NMADS
  - Warehouse table name: KN4_MONITORED_NETWORK_DEVICES_NODES or KN4NMADS
- Attribute group name: nma Performance Object Status
  - Table name: KN4NMAPOS
  - Warehouse table name: KN4_NMA_PERFORMANCE_OBJECT_STATUS or KN4NMAPOS
- Attribute group name: Performance Object Status
  - Table name: KN4POBJST
  - Warehouse table name: KN4_PERFORMANCE_OBJECT_STATUS or KN4POBJST
- Attribute group name: Port And IF Details
  - Table name: KN4IFTOIPT
  - Warehouse table name: KN4_PORT_AND_IF_DETAILS or KN4IFTOIPT
- Attribute group name: Port Forwarding Table
  - Table name: KN4DOT1DT0
  - Warehouse table name: KN4_PORT_FORWARDING_TABLE or KN4DOT1DT0
- Attribute group name: SNMP
  - Table name: KN4SNMP
  - Warehouse table name: KN4_SNMP
- Attribute group name: System
  - Table name: KN4SYSTEM
  - Warehouse table name: KN4_SYSTEM
- Attribute group name: Take Action Status
  - Table name: KN4TACTST
  - Warehouse table name: KN4_TAKE_ACTION_STATUS or KN4TACTST
- Attribute group name: TCP
  - Table name: KN4TCP
  - Warehouse table name: KN4_TCP
- Attribute group name: TCPConnTable
  - Table name: KN4TCPCONN
  - Warehouse table name: KN4_TCPCONNTABLE or KN4TCPCONN
- Attribute group name: Thread Pool Status
  - Table name: KN4THPLST
  - Warehouse table name: KN4_THREAD_POOL_STATUS or KN4THPLST
- Attribute group name: UDP

  - Table name: KN4UDP
  - Warehouse table name: KN4_UDP
- Attribute group name: UDPTable
  - Table name: KN4UDPTABL
  - Warehouse table name: KN4_UDPTABLE or KN4UDPTABL

Attributes in each attribute group

Attributes in each IBM Tivoli Monitoring Agent for Network Devices 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
Description, type, and Warehouse name (if 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.

dot1dBasePortTable attribute group

This attribute group contains data gathered from the MIB Object dot1dBasePortTable.

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 dot1dBasePortTable attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

dot1dBasePort attribute - This attribute is a key attribute.

Description
The port number of the port for which this entry contains bridge management information.

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

- Value Exceeds Maximum (2147483647)

- Value Exceeds Minimum (-2147483648)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DOT1DBASEPORT or DOT1DBASE4

dot1dBasePortIfIndex attribute

Description
The value of the instance of the ifIndex object, defined in [4,6], for the interface corresponding to this port.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DOT1DBASEPORTIFINDEX or DOT1DBASE5

IfTable attribute group

This attribute group contains data gathered from the the SNMP Object IfTable.

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 IfTable attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

ifIndex attribute - This attribute is a key attribute.

Description
A unique value for each interface. The value ranges between 1 and the value of ifNumber. The value for each interface must remain constant at least from one re-initialization of the network management system for the entity to the next re-initialization.

Type Integer (32-bit gauge) with enumerated values. The strings are displayed in the

Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINDEX

ifDescr attribute

Description
A text string containing information about the interface. This string must include the name of the manufacturer, the product name, and the version of the interface hardware or software.

Type String

Warehouse name
IFDESCR

ifType attribute

Description
The type of interface. Additional values for ifType are assigned by the Internet Assigned Numbers Authority (IANA) through updating the syntax of the IANAifType textual convention.

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

- other (1)
- regular1822 (2)
- hdh1822 (3)
- ddnX25 (4)
- rfc877x25 (5)
- ethernetCsmacd (6)
- iso88023Csmacd (7)
- iso88024TokenBus (8)
- iso88025TokenRing (9)
- iso88026Man (10)
- starLan (11)
- proteon10Mbit (12)
- proteon80Mbit (13)
- hyperchannel (14)
- fddi (15)
- lapb (16)
- sdlc (17)
- ds1 (18)
- e1 (19)
- basicISDN (20)
- primaryISDN (21)

- propPointToPointSerial (22)
- ppp (23)
- softwareLoopback (24)
- eon (25)
- ethernet3Mbit (26)
- nsip (27)
- slip (28)
- ultra (29)
- ds3 (30)
- sip (31)
- frameRelay (32)
- rs232 (33)
- para (34)
- arcnet (35)
- arcnetPlus (36)
- atm (37)
- miox25 (38)
- sonet (39)
- x25ple (40)
- iso88022llc (41)
- localTalk (42)
- smdsDxi (43)
- frameRelayService (44)
- v35 (45)
- hssi (46)
- hippi (47)
- modem (48)
- aal5 (49)
- sonetPath (50)
- sonetVT (51)
- smdsIcip (52)
- propVirtual (53)
- propMultiplexor (54)
- ieee80212 (55)
- fibre-channel (56)
- hippiInterfaces (57)
- frameRelayInterconnect (58)
- aflane8023 (59)
- aflane8025 (60)
- cctEmul (61)
- fastEther (62)
- isdn (63)
- v11 (64)
- v36 (65)
- g703-64k (66)

- g703-2mb (67)
- qllc (68)
- fastEtherFX (69)
- channel (70)
- iEEE80211 (71)
- ibm370parChan (72)
- eSCON (73)
- dLSw (74)
- iSDNs (75)
- iSDNu (76)
- lapd (77)
- ip-switch (78)
- rsrb (79)
- atm-logical (80)
- ds0 (81)
- ds0Bundle (82)
- bsc (83)
- async (84)
- cnr (85)
- iso88025Dtr (86)
- eplrs (87)
- arap (88)
- propCnls (89)
- hostPad (90)
- termPad (91)
- frameRelayMPI (92)
- x213 (93)
- adsl (94)
- radsl (95)
- sdsl (96)
- vdsl (97)
- iso88025CRFPInt (98)
- myrinet (99)
- voiceEM (100)
- voiceFXO (101)
- voiceFXS (102)
- voiceEncap (103)
- voiceOverIp (104)
- atmDxi (105)
- atmFuni (106)
- atmIma (107)
- pppMultilinkBundle (108)
- ipOverCdlc (109)
- ipOverClaw (110)
- stackToStack (111)

- virtualIpAddress (112)
- mpc (113)
- ipOverAtm (114)
- iso88025Fiber (115)
- tdlc (116)
- gigabitEthernet (117)
- hdlc (118)
- lapf (119)
- v37 (120)
- x25mlp (121)
- x25huntGroup (122)
- transpHdlc (123)
- interleave (124)
- fast (125)
- ip (126)
- docsCableMaclayer (127)
- docsCableDownstream (128)
- docsCableUpstream (129)
- a12MppSwitch (130)
- tunnel (131)
- coffee (132)
- ces (133)
- atmSubInterface (134)
- l2vlan (135)
- l3ipvlan (136)
- l3ipxvlan (137)
- digitalPowerLine (138)
- mediaMailOverIP (139)
- dtm (140)
- dcm (141)
- ipForward (142)
- msdsl (143)
- ieee1394 (144)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFTYPE

ifMtu attribute

Description
The size of the largest packet that can be sent or received on the interface specified in octets. For interfaces that are used for transmitting network datagrams, this size is the largest network datagram that can be sent on the interface.

Type Integer (32-bit gauge) with enumerated values. The strings are displayed in the

Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFMTU

ifSpeed attribute

Description
An estimate of the current bandwidth for the interface in bits per second. For interfaces that do not vary in bandwidth or for interfaces where no accurate estimation can be made, this object must contain the nominal bandwidth.

Type Integer (64-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFSPEED

ifPhysAddress attribute

Description
The address of the interface at the protocol sub-layer. For example, for an 802.x interface, this object typically contains a MAC address. The media-specific MIB for the interface must define the bit and byte ordering and the format of the value of this object.

Type String

Warehouse name
IFPHYSADDRESS or IFPHYSADDR

ifAdminStatus attribute

Description
The desired state of the interface. The testing(3) state indicates that no operational packets can be passed. When a managed system initializes, all interfaces start with ifAdminStatus in the down(2) state.

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

- up (1)
- down (2)
- testing (3)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFADMINSTATUS or IFADMINSTA

ifOperStatus attribute

Description
The current operational state of the interface. The testing(3) state indicates that no operational packets can be passed. If ifAdminStatus is down(2),then the ifOperStatus is down(2).

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

- up (1)
- down (2)
- testing (3)
- unknown (4)
- dormant (5)
- notPresent (6)
- lowerLayerDown (7)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOPERSTATUS or IFOPERSTAT

ifLastChange attribute

Description
The value of sysUpTime at the time the interface entered its current operational state. If the current state was entered before the last re-initialization of the local network management subsystem, this object contains a zero value.

Type String

Warehouse name
IFLASTCHANGE or IFLASTCHAN

ifInOctets attribute

Description
The total number of octets received on the interface, including framing characters.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINOCTETS

ifInUcastPkts attribute

Description
The number of packets, delivered by this sub-layer to a higher layer or sub-layer, that were not addressed to a multicast or broadcast address at this sub-layer.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINUCASTPKTS or IFINUCASTP

ifInNUcastPkts attribute

Description
The number of packets, delivered by this sub-layer to a higher layer or sub-layer that were addressed to a multicast or broadcast address at this sub-layer.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINNUCASTPKTS or IFINNUCAST

ifInDiscards attribute

Description
The number of inbound packets that were chosen to be discarded even though no errors had been detected to prevent the packets from being deliverable to a higher-layer protocol. One possible reason for discarding such a packet might be to free up buffer space.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINDISCARDS or IFINDISCAR

ifInErrors attribute

Description
The number of inbound packets or transmission units that contained errors preventing them from being deliverable to a higher-layer protocol.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINERRORS

ifInUnknownProtos attribute

Description
The number of packets or transmission units received through the interface that were discarded because of an unknown or unsupported protocol. For interfaces that do not support protocol multiplexing, this counter is always 0.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINUNKNOWNPROTOS or IFINUNKNOW

ifOutOctets attribute

Description
The total number of octets transmitted out of the interface, including framing characters.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTOCTETS or IFOUTOCTET

ifOutUcastPkts attribute

Description
The total number of packets that higher-level protocols requested be transmitted that were not addressed to a multicast or broadcast address at this sub-layer. This number includes packets that were discarded or not sent.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTUCASTPKTS or IFOUTUCAST

ifOutNUcastPkts attribute

Description
The total number of packets that higher-level protocols requested be transmitted

that were addressed to a multicast or broadcast address at this sub-layer. This includes packets that were discarded or not sent.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTNUCASTPKTS or IFOUTNUCAS

ifOutDiscards attribute

Description
The number of outbound packets that were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet might be to free up buffer space.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTDISCARDS or IFOUTDISCA

ifOutErrors attribute

Description
The number of outbound packets or transmission units that cannot be transmitted because of errors.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTERRORS or IFOUTERROR

ifOutQLen attribute

Description
The length of the output packet queue (in packets).

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTQLEN

ifSpecific attribute

Description
A reference to MIB definitions specific to the particular media being used to realize the interface. Typically, this value point relates to an instance of a MIB object in the media-specific MIB.

Type String

Warehouse name
IFSPECIFIC

ifInOctetsInMil attribute

Description
The total number of octets received on the interface (in millions), including framing characters.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Formula
The value for this attribute is calculated as `ifInOctets/1000000`.

Warehouse name
IFINOCTETSINMIL or IFINOCTET0

ifOutOctectsInMil attribute

Description
The total number of octets transmitted out of the interface (in millions), including framing characters.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Formula
The value for this attribute is calculated as `ifOutOctets/1000000`.

Warehouse name
IFOUTOCTECTSINMIL or IFOUTOCTEC

ifOutOctectsPerSec attribute

Description
The total number of octets transmitted out of the interface, including framing characters.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTOCTECTSPERSEC or IFOUTOCTE0

ifInOctectsPerSec attribute

Description
The total number of octets received on the interface, including framing characters.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINOCTECTSPERSEC or IFINOCTECT

ifInDiscardsPerSec attribute

Description
The number of inbound packets that were chosen to be discarded even though no errors had been detected to prevent the packets from being deliverable to a higher-layer protocol. One possible reason for discarding such a packet might be to free up buffer space.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINDISCARDSPERSEC or IFINDISCA0

ifInErrorsPerSec attribute

Description
The number of inbound packets or transmission units that contained errors preventing them from being deliverable to a higher-layer protocol.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINERRORSPERSEC or IFINERROR0

ifInUnknownProtosPerSec attribute

Description
The number of packets or transmission units received through the interface that were discarded because of an unknown or unsupported protocol.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINUNKNOWNPROTOSPERSEC or IFINUNKNO0

ifOutDiscardsPerSec attribute

Description
The number of outbound packets that were chosen to be discarded even though no errors had been detected to prevent the packets being transmitted. One possible reason for discarding such a packet might be to free up buffer space.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTDISCARDSPERSEC or IFOUTDISC0

ifOutErrorsPerSec attribute

Description
The number of outbound packets or transmission units that cannot be transmitted because of errors.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTERRORSPERSEC or IFOUTERRO0

ifOutQLenPerSec attribute

Description
The length of the output packet queue (in packets).

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTQLENPERSEC or IFOUTQLENP

IfToIpMap attribute group

This attribute group shows the mapping of the interfaces to the IP addresses.

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 IfToIpMap attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

ifIndex attribute - This attribute is a key attribute.

Description
A unique value for each interface. The value ranges between 1 and the value of ifNumber. The value for each interface must remain constant at least from one re-initialization of the network management system for the entity to the next re-initialization.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINDEX

ifDescr attribute

Description
A text string containing information about the interface. This string must include the name of the manufacturer, the product name, and the version of the interface hardware or software.

Type String

Warehouse name
IFDESCR

ifType attribute

Description
The type of interface. Additional values for ifType are assigned by the Internet Assigned Numbers Authority (IANA) through updating the syntax of the IANAifType textual convention.

