HITACHI
DATA SYSTEMS

HiCommand® Tuning Manager User's Guide

MK-92HC022-15

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Preface

This manual describes the HiCommand® Tuning Manager GUI operations on a client. In this manual, HiCommand Tuning Manager is abbreviated to Tuning Manager.

For details on how to install and set up the software on a server, see the *HiCommand Tuning Manager Installation Guide*. For details on how to install and set up the software on a client, see the manual corresponding to the Agent.

For details on how to manage the software on a server, see the *HiCommand Tuning Manager Server Administration Guide*.

This manual is intended for the following users:

- System administrators
- Storage administrators
- Application developers
- System integrators
- Technology consultants
- System architects and capacity planners who rely on HiCommand Tuning Manager reports and forecasts

Software Version

This document revision applies to HiCommand Tuning Manager version 5.8.

Conventions for Storage Capacity Values

Storage capacity values displayed by HiCommand Tuning Manager are calculated based on the following values:

1 KB (kilobyte) = 1,024 bytes
1 MB (megabyte) = $1{,}024^2$ bytes
1 GB (gigabyte) = $1{,}024^3$ bytes
1 TB (terabyte) = $1{,}024^4$ bytes

Referenced Documents

- *HiCommand Tuning Manager Server Administration Guide*, MK-92HC021
- *HiCommand Tuning Manager Agent Administration Guide*, MK-92HC013
- *HiCommand Tuning Manager Hardware Reports Reference*, MK-95HC111
- *HiCommand Tuning Manager Operating System Reports Reference*, MK-95HC112
- *HiCommand Tuning Manager Application Reports Reference*, MK-95HC113
- *HiCommand Tuning Manager Messages Reference*, MK-95HC114
- *HiCommand Tuning Manager Command Line Interface Guide*, MK-96HC119
- *HiCommand Tuning Manager Installation Guide*, MK-96HC141

Readme and Release Notes Contents

These files can be found on the installation CD. They contain requirements and notes for use of HiCommand Tuning Manager that may not be fully described in the manual. Be sure to review these files before installing HiCommand Tuning Manager.

Comments

Please send us your comments on this document. Make sure to include the document title, number, and revision. Refer to specific section(s) and paragraph(s) whenever possible.

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Chapter 1 Overview of Tuning Manager

- Managing Networked Storage (see section 1.1)
- Tuning Manager Software (see section 1.2)
- The Tuning Manager System Configuration (see section 1.3)
- Reviewing the Managed Resources (see section 1.4)
- Reviewing the Data Model (see section 1.5)
- Reviewing the Monitored Metrics (see section 1.6)
- Reviewing the Reports (see section 1.7)
- Avoiding Performance Problems (see section 1.8)
- Solving Performance Problems (see section 1.9)
- Planning for System Monitoring (see section 1.10)
- Using Reports to Manage Your System (see section 1.11)
- Using the Command Line Interface (see section 1.12)
- Operating with a Cluster System (see section 1.13)
- Introducing the Graphical User Interface (see section 1.14)

1.1 Managing Networked Storage

Today's complex IT environments often include dozens or even hundreds of application and database servers and various operating systems connected to terabytes of data, which reside on several classes (or tiers) of storage systems. Often the servers and storage are located on one or more storage area networks (SANs) connected by SAN switches and/or storage directors with hundreds of interconnected switch ports.

HiCommand Tuning Manager is a real-time software monitor that can view the current state of all the host, file system, database, SAN, and storage resources that are being used by an application. It lets you contrast data about the monitored resources with an historical view of the normal, baseline performance of those resources that were previously stored in the Tuning Manager database. The ability to query a historical database for performance and capacity trend analysis on each component of the SAN enables you to easily correlate the current changes in performance with recent changes to the physical configuration, software, workload, or other environmental changes that may be causing changes in an application's performance.

The goal of every IT organization is to detect and resolve potential problems before they occur. Tuning Manager also enables you to define and continuously monitor and store critical performance and capacity thresholds, and send a warning to the proper persons to alert them of potential problems before they occur.

Note: In Tuning Manager, the "resource" and "metric" terms have the following meanings:

- **Resource** indicates any object monitored by Tuning Manager.
- **Metric** indicates any monitored performance or capacity data item.