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

- other (1)
- regular1822 (2)
- hdh1822 (3)
- ddnX25 (4)
- rfc877x25 (5)
- ethernetCsmacd (6)
- iso88023Csmacd (7)
- iso88024TokenBus (8)
- iso88025TokenRing (9)
- iso88026Man (10)
- starLan (11)
- proteon10Mbit (12)
- proteon80Mbit (13)
- hyperchannel (14)
- fddi (15)
- lapb (16)
- sdlc (17)
- ds1 (18)
- e1 (19)
- basicISDN (20)
- primaryISDN (21)
- propPointToPointSerial (22)
- ppp (23)
- softwareLoopback (24)
- eon (25)
- ethernet3Mbit (26)
- nsip (27)

- slip (28)
- ultra (29)
- ds3 (30)
- sip (31)
- frameRelay (32)
- rs232 (33)
- para (34)
- arcnet (35)
- arcnetPlus (36)
- atm (37)
- miox25 (38)
- sonet (39)
- x25ple (40)
- iso88022llc (41)
- localTalk (42)
- smdsDxi (43)
- frameRelayService (44)
- v35 (45)
- hssi (46)
- hippi (47)
- modem (48)
- aal5 (49)
- sonetPath (50)
- sonetVT (51)
- smdsIcip (52)
- propVirtual (53)
- propMultiplexor (54)
- ieee80212 (55)
- fibre-channel (56)
- hippiInterfaces (57)
- frameRelayInterconnect (58)
- aflane8023 (59)
- aflane8025 (60)
- cctEmul (61)
- fastEther (62)
- isdn (63)
- v11 (64)
- v36 (65)
- g703-64k (66)
- g703-2mb (67)
- qllc (68)
- fastEtherFX (69)
- channel (70)
- iEEE80211 (71)
- ibm370parChan (72)

- eSCON (73)
- dLSw (74)
- iSDNs (75)
- iSDNu (76)
- lapd (77)
- ip-switch (78)
- rsrb (79)
- atm-logical (80)
- ds0 (81)
- ds0Bundle (82)
- bsc (83)
- async (84)
- cnr (85)
- iso88025Dtr (86)
- eplrs (87)
- arap (88)
- propCnls (89)
- hostPad (90)
- termPad (91)
- frameRelayMPI (92)
- x213 (93)
- adsl (94)
- radsl (95)
- sdsl (96)
- vdsl (97)
- iso88025CRFPInt (98)
- myrinet (99)
- voiceEM (100)
- voiceFXO (101)
- voiceFXS (102)
- voiceEncap (103)
- voiceOverIp (104)
- atmDxi (105)
- atmFuni (106)
- atmIma (107)
- pppMultilinkBundle (108)
- ipOverCdlc (109)
- ipOverClaw (110)
- stackToStack (111)
- virtualIpAddress (112)
- mpc (113)
- ipOverAtm (114)
- iso88025Fiber (115)
- tdlc (116)
- gigabitEthernet (117)

- hdlc (118)
- lapf (119)
- v37 (120)
- x25mlp (121)
- x25huntGroup (122)
- transpHdlc (123)
- interleave (124)
- fast (125)
- ip (126)
- docsCableMaclayer (127)
- docsCableDownstream (128)
- docsCableUpstream (129)
- a12MppSwitch (130)
- tunnel (131)
- coffee (132)
- ces (133)
- atmSubInterface (134)
- l2vlan (135)
- l3ipvlan (136)
- l3ipxvlan (137)
- digitalPowerLine (138)
- mediaMailOverIP (139)
- dtm (140)
- dcm (141)
- ipForward (142)
- msdsl (143)
- ieee1394 (144)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFTYPE

ifMtu attribute

Description
The size of the largest packet that can be sent or received on the interface specified in octets. For interfaces that are used for transmitting network datagrams, this size is the largest network datagram that can be sent on the interface.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFMTU

ifSpeed attribute

Description
An estimate of the current bandwidth for the interface in bits per second. For interfaces that do not vary in bandwidth or for interfaces where no accurate estimation can be made, this object must contain the nominal bandwidth.

Type Integer (64-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFSPEED

ifPhysAddress attribute

Description
The address of the interface at the protocol sub-layer. For example, for an 802.x interface, this object typically contains a MAC address. The media-specific MIB for the interface must define the bit and byte ordering and the format of the value of this object.

Type String

Warehouse name
IFPHYSADDRESS or IFPHYSADDR

ifAdminStatus attribute

Description
The desired state of the interface. The testing(3) state indicates that no operational packets can be passed. When a managed system initializes, all interfaces start with ifAdminStatus in the down(2) state.

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

- up (1)
- down (2)
- testing (3)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFADMINSTATUS or IFADMINSTA

ifOperStatus attribute

Description
The current operational state of the interface. The testing(3) state indicates that no operational packets can be passed. If ifAdminStatus is down(2),then the ifOperStatus is down(2).

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

- up (1)
- down (2)
- testing (3)
- unknown (4)
- dormant (5)
- notPresent (6)
- lowerLayerDown (7)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOPERSTATUS or IFOPERSTAT

ifLastChange attribute

Description
The value of sysUpTime at the time the interface entered its current operational state. If the current state was entered before the last re-initialization of the local network management subsystem, then this object contains a zero value.

Type String

Warehouse name
IFLASTCHANGE or IFLASTCHAN

ifInOctets attribute

Description
The total number of octets received on the interface, including framing characters.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINOCTETS

ifInUcastPkts attribute

Description
The number of packets, delivered by this sub-layer to a higher layer or sub-layer, that were not addressed to a multicast or broadcast address at this sub-layer.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINUCASTPKTS or IFINUCASTP

ifInNUcastPkts attribute

Description
The number of packets, delivered by this sub-layer to a higher layer or sub-layer that were addressed to a multicast or broadcast address at this sub-layer.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINNUCASTPKTS or IFINNUCAST

ifInDiscards attribute

Description
The number of inbound packets that were chosen to be discarded even though no errors had been detected to prevent the packets from being deliverable to a higher-layer protocol. One possible reason for discarding such a packet might be to free up buffer space.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINDISCARDS or IFINDISCAR

ifInErrors attribute

Description
The number of inbound packets or transmission units that contained errors preventing them from being deliverable to a higher-layer protocol.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINERRORS

ifInUnknownProtos attribute

Description
The number of packets or transmission units received through the interface that

were discarded because of an unknown or unsupported protocol. For interfaces that do not support protocol multiplexing, this counter is always 0.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINUNKNOWNPROTOS or IFINUNKNOW

ifOutOctets attribute

Description
The total number of octets transmitted out of the interface, including framing characters.

Type
Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTOCTETS or IFOUTOCTET

ifOutUcastPkts attribute

Description
The total number of packets that higher-level protocols requested be transmitted that were not addressed to a multicast or broadcast address at this sub-layer. This number includes packets that were discarded or not sent.

Type
Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTUCASTPKTS or IFOUTUCAST

ifOutNUcastPkts attribute

Description
The total number of packets that higher-level protocols requested be transmitted that were addressed to a multicast or broadcast address at this sub-layer. This includes packets that were discarded or not sent.

Type
Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTNUCASTPKTS or IFOUTNUCAS

ifOutDiscards attribute

Description
The number of outbound packets that were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet might be to free up buffer space.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTDISCARDS or IFOUTDISCA

ifOutErrors attribute

Description
The number of outbound packets or transmission units that cannot be transmitted because of errors.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTERRORS or IFOUTERROR

ifOutQLen attribute

Description
The length of the output packet queue (in packets).

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTQLEN

ifSpecific attribute

Description
A reference to MIB definitions specific to the particular media being used to realize the interface. Typically, this value point relates to an instance of a MIB object in the media-specific MIB.

Type String

Warehouse name
IFSPECIFIC

ifInOctetsInMil attribute

Description
The total number of octets received on the interface (in millions), including framing characters.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINOCTETSINMIL or IFINOCTET0

ifOutOctectsInMil attribute

Description
The total number of octets transmitted out of the interface (in millions), including framing characters.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTOCTECTSINMIL or IFOUTOCTEC

ifOutOctectsPerSec attribute

Description
The total number of octets transmitted out of the interface, including framing characters.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTOCTECTSPERSEC or IFOUTOCTE0

ifInOctectsPerSec attribute

Description
The total number of octets received on the interface, including framing characters.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINOCTECTSPERSEC or IFINOCTECT

ifInDiscardsPerSec attribute

Description
The number of inbound packets that were chosen to be discarded even though no errors had been detected to prevent the packets from being deliverable to a higher-layer protocol. One possible reason for discarding such a packet might be to free up buffer space.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINDISCARDSPERSEC or IFINDISCA0

ifInErrorsPerSec attribute

Description
The number of inbound packets or transmission units that contained errors preventing them from being deliverable to a higher-layer protocol.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINERRORSPERSEC or IFINERROR0

ifInUnknownProtosPerSec attribute

Description
The number of packets or transmission units received through the interface that were discarded because of an unknown or unsupported protocol.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINUNKNOWNPROTOSPERSEC or IFINUNKNO0

ifOutDiscardsPerSec attribute

Description
The number of outbound packets that were chosen to be discarded even though no errors had been detected to prevent the packets being transmitted. One possible reason for discarding such a packet might be to free up buffer space.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTDISCARDSPERSEC or IFOUTDISC0

ifOutErrorsPerSec attribute

Description
The number of outbound packets or transmission units that cannot be transmitted because of errors.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTERRORSPERSEC or IFOUTERRO0

ifOutQLenPerSec attribute

Description
The length of the output packet queue (in packets).

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTQLENPERSEC or IFOUTQLENP

ipAdEntAddr attribute - This attribute is a key attribute.

Description
The IP address for a set of related information.

Type String

Warehouse name
IPADENTADDR or IPADENTADD

ipAdEntIfIndex attribute

Description
The index value that uniquely identifies the interface pertaining to a specific entry. The interface identified by a particular value of this index is the same interface as identified by the same value of the RFC 1573 ifIndex.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPADENTIFINDEX or IPADENTIFI

ipAdEntNetMask attribute

Description
The subnet mask associated with the IP address for a specific entry. The value of the mask is an IP address with all the network bits set to 1 and all the host bits set to 0.

Type String

Warehouse name
IPADENTNETMASK or IPADENTNET

ipAdEntBcastAddr attribute

Description
The value of the least significant bit in the IP broadcast address used for sending datagrams on the (logical) interface associated with the IP address.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPADENTBCASTADDR or IPADENTBCA

ipAdEntReasmMaxSize attribute

Description
The size of the largest IP datagram that this entity can reassemble from incoming IP fragmented datagrams received on the interface.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPADENTREASMMAXSIZE or IPADENTREA

Interfaces attribute group

This attribute group contains data gathered from the SNMP Object Interfaces.

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 Interfaces attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

ifNumber attribute

Description
The number of network interfaces (regardless of their current state) present on this 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 shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFNUMBER

IP attribute group

This attribute group contains data gathered from the SNMP Object IP.

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 IP attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

ipForwarding attribute

Description
Indicates whether the entity is acting as an IP router for forwarded datagrams. IP routers forward datagrams; IP hosts do not forward datagrams (except those source-routed through the host).

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

- forwarding (1)
- notForwarding (2)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPFORWARDING or IPFORWARDI

ipDefaultTTL attribute

Description
The default value inserted into the Time-To-Live field of the IP header for datagrams originated at the entity. A TTL value is not supplied by the transport layer protocol.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPDEFAULTTTL or IPDEFAULTT

ipInReceives attribute

Description
The total number of input datagrams received from interfaces, including interfaces received in error.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPINRECEIVES or IPINRECEIV

ipInHdrErrors attribute

Description
The number of input datagrams discarded due to errors in their IP headers, including bad checksums, version number mismatch, format errors, Time-To-Live exceeded, and errors discovered in processing IP options.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPINHDRERRORS or IPINHDRERR

ipInAddrErrors attribute

Description
The number of input datagrams discarded because the IP address in the IP header destination field was not a valid address to be received. This count includes invalid addresses (such as 0.0.0.0) and addresses of unsupported classes (such as, Class E).

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPINADDRERRORS or IPINADDRER

ipForwDatagrams attribute

Description
The number of input datagrams that do not point to this entity as a final IP destination. These datagrams result in an attempt to find a route to forward them to their final destination.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPFORWDATAGRAMS or IPFORWDATA

ipInUnknownProtos attribute

Description
The number of locally addressed datagrams received successfully but discarded because of an unknown or unsupported protocol.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPINUNKNOWNPROTOS or IPINUNKNOW

ipInDiscards attribute

Description
The number of input IP datagrams for which no problems were encountered to prevent their continued processing, but which were discarded. This counter does not include datagrams discarded while awaiting reassembly.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPINDISCARDS or IPINDISCAR

ipInDelivers attribute

Description
The total number of input datagrams successfully delivered to the IP user-protocols (including ICMP).

Type Integer (32-bit counter) with enumerated values. The strings are displayed in the

Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPINDELIVERS or IPINDELIVE

ipOutRequests attribute

Description
The total number of IP datagrams that local IP user-protocols (including ICMP) supplied to the IP in requests for transmission. This counter does not include datagrams counted in ipForwDatagrams.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPOUTREQUESTS or IPOUTREQUE

ipOutDiscards attribute

Description
The number of output IP datagrams for which no problem was encountered to prevent their transmission to their destination, but that were discarded. This counter includes datagrams counted in ipForwDatagrams that meet the discard criteria.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPOUTDISCARDS or IPOUTDISCA

ipOutNoRoutes attribute

Description
The number of IP datagrams discarded because no route could be found to transmit them to their destination. This attribute also includes datagrams that a host cannot route because all of the default gateways for this host are down.

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

- Value Exceeds Maximum (2147483647)

- Value Exceeds Minimum (-2147483648)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPOUTNOROUTES or IPOUTNOROU

ipReasmTimeout attribute

Description
The maximum number of seconds that received fragments are held while awaiting reassembly at this entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPREASMTIMEOUT or IPREASMTIM

ipReasmReqds attribute

Description
The number of IP fragments received that must be reassembled at this entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPREASMREQDS or IPREASMREQ

ipReasmOKs attribute

Description
The number of IP datagrams successfully reassembled.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPREASMOKS

ipReasmFails attribute

Description
The number of failures detected by the IP reassembly algorithm. This number is

not a count of discarded IP fragments. Note: Some algorithms (such as the algorithm in RFC 815) can lose track of the number of fragments by combining them as they are received.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPREASMFAILS or IPREASMFAI

ipFragOKs attribute

Description
The number of IP datagrams that have been successfully fragmented at this entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPFRAGOKS

ipFragFails attribute

Description
The number of IP datagrams that have been discarded because they needed to be fragmented at this entity but were not. One reason might be that their Don't Fragment flag was set.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPFRAGFAILS or IPFRAGFAIL

ipFragCreates attribute

Description
The number of IP datagram fragments that have been generated as a result of fragmentation at this entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPFRAGCREATES or IPFRAGCREA

ipRoutingDiscards attribute

Description
The number of routing entries that were chosen to be discarded even though they were valid. One possible reason for discarding such an entry might be to free up buffer space for other routing entries.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPROUTINGDISCARDS or IPROUTINGD

ipInHdrErrorsPerSec attribute

Description
The number of input datagrams discarded because of errors in their IP headers, including bad checksums, version number mismatch, format errors, time-to-live exceeded, and errors discovered in processing IP options.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPINHDRERRORSPERSEC or IPINHDRER0

ipInAddrErrorsPerSec attribute

Description
The number of input datagrams discarded because the IP address in their IP header destination field was not a valid address to be received at this entity. This count includes invalid addresses (such as 0.0.0.0) and addresses of unsupported classes.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPINADDRERRORSPERSEC or IPINADDRE0

IpAddrTable attribute group

This attribute group contains data gathered from the SNMP Object IpAddrTable.

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 IpAddrTable attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

ipAdEntAddr attribute - This attribute is a key attribute.

Description
The IP address for a set of related information.

Type String

Warehouse name
IPADENTADDR or IPADENTADD

ipAdEntIfIndex attribute

Description
The index value that uniquely identifies the interface pertaining to a specific entry. The interface identified by a particular value of this index is the same interface as identified by the same value of the RFC 1573 ifIndex.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPADENTIFINDEX or IPADENTIFI

ipAdEntNetMask attribute

Description
The subnet mask associated with the IP address for a specific entry. The value of the mask is an IP address with all the network bits set to 1 and all the host bits set to 0.

Type String

Warehouse name
IPADENTNETMASK or IPADENTNET

ipAdEntBcastAddr attribute

Description
The value of the least significant bit in the IP broadcast address used for sending datagrams on the (logical) interface associated with the IP address.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPADENTBCASTADDR or IPADENTBCA

ipAdEntReasmMaxSize attribute

Description
The size of the largest IP datagram that this entity can reassemble from incoming IP fragmented datagrams received on the interface.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPADENTREASMMAXSIZE or IPADENTREA

IpRouteTable attribute group

This attribute group contains data gathered from the SNMP Object IpRouteTable.

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 IpRouteTable attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

ipRouteDest attribute - This attribute is a key attribute.

Description
The destination IP address of the route. A default route is 0.0.0.0. Multiple routes to a single destination appear in the table, but access to multiple entries is dependent on the table access mechanisms defined by the network management protocol in use.