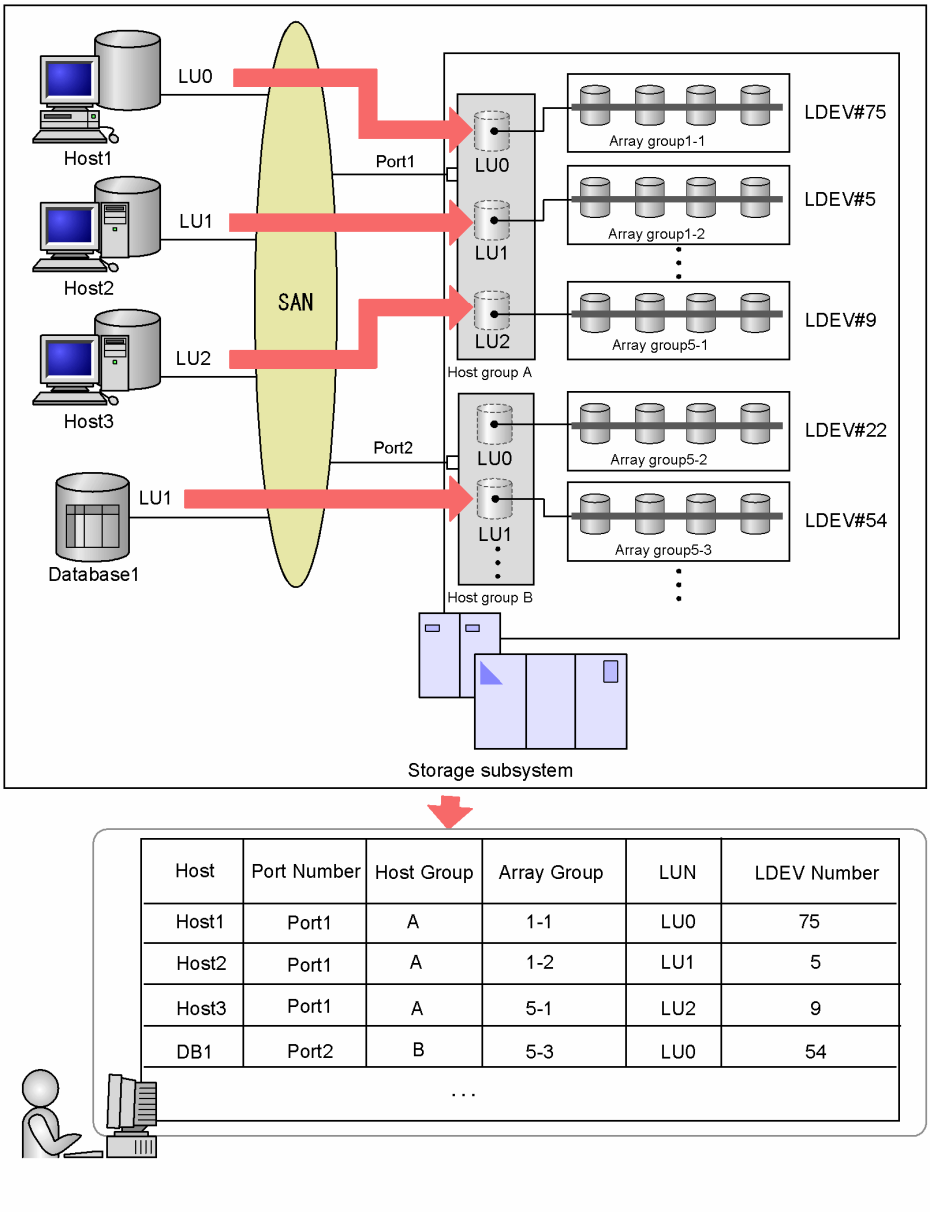
1.2 Tuning Manager Software

The Tuning Manager software is a solution that monitors, reports, and forecasts storage performance and capacity in the context of the entire storage network, including hosts, file systems, database applications, SAN switches, and the internal disk storage components of all tiers of storage systems. Tuning Manager periodically discovers the capacity and performance of storage devices, file systems, hosts, databases and network attached storage (NAS) devices. It then consolidates, analyzes, and reports on current performance, capacity, utilization, historical and future usage trends, and notifies you of any predetermined threshold violations. Tuning Manager provides the information you need to make informed decisions and more efficiently operate your storage environment while taking the guesswork out of planning and budgeting for future growth. Tuning Manager's reports, charts, and other metrics help you to:

- Replace risky guesswork with fact-based decisions
- Identify all storage systems on the network and their current performance, capacity, and utilization
- Determine how many and what kind of servers exist on your whole network and its subnetworks, and the storage they are consuming
- Determine which storage systems are either under- or over-utilized or under- or over-allocated
- Quantify file systems total capacity, amount used, and amount remaining
- Detect and prevent capacity shortages with proactive alerts when critical thresholds are violated
- Detect and prevent potential performance bottlenecks with alerts when predetermined thresholds are violated
- Isolate the root cause of application response time problems by monitoring and reporting the performance of all components in the path from the host and database application to the disk parity group
- Determine when to acquire additional storage capacity
- Understand the relationship between the host's file systems, logical devices, and corresponding physical storage components
- Understand the RAID configuration of the storage system associated with a host's file systems

Tuning Manager collects performance data from the operating systems installed on the servers and databases (such as Oracle®) connected to a SAN, as well as from storage subsystems. Tuning Manager enables you to display the collected performance data as described below, enabling you to easily manage the performance and configuration for each resource in a SAN environment:

- Relate file systems and database tables to ports on the storage subsystems and logical devices, and display them collectively (Figure 1.1).
- Display the performance and capacity summary information as well as reports generated from Main Console for the units selected in the tree-like structure (Figure 1.2).



Host	Port Number	Host Group	Array Group	LUN	LDEV Number
Host1	Port1	A	1-1	LU0	75
Host2	Port1	A	1-2	LU1	5
Host3	Port1	A	5-1	LU2	9
DB1	Port2	B	5-3	LU0	54
...					

Figure 1.1 Displaying Ports, Disk Subsystems, LUNs, and LDEVs of Databases and File Systems

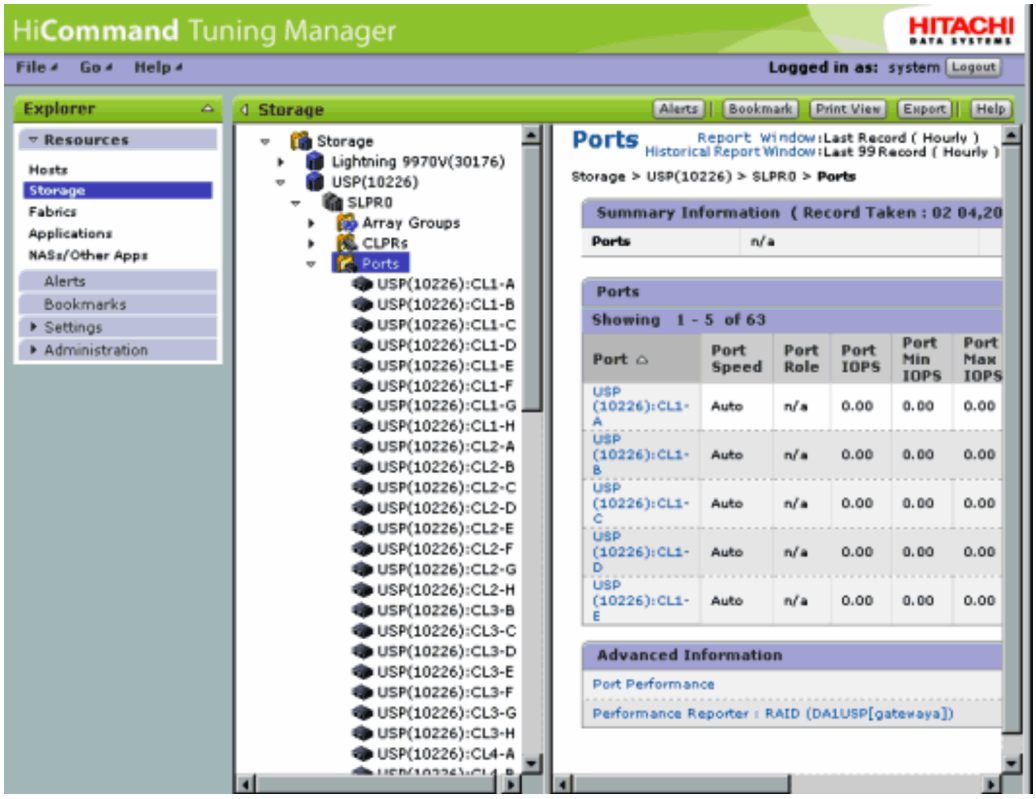
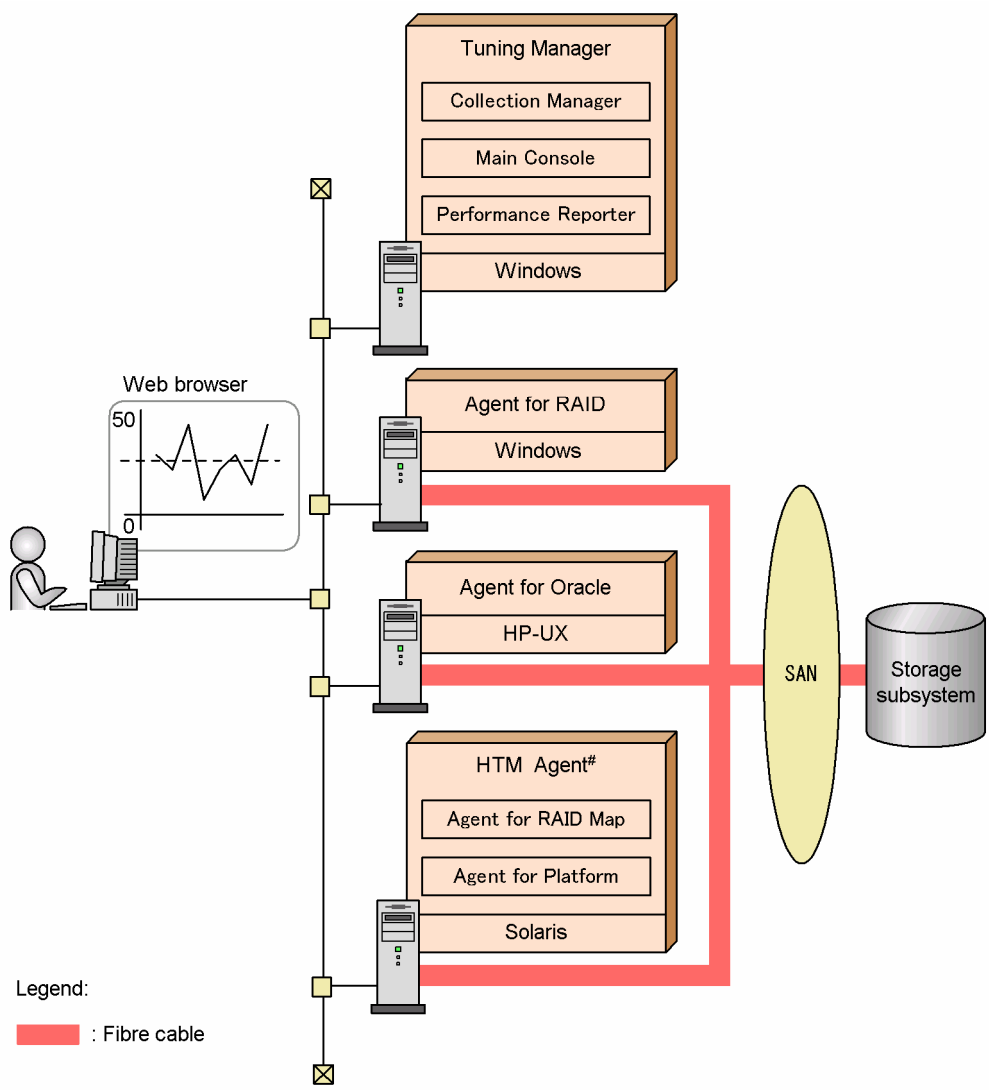