Type String

Warehouse name
IPROUTEDEST or IPROUTEDES

ipRouteIfIndex attribute

Description
The index value that uniquely identifies the local interface through which the next hop in the route must be reached. The interface identified by a particular value of this index is the same interface identified by the same value of ifIndex.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPROUTEIFINDEX or IPROUTEIFI

ipRouteMetric1 attribute

Description
The primary routing metric for the route. The semantics of this metric are determined by the routing protocol specified in the ipRouteProto value for the route. If this metric is not used, set the value to -1.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPROUTEMETRIC1 or IPROUTEMET

ipRouteMetric2 attribute

Description
An alternate routing metric for the route. The semantics of this metric are determined by the routing protocol specified in the ipRouteProto value for the route. If this metric is not used, set the value to -1.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPROUTEMETRIC2 or IPROUTEME0

ipRouteMetric3 attribute

Description
An alternate routing metric for the route. The semantics of this metric are determined by the routing protocol specified in the ipRouteProto value for the route. If this metric is not used, set the value to -1.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPROUTEMETRIC3 or IPROUTEME1

ipRouteMetric4 attribute

Description
An alternate routing metric for the route. The semantics of this metric are determined by the routing protocol specified in the ipRouteProto value for the route. If this metric is not used, set the value to -1.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPROUTEMETRIC4 or IPROUTEME2

ipRouteNextHop attribute

Description
The IP address of the next hop in the route. (In the case of a route bound to an interface that is realized through broadcast media, the value of this field is the IP address for the agent on that interface.)

Type String

Warehouse name
IPROUTENEXTHOP or IPROUTENEX

ipRouteType attribute

Description
The type of route. Note: The values direct(3) and indirect(4) refer to direct and indirect routing in the IP architecture. Setting this object to invalid(2) invalidates the corresponding entry in the ipRouteTable object.

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

- other (1)
- invalid (2)
- direct (3)
- indirect (4)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPROUTETYPE or IPROUTETYP

ipRouteProto attribute

Description
The routing mechanism that learned the route. The inclusion of values for gateway routing protocols is not intended to imply that hosts must support those protocols.

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

- other (1)
- local (2)
- netmgmt (3)
- icmp (4)
- egp (5)
- ggp (6)
- hello (7)
- rip (8)
- is-is (9)
- es-is (10)
- ciscoIgrp (11)
- bbnSpfIgp (12)
- ospf (13)
- bgp (14)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPROUTEPROTO or IPROUTEPRO

ipRouteAge attribute

Description
The number of seconds since the route was last updated or otherwise determined to be correct.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPROUTEAGE

ipRouteMask attribute

Description
Indicates whether the mask is logical to the destination address before being compared to the value in the ipRouteDest field.

Type String

Warehouse name
IPROUTEMASK or IPROUTEMAS

ipRouteMetric5 attribute

Description
An alternate routing metric for the route. The semantics of this metric are determined by the routing protocol specified in the ipRouteProto value for the route. If this metric is not used, the value must be set to -1.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IPROUTEMETRIC5 or IPROUTEME3

ipRouteInfo attribute

Description
A reference to MIB definitions specific to the particular routing protocol responsible for this route, as determined by the value specified in the ipRouteProto value for the route.

Type String

Warehouse name
IPROUTEINFO or IPROUTEINF

Monitored Network Devices nodes attribute group

This attribute group contains data about the network monitored devices.

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 Network Devices nodes attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

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
SUBNODE_RESOURCE_NAME or SN_RES

Subnode Version attribute

Description
The Version of the subnode agent.

Type String

Warehouse name
SUBNODE_VERSION or SN_VER

nma 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 nma Performance Object Status attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

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 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 values will display the actual value 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 shown in parentheses. The following values are defined:

- ACTIVE (0)
- INACTIVE (1)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OBJECT_STATUS or OBJSTTS

Error Code attribute

Description
The error code 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 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)

Any other values will display the actual value 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 for this group started.

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

- NOT COLLECTED (0691231190000000)

Any other values will display the actual value 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 for this group finished.

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

- NOT COLLECTED (0691231190000000)

Any other values will display the actual value 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 for this group in seconds.

Type Real number (32-bit counter) with 2 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 2 decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- NO DATA (-100)

Any other values will display the actual value 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 2 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

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

Warehouse name
NODE

Timestamp attribute

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

Type String

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 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 values will display the actual value 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 shown in parentheses. The following values are defined:

- ACTIVE (0)
- INACTIVE (1)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
OBJECT_STATUS or OBJSTTS

Error Code attribute

Description
The error code 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 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)

Any other values will display the actual value 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 for this group started.

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

- NOT COLLECTED (0691231190000000)

Any other values will display the actual value 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 for this group finished.

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

- NOT COLLECTED (0691231190000000)

Any other values will display the actual value 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 for this group in seconds.

Type Real number (32-bit counter) with 2 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 2 decimal places of precision with enumerated

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

- NO DATA (-100)

Any other values will display the actual value 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 2 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

Port And IF Details attribute group

This attribute groups shows the mapping of the interfaces to the Base Port Table.

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 Port And IF Details attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

dot1dBasePort attribute - This attribute is a key attribute.

Description
The port number of the port for which this entry contains bridge management information.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DOT1DBASEPORT or DOT1DBASE4

dot1dBasePortIfIndex attribute

Description
The value of the instance of the ifIndex object, defined in [4,6], for the interface corresponding to this port.

Type Integer (32-bit gauge) with enumerated values. The strings are displayed in the

Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
DOT1DBASEPORTIFINDEX or DOT1DBASE5

ifIndex attribute - This attribute is a key attribute.

Description
A unique value for each interface. The value ranges between 1 and the value of ifNumber. The value for each interface must remain constant at least from one re-initialization of the network management system for the entity to the next re-initialization.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINDEX

ifDescr attribute

Description
A text string containing information about the interface. This string must include the name of the manufacturer, the product name, and the version of the interface hardware or software.

Type String

Warehouse name
IFDESCR

ifType attribute

Description
The type of interface. Additional values for ifType are assigned by the Internet Assigned Numbers Authority (IANA) through updating the syntax of the IANAifType textual convention.

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

- other (1)
- regular1822 (2)
- hdh1822 (3)
- ddnX25 (4)
- rfc877x25 (5)
- ethernetCsmacd (6)
- iso88023Csmacd (7)

- iso88024TokenBus (8)
- iso88025TokenRing (9)
- iso88026Man (10)
- starLan (11)
- proteon10Mbit (12)
- proteon80Mbit (13)
- hyperchannel (14)
- fddi (15)
- lapb (16)
- sdlc (17)
- ds1 (18)
- e1 (19)
- basicISDN (20)
- primaryISDN (21)
- propPointToPointSerial (22)
- ppp (23)
- softwareLoopback (24)
- eon (25)
- ethernet3Mbit (26)
- nsip (27)
- slip (28)
- ultra (29)
- ds3 (30)
- sip (31)
- frameRelay (32)
- rs232 (33)
- para (34)
- arcnet (35)
- arcnetPlus (36)
- atm (37)
- miox25 (38)
- sonet (39)
- x25ple (40)
- iso88022llc (41)
- localTalk (42)
- smdsDxi (43)
- frameRelayService (44)
- v35 (45)
- hssi (46)
- hippi (47)
- modem (48)
- aal5 (49)
- sonetPath (50)
- sonetVT (51)
- smdsIcip (52)

- propVirtual (53)
- propMultiplexor (54)
- ieee80212 (55)
- fibre-channel (56)
- hippiInterfaces (57)
- frameRelayInterconnect (58)
- aflane8023 (59)
- aflane8025 (60)
- cctEmul (61)
- fastEther (62)
- isdn (63)
- v11 (64)
- v36 (65)
- g703-64k (66)
- g703-2mb (67)
- qllc (68)
- fastEtherFX (69)
- channel (70)
- iEEE80211 (71)
- ibm370parChan (72)
- eSCON (73)
- dLSw (74)
- iSDNs (75)
- iSDNu (76)
- lapd (77)
- ip-switch (78)
- rsrb (79)
- atm-logical (80)
- ds0 (81)
- ds0Bundle (82)
- bsc (83)
- async (84)
- cnr (85)
- iso88025Dtr (86)
- eplrs (87)
- arap (88)
- propCnls (89)
- hostPad (90)
- termPad (91)
- frameRelayMPI (92)
- x213 (93)
- adsl (94)
- radsl (95)
- sdsl (96)
- vdsl (97)

- iso88025CRFPInt (98)
- myrinet (99)
- voiceEM (100)
- voiceFXO (101)
- voiceFXS (102)
- voiceEncap (103)
- voiceOverIp (104)
- atmDxi (105)
- atmFuni (106)
- atmIma (107)
- pppMultilinkBundle (108)
- ipOverCdlc (109)
- ipOverClaw (110)
- stackToStack (111)
- virtualIpAddress (112)
- mpc (113)
- ipOverAtm (114)
- iso88025Fiber (115)
- tdlc (116)
- gigabitEthernet (117)
- hdlc (118)
- lapf (119)
- v37 (120)
- x25mlp (121)
- x25huntGroup (122)
- transpHdlc (123)
- interleave (124)
- fast (125)
- ip (126)
- docsCableMaclayer (127)
- docsCableDownstream (128)
- docsCableUpstream (129)
- a12MppSwitch (130)
- tunnel (131)
- coffee (132)
- ces (133)
- atmSubInterface (134)
- l2vlan (135)
- l3ipvlan (136)
- l3ipxvlan (137)
- digitalPowerLine (138)
- mediaMailOverIP (139)
- dtm (140)
- dcm (141)
- ipForward (142)

- msdsl (143)
- ieee1394 (144)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFTYPE

ifMtu attribute

Description
The size of the largest packet that can be sent or received on the interface specified in octets. For interfaces that are used for transmitting network datagrams, this size is the largest network datagram that can be sent on the interface.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFMTU

ifSpeed attribute

Description
An estimate of the current bandwidth for the interface in bits per second. For interfaces that do not vary in bandwidth or for interfaces where no accurate estimation can be made, this object must contain the nominal bandwidth.

Type Integer (64-bit gauge) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFSPEED

ifPhysAddress attribute

Description
The address of the interface at the protocol sub-layer. For example, for an 802.x interface, this object typically contains a MAC address. The media-specific MIB for the interface must define the bit and byte ordering and the format of the value of this object.

Type String

Warehouse name
IFPHYSADDRESS or IFPHYSADDR

ifAdminStatus attribute

Description
The desired state of the interface. The testing(3) state indicates that no operational packets can be passed. When a managed system initializes, all interfaces start with ifAdminStatus in the down(2) state.

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

- up (1)
- down (2)
- testing (3)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFADMINSTATUS or IFADMINSTA

ifOperStatus attribute

Description
The current operational state of the interface. The testing(3) state indicates that no operational packets can be passed. If ifAdminStatus is down(2),then the ifOperStatus is down(2).

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

- up (1)
- down (2)
- testing (3)
- unknown (4)
- dormant (5)
- notPresent (6)
- lowerLayerDown (7)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOPERSTATUS or IFOPERSTAT

ifLastChange attribute

Description
The value of sysUpTime at the time the interface entered its current operational state. If the current state was entered before the last re-initialization of the local network management subsystem, then this object contains a zero value.

Type String

Warehouse name
IFLASTCHANGE or IFLASTCHAN

ifInOctets attribute

Description
The total number of octets received on the interface, including framing characters.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the

Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINOCTETS

ifInUcastPkts attribute

Description
The number of packets, delivered by this sub-layer to a higher layer or sub-layer, that were not addressed to a multicast or broadcast address at this sub-layer.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINUCASTPKTS or IFINUCASTP

ifInNUcastPkts attribute

Description
The number of packets, delivered by this sub-layer to a higher layer or sub-layer that were addressed to a multicast or broadcast address at this sub-layer.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINNUCASTPKTS or IFINNUCAST

ifInDiscards attribute

Description
The number of inbound packets that were chosen to be discarded even though no errors had been detected to prevent the packets from being deliverable to a higher-layer protocol. One possible reason for discarding such a packet might be to free up buffer space.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINDISCARDS or IFINDISCAR

ifInErrors attribute

Description
The number of inbound packets or transmission units that contained errors preventing them from being deliverable to a higher-layer protocol.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINERRORS

ifInUnknownProtos attribute

Description
The number of packets or transmission units received through the interface that were discarded because of an unknown or unsupported protocol. For interfaces that do not support protocol multiplexing, this counter is always 0.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINUNKNOWNPROTOS or IFINUNKNOW

ifOutOctets attribute

Description
The total number of octets transmitted out of the interface, including framing characters.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTOCTETS or IFOUTOCTET

ifOutUcastPkts attribute

Description
The total number of packets that higher-level protocols requested be transmitted that were not addressed to a multicast or broadcast address at this sub-layer. This number includes packets that were discarded or not sent.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTUCASTPKTS or IFOUTUCAST

ifOutNUcastPkts attribute

Description
The total number of packets that higher-level protocols requested be transmitted that were addressed to a multicast or broadcast address at this sub-layer. This includes packets that were discarded or not sent.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTNUCASTPKTS or IFOUTNUCAS

ifOutDiscards attribute

Description
The number of outbound packets that were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet might be to free up buffer space.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTDISCARDS or IFOUTDISCA

ifOutErrors attribute

Description
The number of outbound packets or transmission units that cannot be transmitted because of errors.

Type Integer (32-bit counter) with enumerated values. The strings are displayed in the

Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTERRORS or IFOUTERROR

ifOutQLen attribute

Description
The length of the output packet queue (in packets).

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTQLEN

ifSpecific attribute

Description
A reference to MIB definitions specific to the particular media being used to realize the interface. Typically, this value point relates to an instance of a MIB object in the media-specific MIB.

Type String

Warehouse name
IFSPECIFIC

ifInOctetsInMil attribute

Description
The total number of octets received on the interface (in millions), including framing characters.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINOCTETSINMIL or IFINOCTET0

ifOutOctectsInMil attribute

Description
The total number of octets transmitted out of the interface (in millions), including framing characters.

Type Integer (64-bit counter) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- Value Exceeds Maximum (9223372036854775807)
- Value Exceeds Minimum (-9223372036854775808)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTOCTECTSINMIL or IFOUTOCTEC

ifOutOctectsPerSec attribute

Description
The total number of octets transmitted out of the interface, including framing characters.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTOCTECTSPERSEC or IFOUTOCTE0

ifInOctectsPerSec attribute

Description
The total number of octets received on the interface, including framing characters.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINOCTECTSPERSEC or IFINOCTECT

ifInDiscardsPerSec attribute

Description
The number of inbound packets that were chosen to be discarded even though no errors had been detected to prevent the packets from being deliverable to a higher-layer protocol. One possible reason for discarding such a packet might be to free up buffer space.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINDISCARDSPERSEC or IFINDISCA0

ifInErrorsPerSec attribute

Description
The number of inbound packets or transmission units that contained errors preventing them from being deliverable to a higher-layer protocol.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINERRORSPERSEC or IFINERROR0

ifInUnknownProtosPerSec attribute

Description
The number of packets or transmission units received through the interface that were discarded because of an unknown or unsupported protocol.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFINUNKNOWNPROTOSPERSEC or IFINUNKNO0

ifOutDiscardsPerSec attribute

Description
The number of outbound packets that were chosen to be discarded even though no errors had been detected to prevent the packets being transmitted. One possible reason for discarding such a packet might be to free up buffer space.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTDISCARDSPERSEC or IFOUTDISC0

ifOutErrorsPerSec attribute

Description
The number of outbound packets or transmission units that cannot be transmitted because of errors.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTERRORSPERSEC or IFOUTERRO0

ifOutQLenPerSec attribute

Description
The length of the output packet queue (in packets).

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
IFOUTQLENPERSEC or IFOUTQLENP

Port Forwarding Table attribute group

This attribute group contains data gathered from the MIB Object dot1dTpFdbTable.

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 Port Forwarding Table attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

HostMACAddress attribute - This attribute is a key attribute.

Description
A unicast MAC address for which the bridge has forwarding information, filtering information, or both.

Type String

Warehouse name
HOSTMACADDRESS or DOT1DTPFD2

PortNumber attribute

Description
Either the value '0', or the port number of the port on which a frame having a source address equal to the value of the corresponding instance of dot1dTpFdbAddress has been seen. A value of '0' indicates that the port number has not been learned but that the bridge has some forwarding or filtering information.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PORTNUMBER or DOT1DTPFD3

Port Status attribute

Description
The status of this entry. The following values are possible: other(1) none of the following; invalid(2) - this entry is no longer valid (for example, it was learned but has since aged out) but has not yet been flushed from the table; learned(3) - the value of the corresponding instance of dot1dTpFdbPort was learned and is being used; and self(4) - the value of the corresponding instance of dot1dTpFdbAddress represents one of the bridge addresses. The corresponding instance of dot1dTpFdbPort indicates which of the bridge ports has this address. mgmt(5) - the value of the corresponding instance of dot1dTpFdbAddress is also the value of an existing instance of dot1dStaticAddress.

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

- other (1)
- invalid (2)
- learned (3)
- self (4)
- mgmt (5)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
PORT_STATUS or DOT1DTPFD4

SNMP attribute group

This attribute group contains data gathered from the the SNMP Object SNMP.

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 SNMP attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

snmpInPkts attribute

Description
The total number of messages delivered to the SNMP entity from the transport service.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINPKTS

snmpOutPkts attribute

Description
The total number of SNMP messages that were passed from the SNMP protocol entity to the transport service.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPOUTPKTS or SNMPOUTPKT

snmpInBadVersions attribute

Description
The total number of SNMP messages that were delivered to the SNMP entity and were for an unsupported SNMP version.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINBADVERSIONS or SNMPINBADV

snmpInBadCommunityNames attribute

Description
The total number of SNMP messages delivered to the SNMP entity that used an SNMP community name not known to the SNMP entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINBADCOMMUNITYNAMES or SNMPINBADC

snmpInBadCommunityUses attribute

Description
The total number of SNMP messages delivered to the SNMP entity that represented an SNMP operation that was not allowed by the SNMP community named in the message.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINBADCOMMUNITYUSES or SNMPINBAD0

snmpInASNParseErrs attribute

Description
The total number of ASN.1 or BER errors encountered by the SNMP entity when decoding received SNMP messages.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINASNPARSEERRS or SNMPINASNP

snmpInTooBigs attribute

Description
The total number of SNMP PDUs that were delivered to the SNMP protocol entity and for which the value of the error-status field is 'toobig'.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINTOOBIGS or SNMPINTOOB

snmpInNoSuchNames attribute

Description
The total number of SNMP PDUs that were delivered to the SNMP protocol entity and for which the value of the error-status field is 'noSuchName'.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINNOSUCHNAMES or SNMPINNOSU

snmpInBadValues attribute

Description
The total number of SNMP PDUs that were delivered to the SNMP protocol entity and for which the value of the error-status field is 'badValue'.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINBADVALUES or SNMPINBAD1

snmpInReadOnlys attribute

Description
The total number valid SNMP PDUs that were delivered to the SNMP protocol entity and for which the value of the error-status field is 'readOnly'. It is a protocol error to generate an SNMP PDU that contains the value 'readOnly' in the error-status field.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINREADONLYS or SNMPINREAD

snmpInGenErrs attribute

Description
The total number of SNMP PDUs that were delivered to the SNMP protocol entity and for which the value of the error-status field is 'genErr'.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINGENERRS or SNMPINGENE

snmpInTotalReqVars attribute

Description
The total number of MIB objects that were retrieved successfully by the SNMP protocol entity as a result of receiving valid SNMP Get-Request and Get-Next PDUs.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINTOTALREQVARS or SNMPINTOTA

snmpInTotalSetVars attribute

Description
The total number of MIB objects that were altered successfully by the SNMP protocol entity as a result of receiving valid SNMP Set-Request PDUs.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINTOTALSETVARS or SNMPINTOT0

snmpInGetRequests attribute

Description
The total number of SNMP Get-Request PDUs that have been accepted and processed by the SNMP protocol entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINGETREQUESTS or SNMPINGETR

snmpInGetNexts attribute

Description
The total number of SNMP Get-Next PDUs that have been accepted and processed by the SNMP protocol entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINGETNEXTS or SNMPINGETN

snmpInSetRequests attribute

Description
The total number of SNMP Set-Request PDUs that have been accepted and processed by the SNMP protocol entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINSETREQUESTS or SNMPINSETR

snmpInGetResponses attribute

Description
The total number of SNMP Get-Response PDUs that have been accepted and processed by the SNMP protocol entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINGETRESPONSES or SNMPINGET0

snmpInTraps attribute

Description
The total number of SNMP Trap PDUs that have been accepted and processed by the SNMP protocol entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINTRAPS or SNMPINTRAP

snmpOutTooBigs attribute

Description
The total number of SNMP PDUs that were generated by the SNMP protocol entity and for which the value of the error-status field is 'tooBig'.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPOUTTOOBIGS or SNMPOUTTOO

snmpOutNoSuchNames attribute

Description
The total number of SNMP PDUs that were generated by the SNMP protocol entity and for which the value of the error-status is 'noSuchName'.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPOUTNOSUCHNAMES or SNMPOUTNOS

snmpOutBadValues attribute

Description
The total number of SNMP PDUs that were generated by the SNMP protocol entity and for which the value of the error-status field is 'badValue'.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPOUTBADVALUES or SNMPOUTBAD

snmpOutGenErrs attribute

Description
The total number of SNMP PDUs that were generated by the SNMP protocol entity and for which the value of the error-status field is `genErr'.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPOUTGENERRS or SNMPOUTGEN

snmpOutGetRequests attribute

Description
The total number of SNMP Get-Request PDUs that have been generated by the SNMP protocol entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPOUTGETREQUESTS or SNMPOUTGET

snmpOutGetNexts attribute

Description
The total number of SNMP Get-Next PDUs that have been generated by the SNMP protocol entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPOUTGETNEXTS or SNMPOUTGE0

snmpOutSetRequests attribute

Description
The total number of SNMP Set-Request PDUs that have been generated by the SNMP protocol entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPOUTSETREQUESTS or SNMPOUTSET

snmpOutGetResponses attribute

Description
The total number of SNMP Get-Response PDUs that have been generated by the SNMP protocol entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPOUTGETRESPONSES or SNMPOUTGE1

snmpOutTraps attribute

Description
The total number of SNMP Trap PDUs that have been generated by the SNMP protocol entity.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPOUTTRAPS or SNMPOUTTRA

snmpEnableAuthenTraps attribute

Description
Indicates whether the SNMP entity is permitted to generate authenticationFailure traps. The value of this object overrides any configuration information, and provides a means whereby all authenticationFailure traps might be disabled.

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

- enabled (1)
- disabled (2)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPENABLEAUTHENTRAPS or SNMPENABLE

snmpSilentDrops attribute

Description
The total number of GetRequest-PDUs, GetNextRequest-PDUs, GetBulkRequest-PDUs, SetRequest-PDUs, and InformRequest-PDUs delivered to the SNMP entity that were silently dropped because the size of a reply containing an alternate Response-PDU was empty.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPSILENTDROPS or SNMPSILENT

snmpProxyDrops attribute

Description
The total number of GetRequest-PDUs, GetNextRequest-PDUs, GetBulkRequest-PDUs, SetRequest-PDUs, and InformRequest-PDUs delivered to the SNMP entity that were silently dropped because of the transmission of a message to a proxy target.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPPROXYDROPS or SNMPPROXYD

snmpInASNParseErrsPerSec attribute

Description
The total number of ASN.1 or BER errors encountered by the SNMP entity when decoding received SNMP messages.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SNMPINASNPARSEERRSPERSEC or SNMPINASN0

System attribute group

This attribute group contains data gathered from the SNMP Object System.

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 System attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

sysDescr attribute

Description
A textual description of the entity. This value includes the full name and version identification of the system hardware type, software operating system, and networking software.

Type String

Warehouse name
SYSDESCR

sysObjectID attribute

Description
The authoritative identification by the vendor of the network management subsystem contained in the entity. This value is allocated within the SMI enterprises subtree (1.3.6.1.4.1).

Type String

Warehouse name
SYSOBJECTID or SYSOBJECTI

sysUpTime attribute

Description
The time (in hundredths of a second) since the network management portion of the system was last re-initialized.

Type String

Warehouse name
SYSUPTIME

sysContact attribute

Description
The textual identification of the contact person for the managed node. If no contact information is known, the value is a zero-length string.

Type String

Warehouse name
SYSCONTACT

sysName attribute

Description
An administratively assigned name for the managed node. By convention, this name is the fully qualified domain name for the node. If the name is unknown, the value is a zero-length string.

Type String

Warehouse name
SYSNAME

sysLocation attribute

Description
The physical location of the node, for example, telephone closet or 3rd floor. If the location is unknown, the value is a zero-length string.

Type String

Warehouse name
SYSLOCATION or SYSLOCATIO

sysServices attribute

Description
A value that indicates the set of services this entity might potentially offer. The value is a sum.

Type Integer (32-bit gauge) with enumerated values. The strings are displayed in the

Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
SYSSERVICES or SYSSERVICE

sysORLastChange attribute

Description
The value of sysUpTime at the time of the most recent change in state or value of any instance of sysORID.

Type String

Warehouse name
SYSORLASTCHANGE or SYSORLASTC

Take Action Status attribute group

The Take Action Status attribute group contains information about the results of actions this agent has executed.

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 Take Action Status attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

Action Name attribute

Description
The name of the action that was run.

Type String

Warehouse name
ACTION_NAME or TSKNAME

Action Status attribute

Description
The return code from the Action Status dialog, which is the return code category defined for the application return code.

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 shown in parentheses. The following values are defined:

- OK (0)
- NOT APPLICABLE (1)
- GENERAL ERROR (2)
- WARNING (3)
- NOT RUNNING (4)
- DEPENDENT NOT RUNNING (5)
- ALREADY RUNNING (6)
- PREREQ NOT RUNNING (7)
- TIMED OUT (8)
- DOESNT EXIST (9)
- UNKNOWN (10)
- DEPENDENT STILL RUNNING (11)
- INSUFFICIENT USER AUTHORITY (12)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
ACTION_STATUS or TSKSTAT

Action App Return Code attribute

Description
The application return code of the action is the actual return code of the command that is executed.

Type Integer (32-bit numeric property)

Warehouse name
ACTION_APP_RETURN_CODE or TSKAPRC

Action Message attribute

Description
The message associated with the return code of the action.

Type String

Warehouse name
ACTION_MESSAGE or TSKMSGE

Action Instance attribute

Description
The instance associated with the output produced by running the action.

Type String

Warehouse name
ACTION_INSTANCE or TSKINST

Action Results attribute

Description
The output produced by running the action.

Type String

Warehouse name
ACTION_RESULTS or TSKOUTP

Action Command attribute

Description
The command that was run by the action.

Type String

Warehouse name
ACTION_COMMAND or TSKCMND

Action Node attribute

Description
The node where the action ran.

Type String

Warehouse name
ACTION_NODE or TSKORGN

Action Subnode attribute

Description
The subnode where the action ran.

Type String

Warehouse name
ACTION_SUBNODE or TSKSBND

Action ID attribute

Description
The ID of the action.

Type Integer (32-bit numeric property)

Warehouse name
ACTION_ID or TSKID

Action Type attribute

Description
The type of action.

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 shown in parentheses. The following values are defined:

- UNKNOWN (0)
- AUTOMATION (1)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
ACTION_TYPE or TSKTYPE

Action Owner attribute

Description
The name of the situation or user that initiated the action.

Type String

Warehouse name
ACTION_OWNER or TSKOWNR

TCP attribute group

This attribute group contains data gathered from the SNMP Object TCP.

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 TCP attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

tcpRtoAlgorithm attribute

Description
The algorithm for determining the timeout value used for retransmitting unacknowledged octets.

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

- other (1)
- constant (2)
- rsre (3)
- vanj (4)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPRTOALGORITHM or TCPRTOALGO

tcpRtoMin attribute

Description
The minimum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined information for objects of this type depends on the algorithm used to determine the retransmission timeout.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPRTOMIN

tcpRtoMax attribute

Description
The maximum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined information for objects of this type depends on the algorithm used to determine the retransmission timeout.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPRTOMAX

tcpMaxConn attribute

Description
The limit on the total number of TCP connections the entity can support. In entities where the maximum number of connections is dynamic, this object must contain the value -1.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPMAXCONN

tcpActiveOpens attribute

Description
The number of times TCP connections have made a direct transition to the SYN-SENT state from the CLOSED state.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPACTIVEOPENS or TCPACTIVEO

tcpPassiveOpens attribute

Description
The number of times TCP connections have made a direct transition to the SYN-RCVD state from the LISTEN state.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPPASSIVEOPENS or TCPPASSIVE

tcpAttemptFails attribute

Description
The number of times TCP connections have made a direct transition to the CLOSED state from either the SYN-SENT state or the SYN-RCVD state, including connections that have made a direct transition to the LISTEN state from the SYN-RCVD state.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPATTEMPTFAILS or TCPATTEMPT

tcpEstabResets attribute

Description
The number of times TCP connections have made a direct transition to the CLOSED state from either the ESTABLISHED state or the CLOSE-WAIT state.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPESTABRESETS or TCPESTABRE

tcpCurrEstab attribute

Description
The number of TCP connections that are in the current state ESTABLISHED or CLOSE-WAIT.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPCURRESTAB or TCPCURREST

tcpInSegs attribute

Description
The total number of segments received, including segments received in error. This count includes segments received on currently established connections.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPINSEGS

tcpOutSegs attribute

Description
The total number of segments sent, including segments on current connections but excluding those containing only retransmitted octets.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPOUTSEGS

tcpRetransSegs attribute

Description
The total number of TCP segments retransmitted containing one or more previously transmitted octets.

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

- Value Exceeds Maximum (2147483647)

- Value Exceeds Minimum (-2147483648)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPRETRANSSEGS or TCPRETRANS

tcpInErrs attribute

Description
The total number of segments received in error, for example, bad TCP checksums.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPINERRS

tcpOutRsts attribute

Description
The number of TCP segments sent containing the RST flag.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPOUTRSTS

tcpInErrsPerSec attribute

Description
The total number of segments received in error, for example, bad TCP checksums.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPINERRSPERSEC or TCPINERRSP

TCPConnTable attribute group

This attribute group contains data gathered from the SNMP Object TCPConnTable.

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 TCPConnTable attribute group:

Node attribute - This attribute is a key attribute.

Description

The managed system name of the agent.

Type String

Warehouse name

NODE

Timestamp attribute

Description

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

Type String

Warehouse name

TIMESTAMP

tcpConnState attribute

Description

The state of the TCP connection. The only value that can be set by a management station is deleteTCB(12). It is appropriate for an agent to return a 'badValue' response if a management station attempts to set this object to any other value.