Figure 1.2 The Tuning Manager Resource Tree with Ports Selected

1.3 The Tuning Manager System Configuration

Tuning Manager is actually a series of software components working together to monitor an entire network and collect performance data from the various systems. The Tuning Manager series consists of Agents that collect the performance data for each monitored resource and the Tuning Manager program that manages all the Agents. Figure 1.3 shows an example of the system configuration.



#: If you install HTM Agent, Agent for RAID Map and Agent for Platform are also installed.

Figure 1.3 Example Tuning Manager System Configuration

Note: This is one possible configuration. In the simplest configuration, Agent for RAID and Agents (other than the Agents for databases) can all be installed and running on the Tuning Manager server machine. An Agent for a database must always be installed and running on the same machine as the database to be monitored.

Figure 1.4 shows how the different components of Tuning Manager work together to collect data.

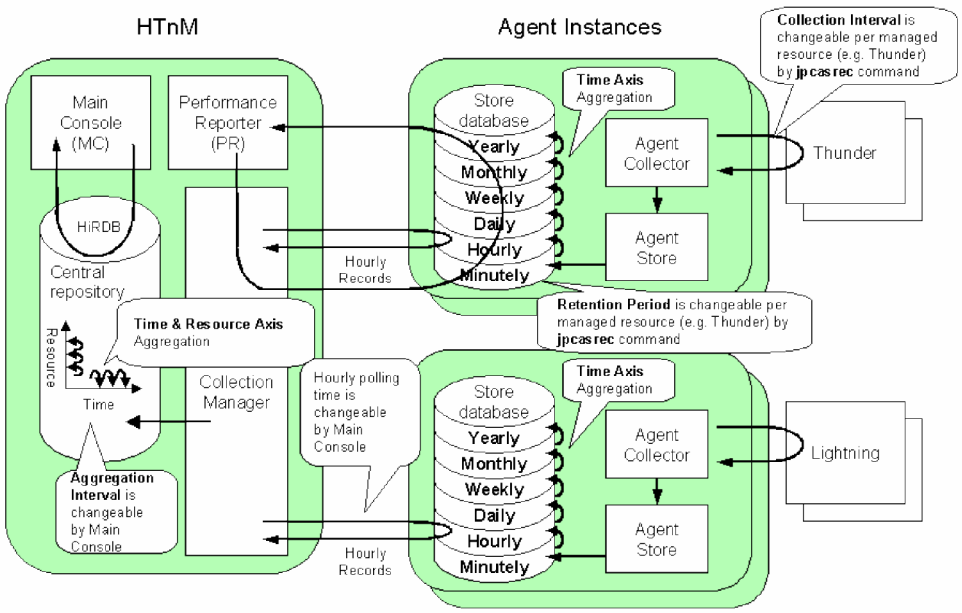


Figure 1.4 Data Collection Overview

The Tuning Manager program uses the internal component Collection Manager to accumulate the performance data collected from each Agent and uses Main Console and Performance Reporter to display data. The role of each component can be summarized as follows:

Collection Manager. Collection Manager runs in the background on the Tuning Manager server and manages the Tuning Manager products and manipulates performance data so that the programs function correctly as a comprehensive system.

Main Console. Collection Manager stores the hourly average value of the performance data collected by the Agents in the central repository of Tuning Manager. Main Console displays the data accumulated in the central repository as a report according to the specified time frame and interval. The Tuning Manager central repository is managed by the relational database system HiRDB.

Main Console displays links to Performance Reporter.

Performance Reporter. Performance Reporter displays performance data collected directly from the Store databases of each Agent and also provides a simple menu-driven method to develop your own custom reports. Performance Reporter reports the performance data collected by a specific agent and enables you to display agent-instance level reports and customized reports with a simple mouse click. Performance Reporter can analyze and report real-time or very recently collected data that is still resident in the local agent's data store, or it can report any past time period by querying the Store databases for historical information. Performance Reporter does not connect to HiRDB.

Agents. Agents run in the background and collect and record performance data. There must be a separate Agent for each unit, which includes each platform, application program, and database monitored by Tuning Manager. If needed, the Agents continually gather hundreds of performance metrics and store them in their local database for instant recall. Agents enable the Tuning Manager program to collect the performance data of monitored objects. The collected data is used to display information about the entire SAN environment within Main Console and information about specific resources in Performance Reporter. An Agent collects the performance data from a monitored OS, database (such as Oracle), or storage subsystem, and stores the performance data into the databases. The databases are called Store databases, and each Agent manages a Store database. Collection Manager accumulates all the Agent Store database metrics hourly and stores those metrics in the central repository of the Tuning Manager program.

The following lists the different kinds of Agents and their functions:

Agent for RAID. Collects performance data and configuration information of storage subsystems.

HTM Agent. HTM Agent consists of the following components:

- **Agent for RAID Map**. Maps the relation between the servers and storage and collects configuration information about the host's file system and the corresponding storage subsystem's resources.
- **Agent for Platform (Windows®, UNIX®)**. Collects performance data of servers, such as the operating status of the OS.
- **Agent for Microsoft® Exchange Server**. Collects performance data, such as the message transfer status of Exchange Server and the status of sent and received data.