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

- closed (1)
- listen (2)
- synSent (3)
- synReceived (4)
- established (5)
- finWait1 (6)
- finWait2 (7)
- closeWait (8)
- lastAck (9)
- closing (10)
- timeWait (11)
- deleteTCB (12)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name

TCPCONNSTATE or TCPCONNSTA

tcpConnLocalAddress attribute - This attribute is a key attribute.

Description

The local IP address for the TCP connection. In the case of a connection in the listen state that is willing to accept connections for any IP interface associated with the node, the value 0.0.0.0 is used.

Type String

Warehouse name
TCPCONNLOCALADDRESS or TCPCONNLOC

tcpConnLocalPort attribute - This attribute is a key attribute.

Description
The local port number for the TCP connection.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPCONNLOCALPORT or TCPCONNLO0

tcpConnRemAddress attribute - This attribute is a key attribute.

Description
The remote IP address for the TCP connection.

Type String

Warehouse name
TCPCONNREMADDRESS or TCPCONNREM

tcpConnRemPort attribute - This attribute is a key attribute.

Description
The remote port number for the TCP connection.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
TCPCONNREMPORT or TCPCONNRE0

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

Warehouse name
NODE

Timestamp attribute

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

Type String

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 shown in parentheses. The following values are defined:

- NO DATA (-1)
- NO DATA (-100)

Any other values will display the actual value 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 shown in parentheses. The following values are defined:

- NO DATA (-1)
- NO DATA (-100)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
THREAD_POOL_MAX_SIZE or TPMAXSZ

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 shown in parentheses. The following values are defined:

- NO DATA (-1)
- NO DATA (-100)

Any other values will display the actual value 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 2 decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- NO DATA (-1)
- NO DATA (-100)

Any other values will display the actual value 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 shown in parentheses. The following values are defined:

- NO DATA (-1)
- NO DATA (-100)

Any other values will display the actual value 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 shown in parentheses. The following values are defined:

- NO DATA (-1)
- NO DATA (-100)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
THREAD_POOL_MAX_ACTIVE_THREADS or TPMAXAT

Thread Pool 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 shown in parentheses. The following values are defined:

- NO DATA (-1)
- NO DATA (-100)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
THREAD_POOL_QUEUE_LENGTH or TPQLGTH

Thread Pool Avg Queue Length attribute

Description
The average length of the thread pool queue during this run.

Type Real number (32-bit gauge) with 2 decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- NO DATA (-1)
- NO DATA (-100)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
THREAD_POOL_AVG_QUEUE_LENGTH or TPAVGQL

Thread Pool 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 shown in parentheses. The following values are defined:

- NO DATA (-1)
- NO DATA (-100)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
THREAD_POOL_MIN_QUEUE_LENGTH or TPMINQL

Thread Pool 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 shown in parentheses. The following values are defined:

- NO DATA (-1)
- NO DATA (-100)

Any other values will display the actual value 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 2 decimal places of precision with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

- NO DATA (-1)
- NO DATA (-100)

Any other values will display the actual value 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 shown in parentheses. The following values are defined:

- NO DATA (-1)
- NO DATA (-100)

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
THREAD_POOL_TOTAL_JOBS or TPTJOBS

UDP attribute group

This attribute group contains data gathered from the SNMP Object UDP.

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 UDP attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

udpInDatagrams attribute

Description
The total number of UDP datagrams delivered to UDP users.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
UDPINDATAGRAMS or UDPINDATAG

udpNoPorts attribute

Description
The total number of received UDP datagrams for which no application existed at the destination port.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
UDPNOPORTS

udpInErrors attribute

Description
The number of received UDP datagrams that cannot be delivered for reasons other than the lack of an application at the destination port.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
UDPINERRORS or UDPINERROR

udpOutDatagrams attribute

Description
The total number of UDP datagrams sent from the entity.

Type Integer (32-bit counter) with enumerated values. The strings are displayed in the

Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
UDPOUTDATAGRAMS or UDPOUTDATA

udpInErrorsPerSec attribute

Description
The number of received UDP datagrams that cannot be delivered for reasons other than the lack of an application at the destination port.

Type Integer (rate of change between successive values) with enumerated values. The strings are displayed in the Tivoli Enterprise Portal. The warehouse and queries return the values shown in parentheses. The following values are defined:

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
UDPINERRORSPERSEC or UDPINERRO0

UDPTable attribute group

This attribute group contains data gathered from the SNMP Object UDPTable.

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 UDPTable attribute group:

Node attribute - This attribute is a key attribute.

Description
The managed system name of the agent.

Type String

Warehouse name
NODE

Timestamp attribute

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

Type String

Warehouse name
TIMESTAMP

udpLocalAddress attribute - This attribute is a key attribute.

Description
The local IP address for the UDP listener. A UDP listener that is willing to accept datagrams for any IP interface associated with the node has a value of 0.0.0.0.

Type String

Warehouse name
UDPLOCALADDRESS or UDPLOCALAD

udpLocalPort attribute - This attribute is a key attribute.

Description
The local port number for the UDP listener.

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

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

Any other values will display the actual value returned by the agent in the Tivoli Enterprise Portal.

Warehouse name
UDPLOCALPORT or UDPLOCALPO

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 25.

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 25.

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 Network Devices agent

Table	Attribute group	Bytes per row (agent)	Database bytes per row (warehouse)	Aggregate bytes per row (warehouse)
KN4DOT1DBA	KN4_DOT1DBASEPORTTABLE	84	82	158
KN4IFTABLE	KN4_IFTABLE	671	699	1460
KN4IFTOIPM	KN4_IFTOIPMAP	747	780	1658
KN4INTERFA	KN4_INTERFACES	80	77	153
KN4IP	KN4_IP	164	182	630
KN4IPADDRT	KN4_IPADDRTABLE	152	153	307
KN4IPROUTE	KN4_IPROUTETABLE	272	281	591
KN4NMADS	KN4_MONITORED_NETWORK_DEVICES_ NODES	197	198	235
KN4NMAPOS	KN4_NMA_PERFORMANCE_OBJECT_STATUS	352	399	664
KN4POBJST	KN4_PERFORMANCE_OBJECT_STATUS	352	399	664
KN4IFTOIPT	KN4_PORT_AND_IF_DETAILS	679	709	1509
KN4DOT1DT0	KN4_PORT_FORWARDING_TABLE	148	147	262
KN4SNMP	KN4_SNMP	200	227	738
KN4SYSTEM	KN4_SYSTEM	1292	1296	1372
KN4TACTST	KN4_TAKE_ACTION_STATUS	3480	3512	3549
KN4TCP	KN4_TCP	136	147	514
KN4TCPCONN	KN4_TCPCONNTABLE	152	153	190
KN4THPLST	KN4_THREAD_POOL_STATUS	124	168	550
KN4UDP	KN4_UDP	96	97	233
KN4UDPTABL	KN4_UDPTABLE	112	110	147

For more information about historical data collection, see 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 tacmds 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 Agent for Network Devices. 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 left panel of 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, the right 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 Network Devices 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 has been 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

- Network Devices
  - Not applicable

- Monitored Network Devices nodes
  - Not applicable
- Performance Object Status
  - Not applicable

Monitored Network Devices (nma) subnode
- Monitored Network Devices
  - Not applicable
- Interface Data
  - KN4_InterfaceDown
  - KN4_PacketsOnError
- Network Protocol Data
  - KN4_IPHdrErrors
  - KN4_ipInAddrErrors
  - KN4_TCPinErrors
  - KN4_UDPinErrors
  - KN4_snmpInASNParseErrs
- nma Performance Object Status
  - Not applicable
- Switch Port Data
  - Not applicable

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 describing 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 of time, when another situation is true, or whichever occurs first if both are selected.

Network Devices Navigator item

No predefined situations are included for this Navigator item.

Monitored Network Devices nodes Navigator item

No predefined situations are included for this Navigator item.

Performance Object Status Navigator item

No predefined situations are included for this Navigator item.

Monitored Network Devices subnode

The situation descriptions are organized by the Navigator item to which the situations are relevant.

Monitored Network Devices Navigator item

No predefined situations are included for this Navigator item.

Interface Data Navigator item

KN4_InterfaceDown situation

Description
Triggers when packets are discarded with errors in the header.

The situation is evaluated for each distinct value of the IFINDEX attribute.

Formula

```
*IF *VALUE KN4_IFTABLE.ifAdminStatus *EQ up *AND *VALUE
KN4_IFTABLE.ifOperStatus *NE up
```

See "Attributes in each attribute group" on page 27 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

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.

KN4_PacketsOnError situation

Description
Triggers when packets with errors are detected in the interface.

The situation is evaluated for each distinct value of the IFINDEX attribute.

Formula

```
*IF ( ( *VALUE KN4_IFTABLE.ifOutErrorsPerSec *GT 0 ) *OR ( *VALUE
KN4_IFTABLE.ifInErrorsPerSec *GT 0 ) )
```

See "Attributes in each attribute group" on page 27 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

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.

Network Protocol Data Navigator item

KN4_IPHdrErrors situation

Description
Triggers when packets are discarded with errors in the header.

The situation will be evaluated for the table.

Formula

```
*IF *VALUE KN4_IP.ipInHdrErrorsPerSec *GT 0
```

See "Attributes in each attribute group" on page 27 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

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.

KN4_ipInAddrErrors situation

Description
Triggers when packets are discarded with a wrong IP address.

The situation will be evaluated for the table.

Formula

```
*IF *VALUE KN4_IP.ipInAddrErrorsPerSec *GT 0
```

See "Attributes in each attribute group" on page 27 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

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.

KN4_TCPinErrors situation

Description
Triggers when bad TCP checksums are in packets.

The situation will be evaluated for the table.

Formula

```
*IF *VALUE KN4_TCP.tcpInErrsPerSec *GT 0
```

See "Attributes in each attribute group" on page 27 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

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.

KN4_UDPinErrors situation

Description
Triggers when UDP packets cannot be delivered.

The situation will be evaluated for the table.

Formula

```
*IF *VALUE KN4_UDP.udpInErrorsPerSec *GT 0
```

See "Attributes in each attribute group" on page 27 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

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.

KN4_snmpInASNParseErrs situation

Description
Triggers with errors in ASN.1 or BER packet decoding.

The situation will be evaluated for the table.

Formula

```
*IF *VALUE KN4_SNMP.snmpInASNParseErrsPerSec *GT 0
```

See "Attributes in each attribute group" on page 27 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

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.

nma Performance Object Status Navigator item

No predefined situations are included for this Navigator item.

Switch Port Data Navigator item

No predefined situations are included for this Navigator item.

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 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:

- StartDeviceMonitor
- StopDeviceMonitor

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.

StartDeviceMonitor action

This command starts data collection and monitoring of a remote network device.

System command

To include the Take Action command in a situation or workflow policy, use the following syntax for the system command:

```
STARTDEVICEMONITOR \

   [Subnode_Resource_Name]

   [SNMP_Host]

   [SNMP_Version]

   [SNMP_Community]

   [SNMP_PortNumber]

   [SNMP_AuthProtocol]

   [SNMP_AuthPassword]

   [SNMP_PrivProtocol]

   [SNMP_PrivPassword]

   [SNMP_SecurityLevel]

   [SNMP_UserName]
```

You can use attribute substitution to supply the Take Action command arguments from the situation, for example:

```
STARTDEVICEMONITOR \

[&{Subnode_Resource_Name}] \

[&{SNMP_Host}] \

[&{SNMP_Version}] \

[&{SNMP_Community}] \

[&{SNMP_PortNumber}] \

[&{SNMP_AuthProtocol}] \

[&{SNMP_AuthPassword}] \

[&{SNMP_PrivProtocol}] \

[&{SNMP_PrivPassword}] \

[&{SNMP_SecurityLevel}] \

[&{SNMP_UserName}]
```

You can also use attribute substitution in a workflow policy though the format is slightly different:

```
STARTDEVICEMONITOR \

[&WaitOnSituation:Subnode_Resource_Name] \

[&WaitOnSituation:SNMP_Host] \
```

```
[&WaitOnSituation:SNMP_Version] \
[&WaitOnSituation:SNMP_Community] \
[&WaitOnSituation:SNMP_PortNumber] \
[&WaitOnSituation:SNMP_AuthProtocol] \
[&WaitOnSituation:SNMP_AuthPassword] \
[&WaitOnSituation:SNMP_PrivProtocol] \
[&WaitOnSituation:SNMP_PrivPassword] \
[&WaitOnSituation:SNMP_SecurityLevel] \
[&WaitOnSituation:SNMP_UserName]
```

Command arguments

- **Name:** Subnode_Resource_Name
  - **Description:** The name that shows in the Tivoli Enterprise Portal Navigator tree for this network device. The name must be unique across all instances of this agent.
  - **Default:** None
- **Name:** SNMP_Host
  - **Description:** The host or IP address of the SNMP server.
  - **Default:** None
- **Name:** SNMP_Version
  - **Description:** The SNMP version to use to make the connection.
  - **Default:** snmpV1
- **Name:** SNMP_Community
  - **Description:** The SNMP server community name.
  - **Default:** None
- **Name:** SNMP_PortNumber
  - **Description:** The port number of the SNMP server.
  - **Default:** 161
- **Name:** SNMP_AuthProtocol
  - **Description:** The authorization protocol used to connect to the SNMP agent.
  - **Default:** MD5
- **Name:** SNMP_AuthPassword
  - **Description:** The authorization password for connecting to the SNMP agent.
  - **Default:** None
- **Name:** SNMP_PrivProtocol
  - **Description:** The privacy protocol used to connect to the SNMP agent.
  - **Default:** DES
- **Name:** SNMP_PrivPassword
  - **Description:** The privacy password for connecting to the SNMP agent.
  - **Default:** None
- **Name:** SNMP_SecurityLevel
  - **Description:** The security level used to connect to the SNMP agent.
  - **Default:** authNoPriv
- **Name:** SNMP_UserName

- **Description:** The user name for connecting to the SNMP agent.
- **Default:** Test

Destination systems

_EnDDESTINATIONS_NONE_OR_LIST_EnD

Return codes

- Return Code: 1
  - Return Code Type: NOT_APPLICABLE
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN41001
  - Message: NOT_APPLICABLE
- Return Code: 2
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN41002
  - Message: GENERAL_ERROR
- Return Code: 8
  - Return Code Type: TIMED_OUT
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN41003
  - Message: TIMED_OUT
- Return Code: 12
  - Return Code Type: INSUFFICIENT_USER_AUTHORITY
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN41004
  - Message: INSUFFICIENT_USER_AUTHORITY
- Return Code: 0
  - Return Code Type: OK
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45001I
  - Message: OK - Start Monitoring Command executed successfully.
- Return Code: 31
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45002E
  - Message: Cannot perform the requested Start Monitoring Command. The InstanceName you specified is already configured.
- Return Code: 32
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45003E
  - Message: Cannot perform the requested Start Monitoring Command. The InstanceName you specified does not exist.
- Return Code: 33
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows

  - Message ID: KN45004E
  - Message: Cannot perform the requested Start Monitoring Command. The InstanceName was not specified.
- Return Code: 34
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45005E
  - Message: Cannot perform the requested Start Monitoring Command. The InstanceName is invalid.
- Return Code: 35
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45006E
  - Message: Cannot perform the requested Start Monitoring Command. The InstanceName you specified does not exist.
- Return Code: 36
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45007E
  - Message: Cannot perform the requested Start Monitoring Command. The InstanceName is invalid.
- Return Code: 37
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45008E
  - Message: Cannot perform the requested Start Monitoring Command. The configuration file cannot be opened.
- Return Code: 38
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45009E
  - Message: Cannot perform the requested Start Monitoring Command. No parameters were specified.

StopDeviceMonitor action

This command stops data collection and monitoring of a remote network device.

System command

To include the Take Action command in a situation or workflow policy, use the following syntax for the system command:

```
STOPDEVICEMONITOR \

   [KN4_MANAGED_SYSTEMS_SNMP.Subnode_Resource_Name]
```

You can use attribute substitution to supply the Take Action command arguments from the situation, for example:

```
STOPDEVICEMONITOR \

[&{KN4_MANAGED_SYSTEMS_SNMP.Subnode_Resource_Name}]
```

You can also use attribute substitution in a workflow policy though the format is slightly different:

```
STOPDEVICEMONITOR \

[&WaitOnSituation:KN4_MANAGED_SYSTEMS_SNMP.Subnode_Resource_Name]
```

Command arguments

- **Name:** KN4_MANAGED_SYSTEMS_SNMP.Subnode_Resource_Name
  - **Description:** The name that shows in the Tivoli Enterprise Portal Navigator tree for this host. The name must be unique across all instances of this agent.
  - **Default:** None

Destination systems

_EnDDESTINATIONS_NONE_OR_LIST_EnD

Return codes

- Return Code: 1
  - Return Code Type: NOT_APPLICABLE
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN41001
  - Message: NOT_APPLICABLE
- Return Code: 2
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN41002
  - Message: GENERAL_ERROR
- Return Code: 8
  - Return Code Type: TIMED_OUT
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN41003
  - Message: TIMED_OUT
- Return Code: 12
  - Return Code Type: INSUFFICIENT_USER_AUTHORITY
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN41004
  - Message: INSUFFICIENT_USER_AUTHORITY
- Return Code: 0
  - Return Code Type: OK
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45010I
  - Message: OK - Stop Monitoring Command executed successfully.
- Return Code: 31
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45011E
  - Message: Cannot perform the requested Stop Monitoring Command. The InstanceName you specified is already configured.
- Return Code: 32
  - Return Code Type: GENERAL_ERROR

  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45012E
  - Message: Cannot perform the requested Stop Monitoring Command. The InstanceName you specified does not exist.
- Return Code: 33
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45013E
  - Message: Cannot perform the requested Stop Monitoring Command. The InstanceName was not specified.
- Return Code: 34
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45014E
  - Message: Cannot perform the requested Stop Monitoring Command. The InstanceName is invalid.
- Return Code: 35
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45015E
  - Message: Cannot perform the requested Stop Monitoring Command. The InstanceName you specified does not exist.
- Return Code: 36
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45016E
  - Message: Cannot perform the requested Stop Monitoring Command. The InstanceName is invalid.
- Return Code: 37
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45017E
  - Message: Cannot perform the requested Stop Monitoring Command. The Configuration file cannot be opened.
- Return Code: 38
  - Return Code Type: GENERAL_ERROR
  - Operating systems: Linux 2.6 (Intel), Windows
  - Message ID: KN45018E
  - Message: Cannot perform the requested Stop Monitoring Command. No parameters were specified.

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.

About policies

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.

Additional information about policies

This monitoring agent does not provide predefined policies. For more information about working with policies, see 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.

Chapter 8. Troubleshooting

Problems can be related to IBM Tivoli Monitoring or the specific agent that you are using.

See the *IBM Tivoli Monitoring Troubleshooting Guide* for general troubleshooting information. Also see "Support information" on page 162 for other problem-solving options.

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.

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 142
- "Consulting the lists of identified problems and workarounds" on page 142

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

Information type	Description
Log files	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 143 for lists of all trace log files and their locations. See the *Tivoli Enterprise Portal User's Guide* for general information about the IBM Tivoli Monitoring environment.
Operating system	Operating system version number and patch level
Messages	Messages and other information displayed on the screen
Version numbers for IBM Tivoli Monitoring	Version number of the following members of the monitoring environment: • IBM Tivoli Monitoring. Also provide the patch level, if available. • IBM Tivoli Monitoring Agent for Network Devices
Screen captures	Screen captures of incorrect output, if any
(UNIX systems only) Core dump files	If the system stops on UNIX systems, collect the core dump file from the *install_dir*/bin directory, where *install_dir* is the directory where you installed the monitoring agent.

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. See the "pdcollect tool" section in the "Tools" chapter of the *IBM Tivoli Monitoring Troubleshooting Guide* for more information about using this tool.

See http://www.ibm.com/support/entry/portal/Open_service_request/Software/Software_support_(general) for information about working with IBM Software Support.

Using logging

Logging is the primary troubleshooting feature in the Network Devices agent. *Logging* refers to the text messages and trace data that is generated by the Network Devices 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 have been 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 152.

See the *IBM Tivoli Monitoring Troubleshooting Guide* for general troubleshooting information.

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 143
- "Examples: Using trace logs" on page 146
- "Setting RAS trace parameters by using the GUI" on page 147

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

Log files have naming conventions.

Log file naming conventions

Table 3 on page 143 provides the names, locations, and descriptions of RAS1 log files. The log file names adhere to the following naming convention:

Windows systems

hostname_productcode_program_HEXtimestamp-nn.log

Linux and UNIX systems

hostname_productcode_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 Agent for Network Devices, the product code is n4.

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 3. Trace log files for troubleshooting agents

System where log is located	File name and path	Description
On the Tivoli Enterprise Monitoring Server	• **Windows:** The 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.
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.

Table 3. Trace log files for troubleshooting agents (continued)

System where log is located	File name and path	Description
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 nnnnn 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* .logand *hostname_productcode_ timestamp*.pid*nnnnn* 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 3. Trace log files for troubleshooting agents (continued)

System where log is located	File name and path	Description
On the computer that hosts the monitoring agent	The RAS1 log files are as follows: • **Windows:** *hostname*_n4_*instance_name*_kn4agent_HEXtimestamp-nn.log in the *install_dir*\tmaitm6\logs directory • **UNIX:** *hostname*_n4_*instance_name*_kn4agent_HEXtimestamp-nn.log in the *install_dir*/logs directory • **Linux:** *hostname*_n4_*instance_name*_kn4agent_HEXtimestamp-nn.log in the *install_dir*/logs directory 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*_n4_timestamp.log – *hostname*_n4_timestamp.pidnnnnn in the *install_dir*/logs path, where *nnnnn* is the process ID number	Traces activity of the monitoring agent.
On the computer that hosts the monitoring agent	The agent operations log files are as follows: *instance_hostname*N4.LG0 is the current log created when the agent was started. *instance_hostname*_N4.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*\tmaitm6\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

Table 3. Trace log files for troubleshooting agents (continued)

System where log is located	File name and path	Description
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.		

See the *IBM Tivoli Monitoring Installation and Setup Guide* for more information about the complete set of trace logs that are maintained on the monitoring server.

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:N4 is ON-LINE.
. . .
(42C3079B.0000-6A4:kpxreqhb.cpp,644,"HeartbeatInserter") Remote node SERVER5B:N4 is OFF-LINE.
```

See the following key points about the preceding excerpts:

- The monitoring server appends the **N4** product code to the server name to form a unique name (SERVER5B:N4) for this instance of the IBM Tivoli Monitoring Agent for Network Devices. 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" 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 Agent for Network Devices, 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.

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 142 to ensure that you understand log rolling and can reference the correct log files when you manage log file generation.

In the log monitoring component of the PeopleSoft Application Domain agent and PeopleSoft Process Scheduler agent, a file name-based scheme is used to determine the newest PeopleSoft log file to monitor. For example, the `APPSRV_1016 log` file from October 16 appears to be newer than the `APPSRV_0218` file from February 18; thus, the `APPSRV_1016` file is monitored. Using this scheme becomes a problem when the date rolls over from December to January upon a new year. The log monitoring incorrectly identifies `APPSRV_1231` as a newer log file than `APPSRV_0101`. The suggested solution is to archive log files from the previous year into a different location. Keep only files from the current year in the directories containing the PeopleSoft domain and scheduler log files.

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 Agent for Network Devices uses RAS1 tracing and generates the logs described in Table 3 on page 143. The default RAS1 trace level is ERROR. 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:kqz ALL)
   - Maximum error tracing. KBB_RAS1=ERROR (UNIT:kqz 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_DEBUGd 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 143 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 IBM Tivoli Monitoring Agent for Network Devices uses RAS1 tracing and generates the logs described in Table 3 on page 143. The default RAS1 trace level is ERROR. The default RAS1 trace level is ERROR.

Procedure

1. Open the trace options file.
   - **Windows:**

     install_dir\tmaitm6\KN4ENV
   - *install_dir* /config/n4.ini
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:kqz 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 given 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.
     - **PRESERVE**: 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 143 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, with the exception of 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)
{(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 `ras1 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.

```
kbbcre1.c, 400, May 29 2007, 12:54:43, 1.1, *
kbbcrn1.c, 400, May 29 2007, 12:54:42, 1.1, *
kdhb1de.c, 400, May 29 2007, 12:59:34, 1.1, KDH
kdh0med.c, 400, May 29 2007, 12:59:24, 1.1, KDH
kdhsrej.c, 400, May 29 2007, 13:00:06, 1.5, KDH
kdhb1fh.c, 400, May 29 2007, 12:59:33, 1.1, KDH
kdhb1oe.c, 400, May 29 2007, 12:59:38, 1.2, KDH
kdhs1ns.c, 400, May 29 2007, 13:00:08, 1.3, KDH
kbbacdl.c, 400, May 29 2007, 12:54:27, 1.2, ACF1
kbbaclc.c, 400, May 29 2007, 12:54:27, 1.4, ACF1
kbbac1i.c, 400, May 29 2007, 12:54:28, 1.11, ACF1
vkdhsfcn.c, 400, May 29 2007, 13:00:11, 1.1, KDH
kdhserq.c, 400, May 29 2007, 12:59:53, 1.1, KDH
kdhb1pr.c, 400, May 29 2007, 12:59:39, 1.1, KDH
kdhsgnh.c, 400, May 29 2007, 12:59:49, 1.1, KDH
kdh0uts.c, 400, May 29 2007, 12:59:23, 1.1, KDH
kdhsrsp.c, 400, May 29 2007, 13:00:13, 1.2, KDH
kdhs1rp.c, 400, May 29 2007, 13:00:12, 1.1, KDH
kdhscsv.c, 400, May 29 2007, 12:59:58, 1.9, KDH
kdebbac.c, 400, May 29 2007, 12:56:50, 1.10, KDE
...
```

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** to modify trace settings. If you type this command in the field at the bottom of the window, 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 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 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 kbbcrcd class of the Windows OS agent, the command is:

   ```
   ras1 set (UNIT:kbbcrcd 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 IBM Tivoli Monitoring Agent for Network Devices, 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 information center.

See the *IBM Tivoli Monitoring Troubleshooting Guide* for general troubleshooting information.

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

Problem	Solution
(*UNIX only*) During a command-line installation, you choose to install a component that is currently installed, and you see the following warning: `WARNING - you are about to install the SAME version of "component_name"` where *component_name* is the name of the component that you are attempting to install. **Note:** This problem affects UNIX command-line installations. If you monitor only Windows environments, you see this problem if you choose to install a product component (for example, a monitoring server) on a UNIX system.	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.
Diagnosing problems with product browse settings (Windows systems only).	When you have problems with browse settings, complete the following steps: 1. Click **Start** > **Programs** > **IBM Tivoli Monitoring** > **Manage Tivoli Enterprise Monitoring Services**. The Manage Tivoli Enterprise Monitoring Services window is displayed. 2. Right-click the Windows agent and select **Browse Settings**. A text window is displayed. 3. Click **Save As** and save the information in the text file. If requested, you can forward this file to IBM Software Support for analysis.
A message similar to `"Unable to find running CMS on CT_CMSLIST"` in the log file is displayed.	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: • Do multiple network interface cards (NICs) exist on the system? • 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.

Table 4. Problems and solutions for installation and configuration (continued)

Problem	Solution
The system is experiencing high CPU usage.	**Agent process:** View the memory usage of the KN4CMA process. If CPU usage seems to be excessive, restart the monitoring agent. **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.

Table 5. General problems and solutions for uninstallation

Problem	Solution
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.
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*.
The software inventory tag for the agent on UNIX and Linux systems is not removed during uninstallation of the agent.	After uninstalling the agent, manually remove the file named *full name of agent*.cmptag from the $CANDLEHOME/properties/version/ directory.

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

Problem	Solution
When you run the `/opt/IBM/ITM/bin/tacmd addbundles -i <inst_media>/ITMfVE_Agents/unix` command to import the whole bundle for all agents, the import fails with the following message: `Unable to find bundle prerequisite: ci 06.22.04.000 li6263.`	Follow the procedure in "Installing the agent on a Linux x86 64-bit system" on page 8 to install the agent locally.
While you are using the remote deployment feature to install the IBM Tivoli Monitoring Agent for Network Devices, an empty command window is displayed on the target computer. This problem occurs when the target of remote deployment is a Windows computer. (See the *IBM Tivoli Monitoring Installation and Setup Guide* for more information about the remote deployment feature.)	Do not close or modify this window. It is part of the installation process and is dismissed automatically.
The removal of a monitoring agent fails when you use the remote removal process in the Tivoli Enterprise Portal desktop or browser.	This problem might occur when you attempt the remote removal process immediately after you have restarted 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.

Agent troubleshooting

A problem can occur with the agent after it has been installed.

Table 7 contains problems and solutions that can occur with the agent after it has been installed.

Table 7. Agent problems and solutions

Problem	Solution
Log data accumulates too rapidly.	Check the RAS trace option settings, which are described in "Setting RAS trace parameters by using the GUI" on page 147. The trace option settings that you can set on the `KBB_RAS1=` and `KDC_DEBUG=` lines potentially generate large amounts of data.

Table 7. Agent problems and solutions (continued)

Problem	Solution
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.	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 simplified 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 above, 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)

Problem	Solution
Continued from previous row.	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.)
I cannot find my queries.	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.

Workspace troubleshooting

Problems can occur with general workspaces and agent-specific workspaces.

Table 8 on page 158 contains problems and solutions related to workspaces.

Table 8. Workspace problems and solutions

Problem	Solution
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 located above the right pane. 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.
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.
You start collection of historical data but the data cannot be seen.	Use the following managing options for historical data collection: • Basic historical data collection populates the Warehouse with raw data. This type of data collection is turned off by default. See the *IBM Tivoli Monitoring Administrator's Guide* for information about managing this feature including how to set the interval at which data is collected. By setting a more frequent interval for data collection, you reduce the load on the system incurred every time data is uploaded. • 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. See the *IBM Tivoli Monitoring Administrator's Guide* to learn how to modify the default collection settings.

Table 8. Workspace problems and solutions (continued)

Problem	Solution
Historical data collection is unavailable because of incorrect queries in the Tivoli Enterprise Portal.	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 been 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. See the *IBM Tivoli Monitoring Administrator's Guide* or the Tivoli Enterprise Portal online help for information about the Historical Data Collection function.
When you use a long process name in the situation, the process name is truncated.	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.
Regular (non-historical) monitoring data fails to be displayed.	Check the formation of the queries you use to gather data. For example, look for invalid SQL statements.
No row of data for 64-bit applications is displayed in the workspaces when the monitoring agent is running on a 64-bit operating system.	The Tivoli Enterprise Portal shows data only for 32-bit applications. No solution is available for this problem at this time.
Navigator items and workspace titles are labeled with internal names such as `Kxx:KXX0000` instead of the correct names (such as Disk), where XX and xx represent the two-character agent code.	Ensure that application support has been added on the monitoring server, portal server, and portal client. For more information about installing application support, see "Installing and enabling application support" in the *IBM Tivoli Monitoring Installation and Setup Guide*.

Situation troubleshooting

Problems can occur with situations and situation configuration.