Agent for SAN Switch. Collects performance data for switches.

Agent for Network Attached Storage. Collects performance data and configuration information about the NAS system.

Agent for Oracle. Collects performance data of Oracle databases.

Agent for Microsoft SQL Server. Collects performance data of Microsoft SQL Server databases.

Agent for DB2®. Collects performance data of DB2 databases.

Note: A single Tuning Manager program can manage up to 200 Agents, so preparing multiple Tuning Manager hosts enables administrators to distribute the Agent-management workload.

1.3.1 Distributed Metrics-Repository Architecture

Tuning Manager has the capability to manage the large-scale infrastructures of storage environments: It has a distributed metrics-repository architecture consisting of HiRDB for trend-analysis, alerting, and forecasting, and distributed Store databases for troubleshooting and deeper analysis. HiRDB stores information about resources, summarized metrics, and correlation information. The Store databases store detailed metrics.

Tuning Manager has two viewers; Main Console, which allows you to view data retrieved from HiRDB, and Performance Reporter, which allows you to view real-time data and data retrieved from each Store database. The features of each viewer and corresponding database are described below.

1.3.2 Main Console

Main Console allows you to view data retrieved from the central repository of Tuning Manager so you can pinpoint the source of a performance bottleneck. The main information displayed by Main Console is as follows:

- Performance summaries for each resource (the latest 1 hour average only)
- Comparisons of performance among resources
- List of connected resources (correlation between resources)
- Resource tree (hierarchy)
- Resource properties
- Major metrics
- Direct links to resources

Main Console is resource-focused (managed-object focused) and helps you find out target resources and metrics. Reports and features of reports displayed by Main Console are as follows:

- Summary reports and reports summarizing multiple resources (View of the entire system, display of a system overview, comparison analysis, and display of trends)
- One-click report display by clicking a resource or link
- Display of the data stored in HiRDB
- Definition of metrics views, view formats, and time ranges of the data to be displayed is not required
- Display of single records (the range can be specified). You can select from the latest one hour, the previous day, previous month, or the previous year.
- Reports of trends for a single period (latest 1 hour, previous day, previous month, and previous year)

1.3.3 Performance Reporter

Performance Reporter allows you to view data retrieved from each Store database to analyze resources deeply and in detail. The main information displayed by Performance Reporter is as follows:

- Detailed metrics (e.g. minutely) collected in agents
- All metrics including those that are not gathered in Main Console

Performance Reporter is metrics-focused and reports the target metrics in a target resource in detail (e.g. minutely). Reports and features of reports displayed by Performance Reporter are as follows:

- Reports for each minute
- Definition of reports, view format, and selection of the time range of the data to be displayed is possible
- Real-time display of metrics and display of metrics stored in each Store database
- Capability of displaying a report of all the metrics collected by an Agent
- Multiple record output (range can be specified). You can select from minutely, hourly, monthly, and yearly.

1.4 Reviewing the Managed Resources

The Tuning Manager main window, Main Console, lets you view and analyze the capacity and performance of all storage systems and their ports, logical devices, and disk storage groups as viewed from the perspective of their associated servers, databases, and file systems. Figure 1.5 shows an example of the Main Console window displaying Performance Information when **Hosts** is selected.

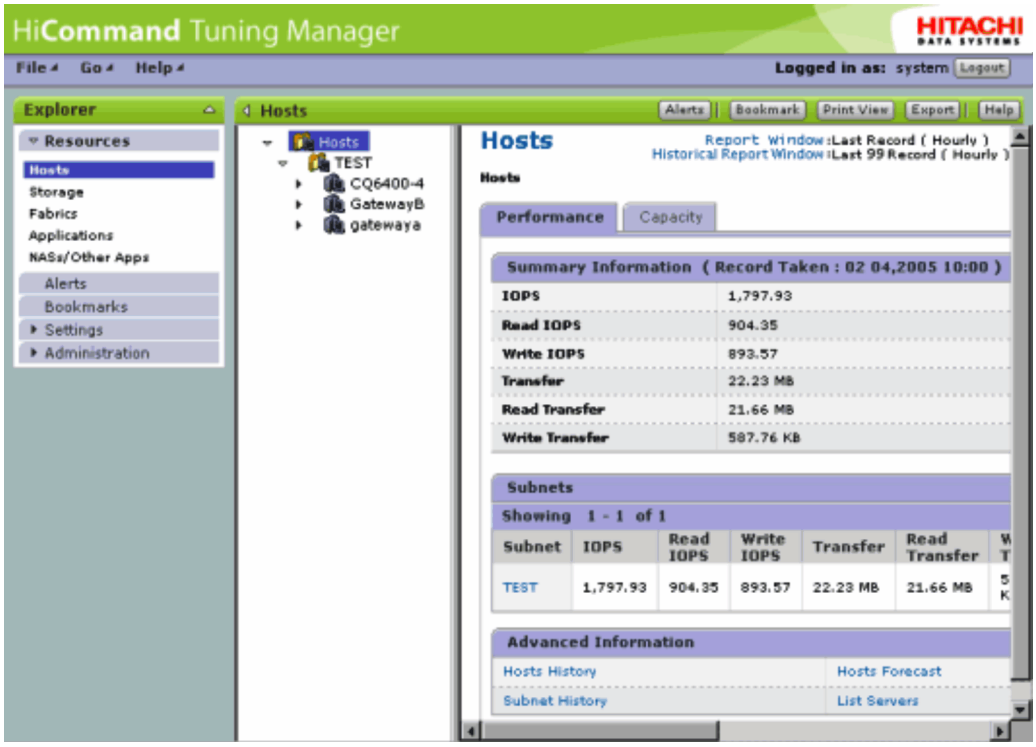


Figure 1.5 The Tuning Manager Main Console Window when Hosts is selected

The left side of the Main Console window displays the Resource Tree, a hierarchical display with successive levels of detail about your network of servers, its subnetworks, hosts, storage, and applications. As you select each level in the tree, the metrics and charts about each selected resource and its subresources are displayed in the right side. In the right side, you can toggle between Capacity and Performance Information.

The displayed resources change depending on the selected resource category. Depending on the selected categories and resources, any combination of the following resources is displayed: Hosts, Subnetworks, Servers, Filesystems, Device Files, Storage, Subsystem, SLPR, Ports, CLPR, Logical Disks, Whole Fabric, Fabric, Switch, Switch Port, Oracle, Oracle Instance, and Tablespace.

The Main Console provides a bi-directional view of the resources on the network. With the Resource Tree and the many hyperlinks that are embedded in the Tuning Manager reports, you can navigate through all of the resources in the network in either direction, up or down, or view the capacity or performance of each resource from different perspectives. As an example, you can display a Disk Array Group in a particular storage system and then find and display the performance and capacity of all of the hosts, file systems, or Oracle instances associated with that particular Disk Array Group. Conversely, you can select a host, file system, or an Oracle instance, and navigate down to display all of the storage, ports, logical devices, or disk array groups associated with that particular host, file system, or Oracle instance.

1.4.1 I/O Path

Figure 1.6 shows an example of the I/O path that an application uses to access storage resources on a system. Tuning Manager obtains the performance data for each component along the path.