Table 9 contains problems and solutions for situations.

Table 9. Situation problems and solutions

Problem	Solution
Monitoring activity requires too much disk space.	Check the RAS trace logging settings that are described in "Setting RAS trace parameters by using the GUI" on page 147. For example, trace logs grow rapidly when you apply the `ALL` logging option.
Monitoring activity requires too many system resources.	"Disk capacity planning for historical data" on page 123 describes the performance impact of specific attribute groups. If possible, decrease your use of the attribute groups that require greater system resources.
A formula that uses mathematical operators appears to be incorrect. For example, if you were monitoring a Linux system, the formula that calculates when **Free Memory** falls under 10 percent of **Total Memory** does not work: `LT #'Linux_VM_Stats.Total_Memory' / 10`	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. In the example, you can select the **% Memory Free** attribute and avoid the need for math operators.

Table 9. Situation problems and solutions (continued)

Problem	Solution
You want to change the appearance of situations when they are displayed in the navigation tree.	1. Right-click an item in the navigation tree. 2. Click **Situations** in the menu. The Situation Editor window is displayed. 3. Select the situation that you want to modify. 4. Use the **State** menu in the lower right of the window to set the status and appearance of the Situation when it triggers. **Note:** The **State** setting is not related to severity settings in IBM Tivoli Enterprise Console.
When a situation is triggered in the Event Log attribute group, it remains in the Situation Event Console as long as the event ID entry is present in the Event Log workspace. When this event ID entry is removed from the Event Log workspace on the Tivoli Enterprise Portal, the situation is also cleared even if the actual problem that caused the event is not resolved, and the event ID entry is also present in the Windows Event Viewer.	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` This variable determines how long events from the NT Event Log are kept.
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.	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.
If the Expert Advice for a situation contains a hyperlink to an external website (for example, a Microsoft TechNet website) and you click the hyperlink, the website opens in an external window. However, the external window stops responding.	The external window responds after you close the Preview window and Situation Editor window.
The situation for a specific agent is not visible in the Tivoli Enterprise Portal.	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 *IBM Tivoli Monitoring Installation and Setup Guide*.
The monitoring interval is too long.	Access the Situation Editor view for the situation that you want to modify. Check the **Sampling interval** area in the **Formula** tab. Adjust the time interval as required.
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.
The situation is not displayed.	Click the **Action** 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.

Table 9. Situation problems and solutions (continued)

Problem	Solution
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 **Distribution** tab and check the distribution settings for the situation.
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 upper-right corner of the **Formula** area. The Show formula window is displayed. a. Confirm the following details in the **Formula** area at the top 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 in the lower left of the window 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. See the *IBM Tivoli Monitoring Troubleshooting Guide* for additional information about situations that do not fire.
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.

Table 9. Situation problems and solutions (continued)

Problem	Solution
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**.
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.

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 143.

Table 10. Take Action commands problems and solutions

Problem	Solution
Take Action commands often require several minutes to complete.	Allow several minutes. If you do not see a message advising you of completion, try to run the command manually.
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 159. If the Take Action command fails, see *IBM Tivoli Monitoring Troubleshooting Guide* for general information about troubleshooting Take Action commands.

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 and follow the instructions.
- Go to the IBM Tivoli Distributed Monitoring and Application Management Wiki. 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.

Informational, warning, and error messages

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:

- 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

IBM Tivoli Monitoring Agent for Network Devices 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 component is one of the following:

KN4 General Network Devices agent messages

Number of the message

severity

Severity of the message. There are three levels of severity:

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 Agent for Network Devices.

KN45001I

`OK - Start Device Monitoring command executed successfully.`

Explanation:

Command executed successfully.

Operator response:

None

KN45010I

`OK - Stop Device Monitoring command executed successfully.`

Explanation:

Command executed successfully.

Operator response:

None

KN45002E

`Cannot perform the requested Start Monitoring command. The InstanceName you specified is already configured.`

Explanation:

This action requires a parameter that identifies the subnode resource name of the monitored system required to start monitoring the device.

Operator response:

Enter a unique subnode resource name.

KN45003E

`Cannot perform the requested Start Monitoring command. The InstanceName you specified does not exist.`

Explanation:

This action requires a parameter that identifies the subnode resource name of the monitored system required to start monitoring the device.

Operator response:

Enter a valid subnode resource name.

KN45004E

`Cannot perform the requested Start Monitoring command. The InstanceName was not specified.`

Explanation:

This action requires a parameter that identifies the subnode resource name of the monitored system required to start monitoring the device.

Operator response:

Please enter subnode resource name.

KN45005E

`Cannot perform the requested Start Monitoring command. The InstanceName is invalid.`

Explanation:

This action requires a parameter that identifies the subnode resource name of the monitored system required to start monitoring the device.

Operator response:

Please enter valid subnode resource name.

KN45006E

`Cannot perform the requested Start Monitoring command. The InstanceName you specified does not exist.`

Explanation:

This action requires a parameter that identifies the subnode resource name of the monitored system required to start monitoring the device.

Operator response:

Enter a valid subnode resource name.

KN45007E

`Cannot perform the requested Start Monitoring command. The InstanceName is invalid.`

Explanation:

This action requires a parameter that identifies the subnode resource name of the monitored system required to start monitoring the device.

Operator response:

Enter a valid subnode resource name.

KN45008E

`Cannot perform the requested Start Monitoring command. The configuration file cannot be opened.`

Explanation:

This action requires an agent configuration file to start monitoring the device.

Operator response:

Check the agent configuration file.

KN45009E

`Cannot perform the requested Start Monitoring command. No parameters were specified.`

Explanation:

This action requires configuration parameters to start monitoring the device.

Operator response:

Enter the required configuration parameters.

KN45011E

`Cannot perform the requested Stop Monitoring command. The InstanceName you specified is already configured.`

Explanation:

This action requires a parameter that identifies the subnode resource name of the monitored system required to stop monitoring the device.

Operator response:

Enter a valid subnode resource name.

KN45012E

`Cannot perform the requested Stop Monitoring command. The InstanceName you specified does not exist.`

Explanation:

This action requires a parameter that identifies the subnode resource name of the monitored system required to stop monitoring the device.

Operator response:

Enter a valid subnode resource name.

KN45013E

`Cannot perform the requested Stop Monitoring command. The InstanceName was not specified.`

Explanation:
This action requires a parameter that identifies the subnode resource name of the monitored system required to stop monitoring the device.

Operator response:
Enter a valid subnode resource name.

KN45014E
`Cannot perform the requested Stop Monitoring command. The InstanceName is invalid.`

Explanation:
This action requires a parameter that identifies the subnode resource name of the monitored system required to stop monitoring the device.

Operator response:
Enter a valid subnode resource name.

KN45015E
`Cannot perform the requested Stop Monitoring command. The InstanceName you specified does not exist.`

Explanation:
This action requires a parameter that identifies the subnode resource name of the monitored system required to stop monitoring the device.

Operator response:
Enter a valid subnode resource name.

KN45016E
`Cannot perform the requested Stop Monitoring command. The InstanceName is invalid.`

Explanation:
This action requires a parameter that identifies the subnode resource name of the monitored system required to stop monitoring the device.

Operator response:
Enter a valid subnode resource name.

KN45017E
`Cannot perform the requested Stop Monitoring command. The configuration file cannot be opened.`

Explanation:
This action requires an agent configuration file to stop monitoring the device.

Operator response:
Check the agent configuration file.

KN45018E
`Cannot perform the requested Stop Monitoring command. No parameters were specified.`

Explanation:
This action requires configuration parameters to stop monitoring the device.

Operator response:
Enter the required configuration parameters.

Appendix A. IBM Tivoli Enterprise Console event mapping

Each event class corresponds to an attribute group in the IBM Tivoli Enterprise Console.

A description of the event slots for each event class is provided. For more information about mapping attribute groups to event classes, see the *IBM Tivoli Monitoring Administrator's Guide*.

Generic event mapping provides useful event class and attribute information for situations that do not have specific event mapping defined. BAROC files are found on the Tivoli Enterprise Monitoring Server in the installation directory in TECLIB (that is, *install_dir*/cms/TECLIB for Windows systems and *install_dir*/tables/*TEMS_hostname* /TECLIB for UNIX systems). IBM Tivoli Enterprise Console event synchronization provides a collection of ready-to-use rule sets that you can deploy with minimal configuration. Be sure to install Tivoli Enterprise Console event synchronization to access the correct `Sentry.baroc` file, which is automatically included during base configuration of Tivoli Enterprise Console rules if you indicate that you want to use an existing rule base. See the *IBM Tivoli Monitoring Installation and Setup Guide* for details.

Each of the event classes is a child of KN4_Base and is defined in the `kn4.baroc` (version 06.22.00) file. The KN4_Base event class can be used for generic rules processing for any event from the IBM Tivoli Monitoring Agent for Network Devices.

For events generated by situations in the dot1dBasePortTable attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_DOT1DBASEPORTTABLE class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- dot1dbaseport: INTEGER
- dot1dbaseport_enum: STRING
- dot1dbaseportifindex: INTEGER
- dot1dbaseportifindex_enum: STRING

For events generated by situations in the IfTable attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_IFTABLE class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- ifindex: INTEGER
- ifindex_enum: STRING
- ifdescr: STRING
- iftype: INTEGER
- iftype_enum: STRING
- ifmtu: INTEGER
- ifmtu_enum: STRING
- ifspeed: REAL
- ifspeed_enum: STRING
- ifphysaddress: STRING
- ifadminstatus: INTEGER
- ifadminstatus_enum: STRING
- ifoperstatus: INTEGER

- ifoperstatus_enum: STRING
- iflastchange: STRING
- ifinoctets: REAL
- ifinoctets_enum: STRING
- ifinucastpkts: REAL
- ifinucastpkts_enum: STRING
- ifinnucastpkts: REAL
- ifinnucastpkts_enum: STRING
- ifindiscards: INTEGER
- ifindiscards_enum: STRING
- ifinerrors: INTEGER
- ifinerrors_enum: STRING
- ifinunknownprotos: INTEGER
- ifinunknownprotos_enum: STRING
- ifoutoctets: REAL
- ifoutoctets_enum: STRING
- ifoutucastpkts: REAL
- ifoutucastpkts_enum: STRING
- ifoutnucastpkts: REAL
- ifoutnucastpkts_enum: STRING
- ifoutdiscards: INTEGER
- ifoutdiscards_enum: STRING
- ifouterrors: INTEGER
- ifouterrors_enum: STRING
- ifoutqlen: INTEGER
- ifoutqlen_enum: STRING
- ifspecific: STRING
- ifinoctetsinmil: REAL
- ifinoctetsinmil_enum: STRING
- ifoutoctectsinmil: REAL
- ifoutoctectsinmil_enum: STRING
- ifoutoctectspersec: INTEGER
- ifoutoctectspersec_enum: STRING
- ifinoctectspersec: INTEGER
- ifinoctectspersec_enum: STRING
- ifindiscardspersec: INTEGER
- ifindiscardspersec_enum: STRING
- ifinerrorspersec: INTEGER
- ifinerrorspersec_enum: STRING
- ifinunknownprotospersec: INTEGER
- ifinunknownprotospersec_enum: STRING
- ifoutdiscardspersec: INTEGER
- ifoutdiscardspersec_enum: STRING
- ifouterrorspersec: INTEGER
- ifouterrorspersec_enum: STRING

- ifoutqlenpersec: INTEGER
- ifoutqlenpersec_enum: STRING

For events generated by situations in the IfToIpMap attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_IFTOIPMAP class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- ifindex: INTEGER
- ifindex_enum: STRING
- ifdescr: STRING
- iftype: INTEGER
- iftype_enum: STRING
- ifmtu: INTEGER
- ifmtu_enum: STRING
- ifspeed: REAL
- ifspeed_enum: STRING
- ifphysaddress: STRING
- ifadminstatus: INTEGER
- ifadminstatus_enum: STRING
- ifoperstatus: INTEGER
- ifoperstatus_enum: STRING
- iflastchange: STRING
- ifinoctets: REAL
- ifinoctets_enum: STRING
- ifinucastpkts: REAL
- ifinucastpkts_enum: STRING
- ifinnucastpkts: REAL
- ifinnucastpkts_enum: STRING
- ifindiscards: INTEGER
- ifindiscards_enum: STRING
- ifinerrors: INTEGER
- ifinerrors_enum: STRING
- ifinunknownprotos: INTEGER
- ifinunknownprotos_enum: STRING
- ifoutoctets: REAL
- ifoutoctets_enum: STRING
- ifoutucastpkts: REAL
- ifoutucastpkts_enum: STRING
- ifoutnucastpkts: REAL
- ifoutnucastpkts_enum: STRING
- ifoutdiscards: INTEGER
- ifoutdiscards_enum: STRING
- ifouterrors: INTEGER
- ifouterrors_enum: STRING
- ifoutqlen: INTEGER

- ifoutqlen_enum: STRING
- ifspecific: STRING
- ifinoctetsinmil: REAL
- ifinoctetsinmil_enum: STRING
- ifoutoctectsinmil: REAL
- ifoutoctectsinmil_enum: STRING
- ifoutoctectspersec: INTEGER
- ifoutoctectspersec_enum: STRING
- ifinoctectspersec: INTEGER
- ifinoctectspersec_enum: STRING
- ifindiscardspersec: INTEGER
- ifindiscardspersec_enum: STRING
- ifinerrorspersec: INTEGER
- ifinerrorspersec_enum: STRING
- ifinunknownprotospersec: INTEGER
- ifinunknownprotospersec_enum: STRING
- ifoutdiscardspersec: INTEGER
- ifoutdiscardspersec_enum: STRING
- ifouterrorspersec: INTEGER
- ifouterrorspersec_enum: STRING
- ifoutqlenpersec: INTEGER
- ifoutqlenpersec_enum: STRING
- ipadentaddr: STRING
- ipadentifindex: INTEGER
- ipadentifindex_enum: STRING
- ipadentnetmask: STRING
- ipadentbcastaddr: INTEGER
- ipadentbcastaddr_enum: STRING
- ipadentreasmmaxsize: INTEGER
- ipadentreasmmaxsize_enum: STRING

For events generated by situations in the Interfaces attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_INTERFACES class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- ifnumber: INTEGER
- ifnumber_enum: STRING

For events generated by situations in the IP attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_IP class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- ipforwarding: INTEGER
- ipforwarding_enum: STRING
- ipdefaultttl: INTEGER
- ipdefaultttl_enum: STRING

- ipinreceives: INTEGER
- ipinreceives_enum: STRING
- ipinhdrerrors: INTEGER
- ipinhdrerrors_enum: STRING
- ipinaddrerrors: INTEGER
- ipinaddrerrors_enum: STRING
- ipforwdatagrams: INTEGER
- ipforwdatagrams_enum: STRING
- ipinunknownprotos: INTEGER
- ipinunknownprotos_enum: STRING
- ipindiscards: INTEGER
- ipindiscards_enum: STRING
- ipindelivers: INTEGER
- ipindelivers_enum: STRING
- ipoutrequests: INTEGER
- ipoutrequests_enum: STRING
- ipoutdiscards: INTEGER
- ipoutdiscards_enum: STRING
- ipoutnoroutes: INTEGER
- ipoutnoroutes_enum: STRING
- ipreasmtimeout: INTEGER
- ipreasmtimeout_enum: STRING
- ipreasmreqds: INTEGER
- ipreasmreqds_enum: STRING
- ipreasmoks: INTEGER
- ipreasmoks_enum: STRING
- ipreasmfails: INTEGER
- ipreasmfails_enum: STRING
- ipfragoks: INTEGER
- ipfragoks_enum: STRING
- ipfragfails: INTEGER
- ipfragfails_enum: STRING
- ipfragcreates: INTEGER
- ipfragcreates_enum: STRING
- iproutingdiscards: INTEGER
- iproutingdiscards_enum: STRING
- ipinhdrerrorspersec: INTEGER
- ipinhdrerrorspersec_enum: STRING
- ipinaddrerrorspersec: INTEGER
- ipinaddrerrorspersec_enum: STRING

For events generated by situations in the IpAddrTable attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_IPADDRTABLE class. This class contains the following slots:

- node: STRING
- timestamp: STRING

- ipadentaddr: STRING
- ipadentifindex: INTEGER
- ipadentifindex_enum: STRING
- ipadentnetmask: STRING
- ipadentbcastaddr: INTEGER
- ipadentbcastaddr_enum: STRING
- ipadentreasmmaxsize: INTEGER
- ipadentreasmmaxsize_enum: STRING

For events generated by situations in the IpRouteTable attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_IPROUTETABLE class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- iproutedest: STRING
- iprouteifindex: INTEGER
- iprouteifindex_enum: STRING
- iproutemetric1: INTEGER
- iproutemetric1_enum: STRING
- iproutemetric2: INTEGER
- iproutemetric2_enum: STRING
- iproutemetric3: INTEGER
- iproutemetric3_enum: STRING
- iproutemetric4: INTEGER
- iproutemetric4_enum: STRING
- iproutenexthop: STRING
- iproutetype: INTEGER
- iproutetype_enum: STRING
- iprouteproto: INTEGER
- iprouteproto_enum: STRING
- iprouteage: INTEGER
- iprouteage_enum: STRING
- iproutemask: STRING
- iproutemetric5: INTEGER
- iproutemetric5_enum: STRING
- iprouteinfo: STRING

For events generated by situations in the Monitored Network Devices nodes attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_MONITORED_NETWORK_DEVICES_NODES class. This 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 generated by situations in the nma Performance Object Status attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_NMA_PERFORMANCE_OBJECT_STATUS class. This 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 generated by situations in the Performance Object Status attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_PERFORMANCE_OBJECT_STATUS class. This 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 generated by situations in the Port And IF Details attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_PORT_AND_IF_DETAILS class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- dot1dbaseport: INTEGER
- dot1dbaseport_enum: STRING
- dot1dbaseportifindex: INTEGER
- dot1dbaseportifindex_enum: STRING
- ifindex: INTEGER
- ifindex_enum: STRING
- ifdescr: STRING
- iftype: INTEGER
- iftype_enum: STRING
- ifmtu: INTEGER
- ifmtu_enum: STRING
- ifspeed: REAL
- ifspeed_enum: STRING
- ifphysaddress: STRING
- ifadminstatus: INTEGER
- ifadminstatus_enum: STRING
- ifoperstatus: INTEGER
- ifoperstatus_enum: STRING
- iflastchange: STRING
- ifinoctets: REAL
- ifinoctets_enum: STRING
- ifinucastpkts: REAL
- ifinucastpkts_enum: STRING
- ifinnucastpkts: REAL
- ifinnucastpkts_enum: STRING
- ifindiscards: INTEGER
- ifindiscards_enum: STRING
- ifinerrors: INTEGER
- ifinerrors_enum: STRING
- ifinunknownprotos: INTEGER
- ifinunknownprotos_enum: STRING
- ifoutoctets: REAL
- ifoutoctets_enum: STRING

- ifoutucastpkts: REAL
- ifoutucastpkts_enum: STRING
- ifoutnucastpkts: REAL
- ifoutnucastpkts_enum: STRING
- ifoutdiscards: INTEGER
- ifoutdiscards_enum: STRING
- ifouterrors: INTEGER
- ifouterrors_enum: STRING
- ifoutqlen: INTEGER
- ifoutqlen_enum: STRING
- ifspecific: STRING
- ifinoctetsinmil: REAL
- ifinoctetsinmil_enum: STRING
- ifoutoctectsinmil: REAL
- ifoutoctectsinmil_enum: STRING
- ifoutoctectspersec: INTEGER
- ifoutoctectspersec_enum: STRING
- ifinoctectspersec: INTEGER
- ifinoctectspersec_enum: STRING
- ifindiscardspersec: INTEGER
- ifindiscardspersec_enum: STRING
- ifinerrorspersec: INTEGER
- ifinerrorspersec_enum: STRING
- ifinunknownprotospersec: INTEGER
- ifinunknownprotospersec_enum: STRING
- ifoutdiscardspersec: INTEGER
- ifoutdiscardspersec_enum: STRING
- ifouterrorspersec: INTEGER
- ifouterrorspersec_enum: STRING
- ifoutqlenpersec: INTEGER
- ifoutqlenpersec_enum: STRING

For events generated by situations in the Port Forwarding Table attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_PORT_FORWARDING_TABLE class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- hostmacaddress: STRING
- portnumber: INTEGER
- portnumber_enum: STRING
- port_status: INTEGER
- port_status_enum: STRING

For events generated by situations in the SNMP attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_SNMP class. This class contains the following slots:

- node: STRING

- timestamp: STRING
- snmpinpkts: INTEGER
- snmpinpkts_enum: STRING
- snmpoutpkts: INTEGER
- snmpoutpkts_enum: STRING
- snmpinbadversions: INTEGER
- snmpinbadversions_enum: STRING
- snmpinbadcommunitynames: INTEGER
- snmpinbadcommunitynames_enum: STRING
- snmpinbadcommunityuses: INTEGER
- snmpinbadcommunityuses_enum: STRING
- snmpinasnparseerrs: INTEGER
- snmpinasnparseerrs_enum: STRING
- snmpintoobigs: INTEGER
- snmpintoobigs_enum: STRING
- snmpinnosuchnames: INTEGER
- snmpinnosuchnames_enum: STRING
- snmpinbadvalues: INTEGER
- snmpinbadvalues_enum: STRING
- snmpinreadonlys: INTEGER
- snmpinreadonlys_enum: STRING
- snmpingenerrs: INTEGER
- snmpingenerrs_enum: STRING
- snmpintotalreqvars: INTEGER
- snmpintotalreqvars_enum: STRING
- snmpintotalsetvars: INTEGER
- snmpintotalsetvars_enum: STRING
- snmpingetrequests: INTEGER
- snmpingetrequests_enum: STRING
- snmpingetnexts: INTEGER
- snmpingetnexts_enum: STRING
- snmpinsetrequests: INTEGER
- snmpinsetrequests_enum: STRING
- snmpingetresponses: INTEGER
- snmpingetresponses_enum: STRING
- snmpintraps: INTEGER
- snmpintraps_enum: STRING
- snmpouttoobigs: INTEGER
- snmpouttoobigs_enum: STRING
- snmpoutnosuchnames: INTEGER
- snmpoutnosuchnames_enum: STRING
- snmpoutbadvalues: INTEGER
- snmpoutbadvalues_enum: STRING
- snmpoutgenerrs: INTEGER
- snmpoutgenerrs_enum: STRING

- snmpoutgetrequests: INTEGER
- snmpoutgetrequests_enum: STRING
- snmpoutgetnexts: INTEGER
- snmpoutgetnexts_enum: STRING
- snmpoutsetrequests: INTEGER
- snmpoutsetrequests_enum: STRING
- snmpoutgetresponses: INTEGER
- snmpoutgetresponses_enum: STRING
- snmpouttraps: INTEGER
- snmpouttraps_enum: STRING
- snmpenableauthentraps: INTEGER
- snmpenableauthentraps_enum: STRING
- snmpsilentdrops: INTEGER
- snmpsilentdrops_enum: STRING
- snmpproxydrops: INTEGER
- snmpproxydrops_enum: STRING
- snmpinasnparseerrspersec: INTEGER
- snmpinasnparseerrspersec_enum: STRING

For events generated by situations in the System attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_SYSTEM class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- sysdescr: STRING
- sysobjectid: STRING
- sysuptime: STRING
- syscontact: STRING
- sysname: STRING
- syslocation: STRING
- sysservices: INTEGER
- sysservices_enum: STRING
- sysorlastchange: STRING

For events generated by situations in the Take Action Status attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_TAKE_ACTION_STATUS class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- action_name: STRING
- action_status: INTEGER
- action_status_enum: STRING
- action_app_return_code: INTEGER
- action_message: STRING
- action_instance: STRING
- action_results: STRING
- action_command: STRING

- action_node: STRING
- action_subnode: STRING
- action_id: INTEGER
- action_type: INTEGER
- action_type_enum: STRING
- action_owner: STRING

For events generated by situations in the TCP attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_TCP class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- tcprtoalgorithm: INTEGER
- tcprtoalgorithm_enum: STRING
- tcprtomin: INTEGER
- tcprtomin_enum: STRING
- tcprtomax: INTEGER
- tcprtomax_enum: STRING
- tcpmaxconn: INTEGER
- tcpmaxconn_enum: STRING
- tcpactiveopens: INTEGER
- tcpactiveopens_enum: STRING
- tcppassiveopens: INTEGER
- tcppassiveopens_enum: STRING
- tcpattemptfails: INTEGER
- tcpattemptfails_enum: STRING
- tcpestabresets: INTEGER
- tcpestabresets_enum: STRING
- tcpcurrestab: INTEGER
- tcpcurrestab_enum: STRING
- tcpinsegs: INTEGER
- tcpinsegs_enum: STRING
- tcpoutsegs: INTEGER
- tcpoutsegs_enum: STRING
- tcpretranssegs: INTEGER
- tcpretranssegs_enum: STRING
- tcpinerrs: INTEGER
- tcpinerrs_enum: STRING
- tcpoutrsts: INTEGER
- tcpoutrsts_enum: STRING
- tcpinerrspersec: INTEGER
- tcpinerrspersec_enum: STRING

For events generated by situations in the TCPConnTable attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_TCPCONNTABLE class. This class contains the following slots:

- node: STRING
- timestamp: STRING

- tcpconnstate: INTEGER
- tcpconnstate_enum: STRING
- tcpconnlocaladdress: STRING
- tcpconnlocalport: INTEGER
- tcpconnlocalport_enum: STRING
- tcpconnremaddress: STRING
- tcpconnremport: INTEGER
- tcpconnremport_enum: STRING

For events generated by situations in the Thread Pool Status attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_THREAD_POOL_STATUS class. This 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
- 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 generated by situations in the UDP attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_UDP class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- udpindatagrams: INTEGER
- udpindatagrams_enum: STRING
- udpnoports: INTEGER

- udpnoports_enum: STRING
- udpinerrors: INTEGER
- udpinerrors_enum: STRING
- udpoutdatagrams: INTEGER
- udpoutdatagrams_enum: STRING
- udpinerrorspersec: INTEGER
- udpinerrorspersec_enum: STRING

For events generated by situations in the UDPTable attribute group, Tivoli Enterprise Console events are sent using the ITM_KN4_UDPTABLE class. This class contains the following slots:

- node: STRING
- timestamp: STRING
- udplocaladdress: STRING
- udplocalport: INTEGER
- udplocalport_enum: STRING

Appendix B. Documentation library

A variety of publications are relevant to the use of the IBM Tivoli Monitoring Agent for Network Devices.

The *IBM Tivoli Monitoring, OMEGAMON XE, and Composite Application Manager products: Documentation Guide*, SC23-8816, contains information about accessing and using publications. You can find the Documentation Guide in the following information centers:

- IBM Tivoli Monitoring and OMEGAMON® XE
- IBM Tivoli Composite Application Manager

To open the Documentation Guide in the information center, select **Using the publications** in the **Contents** pane.

To find a list of new and changed publications, click **What's new in the information center** on the Welcome page of the IBM Tivoli Monitoring and OMEGAMON XE Information Center.

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 Agent for Network Devices library

The documentation for this agent and other product components is located in the IBM Tivoli Monitoring for Virtual Environments information center.

One document is specific to the IBM Tivoli Monitoring Agent for Network Devices: IBM Tivoli Monitoring Agent for Network Devices User's Guide. This publication provides agent-specific information for configuring, using, and troubleshooting the Network Devices agent.

The **Prerequisites** topic in the information center contains information about the prerequisites for each component.

Use the information in this guide with the *Tivoli Enterprise Portal User's Guide* to monitor network devices 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 Readme First*
- *Exploring IBM Tivoli Monitoring*
- *IBM Tivoli Monitoring Administrator's Guide*
- *IBM Tivoli Monitoring Agent Builder User's Guide*
- *IBM Tivoli Monitoring Command Reference*
- *Configuring IBM Tivoli Enterprise Monitoring Server on z/OS*
- *IBM Tivoli Monitoring Installation and Setup Guide*
- *IBM Tivoli Monitoring: Messages*
- *IBM Tivoli Monitoring, OMEGAMON XE, and Composite Application Manager products: Documentation Guide*
- *IBM Tivoli Monitoring Troubleshooting Guide*

- *IBM Tivoli Monitoring Universal Agent User's Guide*
- *IBM Tivoli Universal Agent API and Command Programming Reference Guide*
- *IBM Tivoli Monitoring: Upgrading from Tivoli Distributed Monitoring*
- *IBM Tivoli Monitoring: Upgrading from V5.1.2*
- *IBM Tivoli Monitoring: i5/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: UNIX Logs OS Agent User's*
- *IBM Tivoli Monitoring: Windows OS Agent User's Guide*
- *Tivoli Enterprise Portal User's Guide*

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:

- IBM Tivoli Monitoring
- IBM Tivoli Netcool/OMNIbus
- IBM Tivoli Application Dependency Discovery Manager (TADDM)
- IBM 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:

- IBM Integrated Service Management Library is an online catalog that contains integration documentation as well as other downloadable product extensions.
- IBM Redbook publications (Redbooks® publications, Redpapers, and Redbooks technotes) provide information about products from platform and solution perspectives.
- Technotes, which are found through the IBM Software Support website, provide the latest information about known product limitations and workarounds.
- Tivoli wikis

  Tivoli Wiki Central is the home for interactive wikis that offer best practices and scenarios for using Tivoli products. The wikis contain white papers contributed by IBM employees, and content created by customers and business partners.

  Two of these wikis are of particular relevance to IBM Tivoli Monitoring:

  – Tivoli Distributed Monitoring and Application Management Wiki provides information about IBM Tivoli Monitoring and related distributed products, including IBM Tivoli Composite Application Management products.

  – Tivoli System z® Monitoring and Application Management Wiki provides information about the OMEGAMON XE products, Tivoli NetView® for z/OS®, Tivoli Monitoring Agent for z/TPF, and other System z monitoring and application management products.

Accessibility

Accessibility features help users with physical disabilities, such as restricted mobility or limited vision, to use software products successfully.

The major accessibility features in this product enable users in the following ways:

- Use assistive technologies, such as screen-reader software and digital speech synthesizer, to hear what is displayed on the screen. Consult the product documentation of the assistive technology for details on using those technologies with this product.
- Operate specific or equivalent features using only the keyboard.
- Magnify what is displayed on the screen.

In addition, the product documentation was modified to include the following features to aid accessibility:

- All documentation is available in both HTML and convertible PDF formats to give the maximum opportunity for users to apply screen-reader software.
- All images in the documentation are provided with alternative text so that users with vision impairments can understand the contents of the images.

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Standard shortcut and accelerator keys are used by the product and are documented by the operating system. See the documentation provided by your operating system for more information.

Magnifying what is displayed on the screen

You can enlarge information in the product windows using facilities provided by the operating systems on which the product is run. For example, in a Microsoft Windows environment, you can lower the resolution of the screen to enlarge the font sizes of the text on the screen. See the documentation provided by your operating system for more information.

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