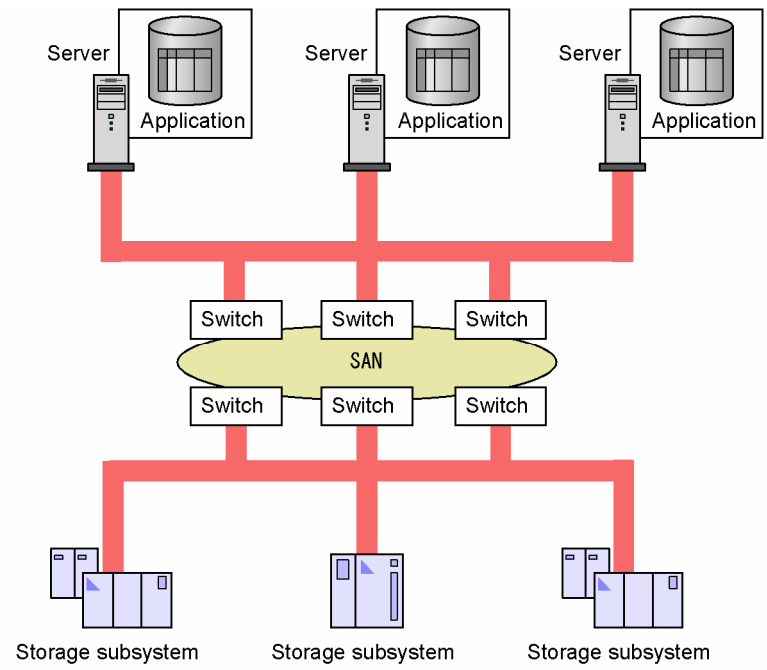


Figure 1.6 I/O Path Example

Figure 1.7 shows some of the corresponding metrics that can be viewed for each resource in the example I/O path. Chapter 7 uses this example system to describe a performance bottleneck analysis procedure.

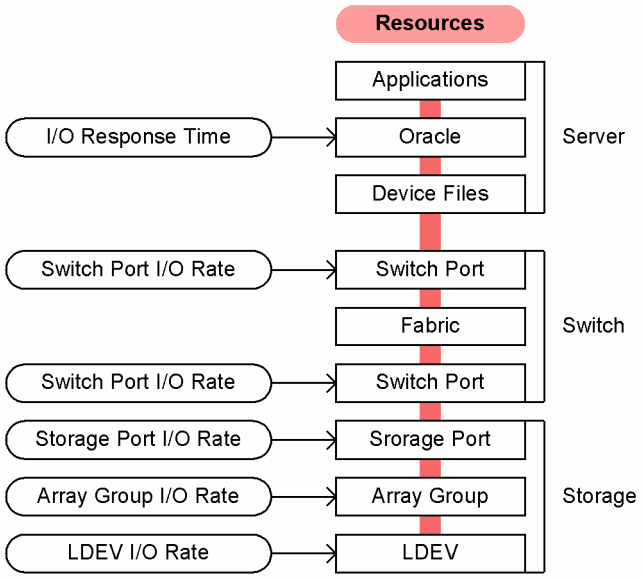


Figure 1.7 Metrics and Resources

The bi-directional view provided by Main Console is essential when trying to determine the root cause of an application performance problem. For example, when the performance of an application on the Oracle application server shown above is slower than expected and you need to check if a bottleneck on the storage subsystem is causing the performance problem, you can use Tuning Manager to complete the following steps until you find the bottleneck and its cause. For a detailed description of the procedures involved in this example, see Chapter 7.

1. Identify server and device files based on the application name or database name.
2. Check the I/O performance of the device files, especially the I/O response time.
3. Determine which side has issues between the server side and switch, storage side.
4. Check the I/O performance of the storage ports for the device files.
5. Check the I/O performance of other servers connected to the same storage port.
6. Determine which server is affecting the performance of the storage port.
7. Check the I/O performance of the array groups for the LDEV.
8. Check the I/O performance of other the servers connected to the same array group.
9. Determine which server is affecting performance of the array group.
10. Check the I/O performance of the switch ports connected to the server.

1.4.2 Management Perspectives

With the bi-directional view provided by the Resource Tree you can navigate through all of the resources in the network in either direction, up or down, or view the capacity or performance of each resource from different perspectives. All the resources are categorized under five perspectives and displayed when **Resources** is selected in the explorer area; Hosts (Whole Network), Storage, Fabric, Application, and NAS/Other Apps. The following sections describe the level of analysis provided for each perspective.

1.4.3 Hosts Perspective

As shown in Figure 1.8, Tuning Manager provides hosts analysis at the following resource levels listed in descending order from summary to most detailed: Whole Network of Storage Servers, Subnetworks of Storage Servers, Servers (Hosts), Filesystems, and Device Files.

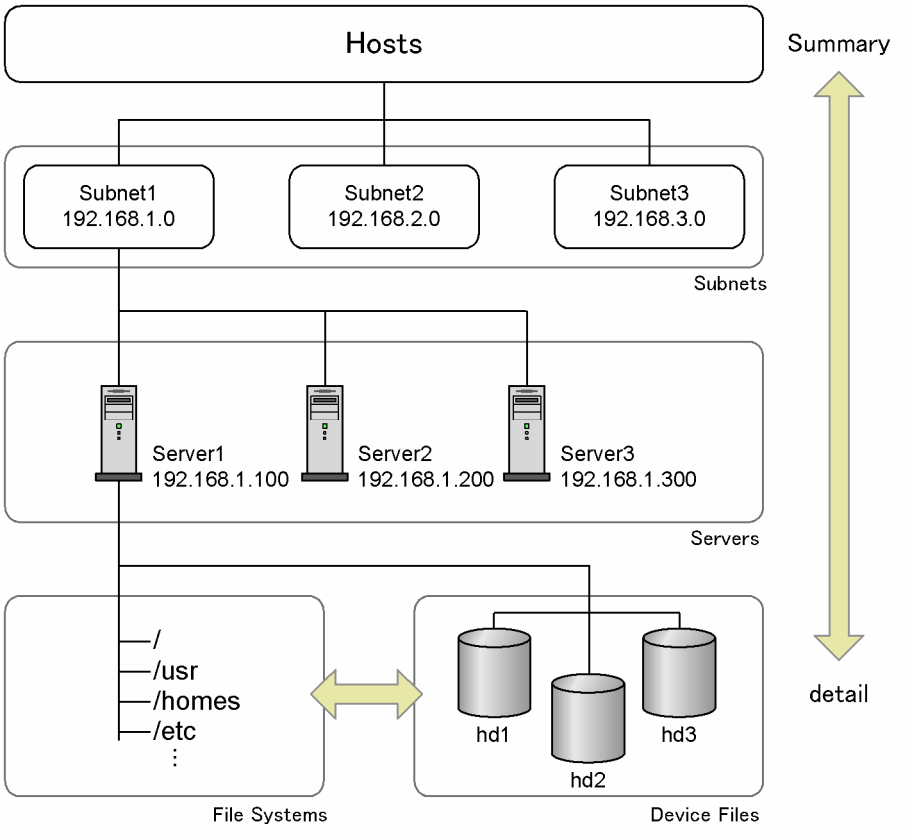


Figure 1.8 Hosts Resource Levels

1.4.4 Storage Perspective

As shown in Figure 1.9, Tuning Manager provides storage analysis at the following resource levels listed in descending order from summary to most detailed: Storage, Subsystems, Port, Logical Disk, and Array Groups.

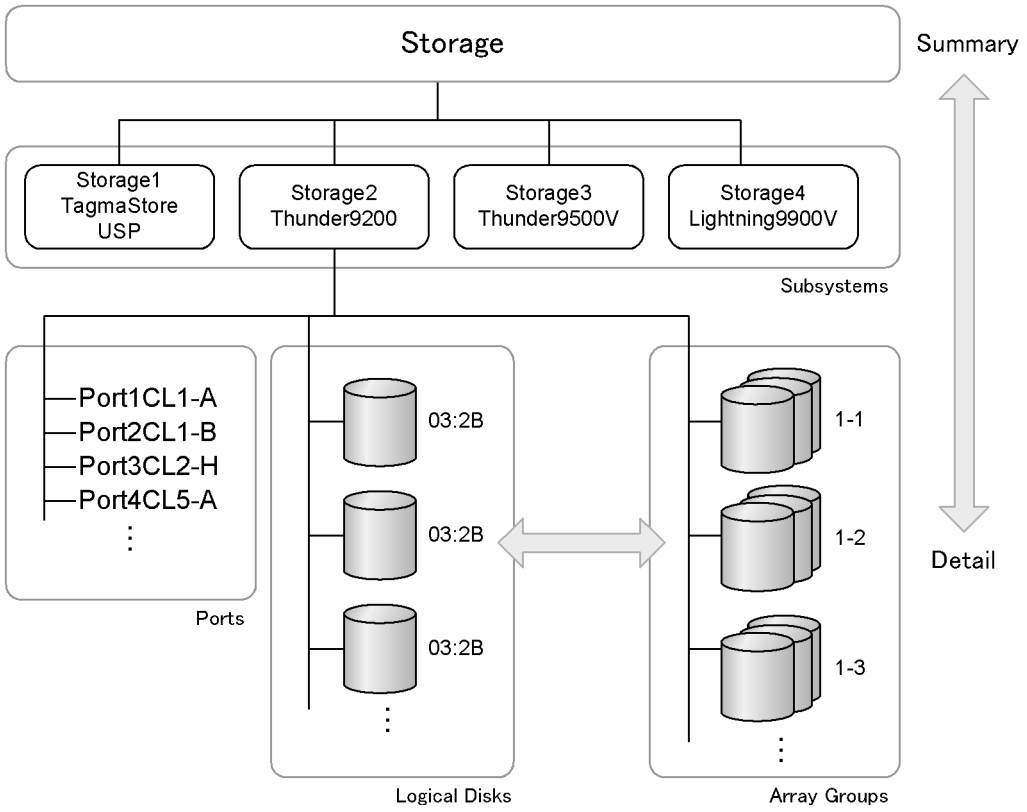


Figure 1.9 Storage Resource Levels

1.4.5 Fabric Perspective

As shown in Figure 1.10, Tuning Manager provides Fabric analysis at the following resource levels listed in descending order from summary to the most detailed: Whole Fabric, Fabric, SAN Switch, and Switch Port.

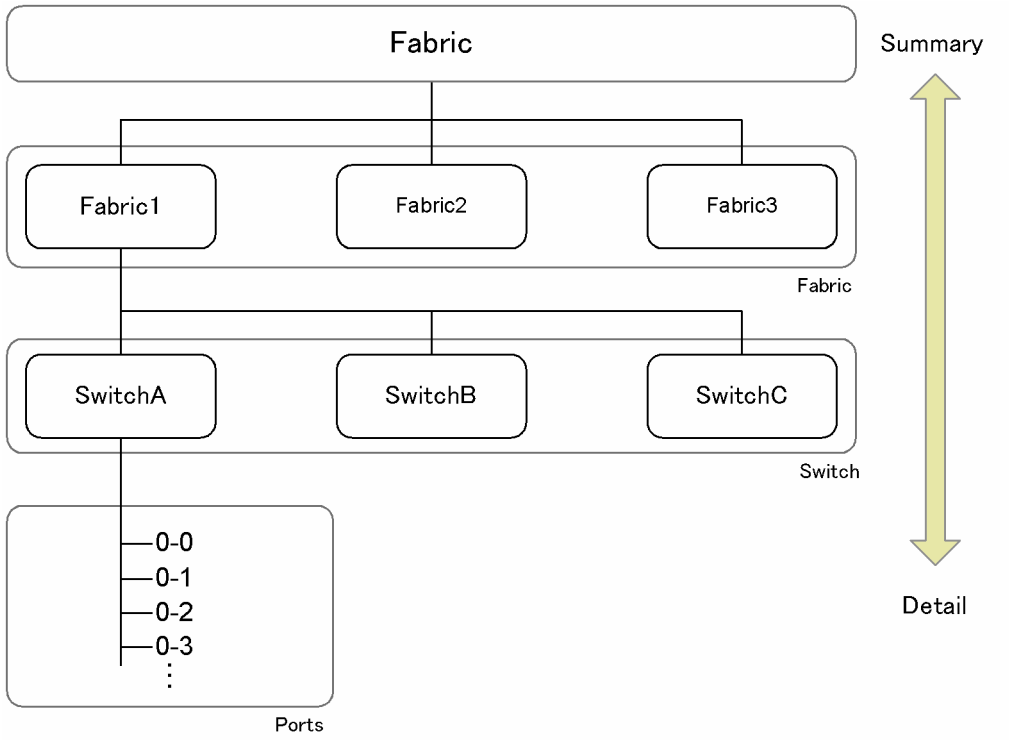


Figure 1.10 Fabric Resource Levels

1.4.6 Applications Perspective

As shown in Figure 1.11, Tuning Manager provides capacity and performance analysis of Application (Oracle-related) resources at the following resource levels listed in descending order from summary to most detailed: Oracle, Oracle Instance, Tablespaces, and Datafiles.

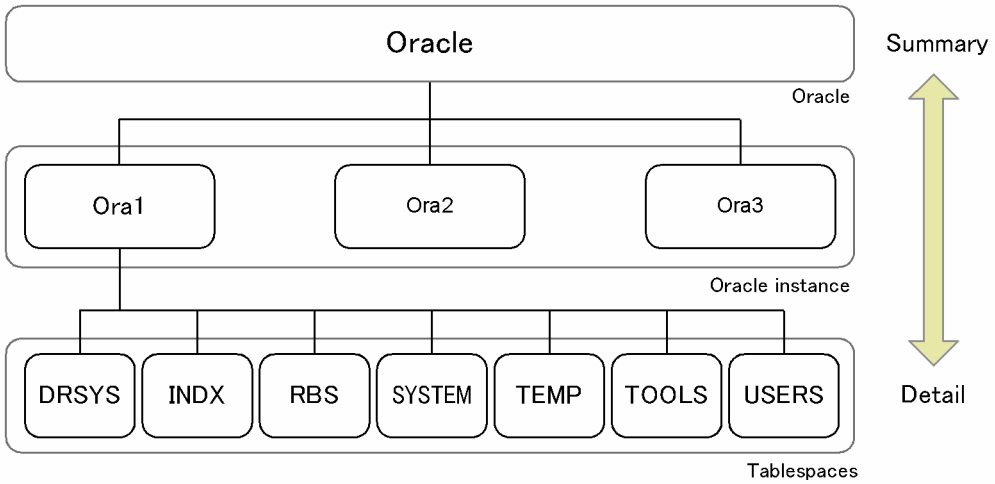


Figure 1.11 Application Resource Levels

1.4.7 NASs/Other Apps Perspective

Tuning Manager provides capacity and performance analyses of the NAS system in a storage subsystem and other applications only on the Agent-instance level. NAS and other application resources are displayed in the Resource Tree only when a corresponding Agent is running for the NAS or other application resource. When the resource is selected in the Navigation area, Performance Reporter is launched to display the information.

1.5 Reviewing the Data Model

Agents of Tuning Manager continuously monitor hundreds of metrics and collect the metric data in records in their Store databases. Each record consists of smaller units called fields. Records and fields are collectively displayed in reports and are called the Tuning Manager data model.

Knowledge of the data model is not required when viewing reports generated from Main Console but is required when you want to define your own reports. Records are classified into three types according to their characteristics. For details about the data model for each Agent, see the *HiCommand Tuning Manager Hardware Reports Reference*, *HiCommand Tuning Manager Operating System Reports Reference*, or *HiCommand Tuning Manager Application Reports Reference*. The record types that are used to collect performance data are predefined in each Agent in provided solution sets.

The record types are as follows:

- **Product Interval record type** (abbreviated as *PI record type*)

  For records of the PI record type, the agent collects performance data for a specified interval, such as the number of processes in one minute. You can use these records to analyze changes or trends in the system status over time.

- **Product Detail record type** (abbreviated as *PD record type*)

  For records of the PD record type, the agent collects performance data that indicates the system status at a specific point in time, such as detailed information about the currently active processes. You can use these records to obtain the system status at a particular time.

- **Product Log record type** (abbreviated as *PL record type*)

  For records of the PL record type, the agent collects application or log information of a database that is being executed on UNIX. Only Agent for Platform (UNIX) can collect records of the PL record type.

Each record name includes the record type abbreviation in the name. For example, the Device Detail (PD_DEV) record for Windows is a Product Detail type record that stores performance data indicating the status (at a specific point in time) of file system driver and kernel driver devices. In the record name, the string in the parentheses (in this example, “PD_DEV”) is the record ID. The fields contained in the Device Detail (PD_DEV) record are as follows: Active, Depend Group Name, Depend Service Name, Device Name, Device Type, Error Control, Group Name, Image Path, Interval, Object Name, Record Time, Record Type, Start Constant, and Tag. For a list of all the available metrics and corresponding resources and record IDs, see Appendix A.

You can use Performance Reporter to select specific performance data records and metrics from the hundreds of records and metrics available to be displayed in reports displayed with Performance Reporter. For details about using Performance Reporter, see section 4.2.

1.6 Reviewing the Monitored Metrics

Tuning Manager collects, stores, and analyzes hundreds of metrics that are available to you for display in reports that you can also use to develop customized reports. Most of the metrics are available for real-time viewing, historical trending, forecasting, and troubleshooting. For details about the available metrics, see Appendix A. Of all the metrics that are continuously monitored, Table 1.1 and Table 1.2 list the most important and commonly-used.

Note: For definitions of the following metrics and other available metrics, see the Glossary.

Table 1.1 Server-Centric Metrics

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Device File	IO Response Time	Avg Disk Secs/Xfer	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Read IOPS	Disk Reads/sec	Physical Disk Overview(PI_PHYD)	Supported
Device File	Write IOPS	Disk Writes/sec	Physical Disk Overview(PI_PHYD)	Supported
Device File	Read Transfer	Disk Read Bytes/sec	Physical Disk Overview(PI_PHYD)	Supported
Device File	Write Transfer	Disk Write Bytes/sec	Physical Disk Overview(PI_PHYD)	Supported
Logical Disk	Not applicable	Avg Disk Read Queue Length	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Avg Disk Write Queue Length	Logical Disk Overview(PI_LOGD)	Not supported
Server (System)	Not applicable	Processor Queue Length	System Overview(PI)	Not supported

Table 1.2 Storage-Centric Metrics

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Array Group	Disk IOPS	Read I/O /sec	RAID Group Summary(PI_RGS)	Supported
Array Group	Disk IOPS	Write I/O /sec	RAID Group Summary(PI_RGS)	Supported
Array Group	Disk Transfer	Read Xfer /sec	RAID Group Summary(PI_RGS)	Not supported
Array Group	Not applicable	Write Xfer /sec	RAID Group Summary(PI_RGS)	Not supported
Array Group	Read Hit Ratio	Read Hit I/O Count	RAID Group Summary(PI_RGS)	Supported
Array Group	Write Hit Ratio	Write Hit I/O Count	RAID Group Summary(PI_RGS)	Supported
Array Group	Usage	Busy %	RAID Group Summary(PI_RGS)	Not supported
Array Group	Max Usage	Max Busy %	RAID Group Summary(PI_RGS)	Not supported
LDEV	Read I/O Response Time	Read Response Rate	Logical Device Summary(PI_LDS)	Supported
LDEV	Write I/O Response Time	Write Response Rate	Logical Device Summary(PI_LDS)	Supported
LDEV	Disk IOPS	Read I/O /sec	Logical Device Summary(PI_LDS)	Supported
LDEV	Disk IOPS	Write I/O /sec	Logical Device Summary(PI_LDS)	Supported
LDEV	Disk Transfer	Read Xfer /sec	Logical Device Summary(PI_LDS)	Not supported
LDEV	Not applicable	Write Xfer /sec	Logical Device Summary(PI_LDS)	Not supported
LDEV	I/O Response Time	Total Response Rate	Logical Device Summary(PI_LDS)	Supported
Port	Port IOPS	Avg I/O /sec	Port Summary(PI_PTS)	Supported
Port	Port Max IOPS	Max I/O /sec	Port Summary(PI_PTS)	Supported
Port	Port Transfer	Avg Xfer /sec	Port Summary(PI_PTS)	Supported
Port	Port Max Transfer	Max Xfer /sec	Port Summary(PI_PTS)	Supported
Subsystem	Write Pending Rate	Cache Write Pending Usage	Storage Summary(PI)	Supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Subsystem	Max Write Pending Rate	Max Cache Write Pending Usage %	Storage Summary(PI)	Supported
Subsystem	Side File Usage	Cache Side File Usage %	Storage Summary(PI)	Supported
Subsystem	Max Side File Usage	Max Cache Side File Usage %	Storage Summary(PI)	Supported

Each Tuning Manager report contains a table of the metrics data available in the report. All of the reports generated from Main Console can be easily modified. Additionally, the Tuning Manager report generator, Performance Reporter, provides a simple, menu-driven method to develop your own custom reports and analysis by accessing the hundreds of real-time and historical metrics in the Agent data stores. Once you understand Tuning Manager's reporting capabilities, you can begin to develop a plan for the ongoing monitoring of your key capacity and performance management metrics.

1.7 Reviewing the Reports

Tuning Manager reports can be requested for a current real-time snapshot, any past point in time, or as a historical trend analysis over a specified time period. The historical data stored in the HiRDB is also used as input for the Tuning Manager reports that forecast future performance or capacity trends. All of these reports can be customized and printed or exported for use with other software tools.

Figure 1.12 is an example of the File System Capacity report for all of the servers on the network and Figure 1.13 is an example of the File System Capacity report for all of the file systems on the “CQ6400-4” server. The columns in each report can be sorted in descending or ascending sequence by simply clicking on the column heading so that you can quickly identify the file systems with the most or the least capacity available or utilized. The information area (Favorite Charts) of the Main Console window can display capacity graphs that you selected in advance for display whenever the File System Capacity report is displayed. All of this data can be exported to a CSV format file for further manipulation by other software applications.

Tuning Manager lets you view the capacity for all of the servers on the network.

Filesystems Capacity : Hosts Print Export

02 04,2005 10:00 (Hourly)

Showing 1 - 32 of 32

Filesystem	Host	Operating System	Filesystem Type	Capacity	Used	Free	Free %	Growth Rate	Filesystems Over Capacity	Inode
C:	CQ6400-4	Microsoft Windows 2000 5.00.2195	Win	16.92 GB	3.87 GB	13.05 GB	77.14%	0.05%	Yes	n/a
C:	GatewayB	Microsoft Windows 2000 5.00.2195	Win	68.35 GB	7.26 GB	61.10 GB	89.38%	0.05%	Yes	n/a
C:	gatewaya	Microsoft Windows 5.02.3790	Win	68.35 GB	6.86 GB	61.49 GB	89.96%	0.14%	Yes	n/a
D:	gatewaya	Microsoft Windows 5.02.3790	Win	48.83 GB	66.00 MB	48.76 GB	99.87%	0.0%	Yes	n/a
E:	CQ6400-4	Microsoft Windows 2000 5.00.2195	Win	16.94 GB	2.82 GB	14.13 GB	83.38%	0.0%	Yes	n/a
E:	GatewayB	Microsoft Windows 2000 5.00.2195	Win	19.52 GB	1.68 GB	17.84 GB	91.39%	0.0%	Yes	n/a
E:	gatewaya	Microsoft Windows 5.02.3790	Win	20.36 GB	65.00 MB	20.30 GB	99.69%	0.0%	Yes	n/a
F:	gatewaya	Microsoft Windows 5.02.3790	Win	19.52 GB	1.99 GB	17.54 GB	89.81%	0.0%	Yes	n/a
F:	GatewayB	Microsoft Windows 2000 5.00.2195	Win	20.08 GB	1.29 GB	18.79 GB	93.59%	0.0%	Yes	n/a
F:	CQ6400-4	Microsoft Windows 2000 5.00.2195	Win	20.08 GB	757.00 MB	19.34 GB	96.32%	0.0%	Yes	n/a

Figure 1.12 File System Capacity (Hosts)

The subresource view provided by Tuning Manager lets you observe capacity for all the file systems on a specific server.

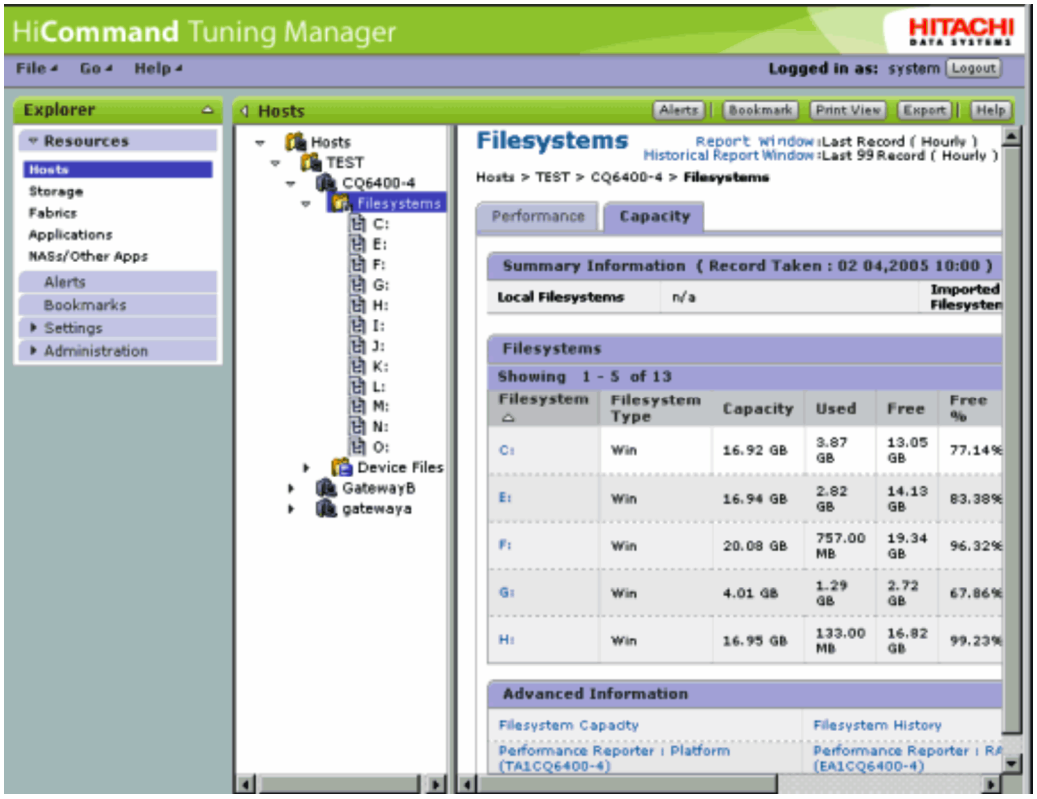


Figure 1.13 File System Capacity subresources

Note: The displayed time frame and Collection Interval are determined by your current **Report Window** settings.

The information area (Advanced Information) of Main Console lists the reports that you can display with Main Console for each resource. Advanced Information provides a variety of historical and forecast reports that access HiRDB that stores collected metrics data acquired hourly from each Agent and reported at the time specified in the current **Report Window** setting. Main Console is also used to launch Performance Reporter, which generates reports that directly access real-time data and the Store databases of each Agent to display real-time and historical data. When you select a report to be displayed with Performance Reporter, it appears in its own browser window.

1.7.1 Reports Generated from Main Console

Depending on the selected resource, a combination of the following reports generated from Main Console is available in the information area (Advanced Information) of the Main Console window:

List. List reports enumerate key data for a list of resources.

Resource Summary. Resource Summary reports display key measures of capacity or performance for the current level selected in the Resource Tree.

Sub-resource Summary. Sub-resource Summary reports display key measures of capacity or performance for the resources below the current level selected in the Resource Tree.

History. History reports enumerate key data collected from a resource for a specified time period.

Forecast. Forecasts predict future values by using data for the resources collected in the Last Record, and configured time intervals.

Figure 1.14 provides an example of a CLPR Performance report, which displays a chart indicating the Write Pending Rate.

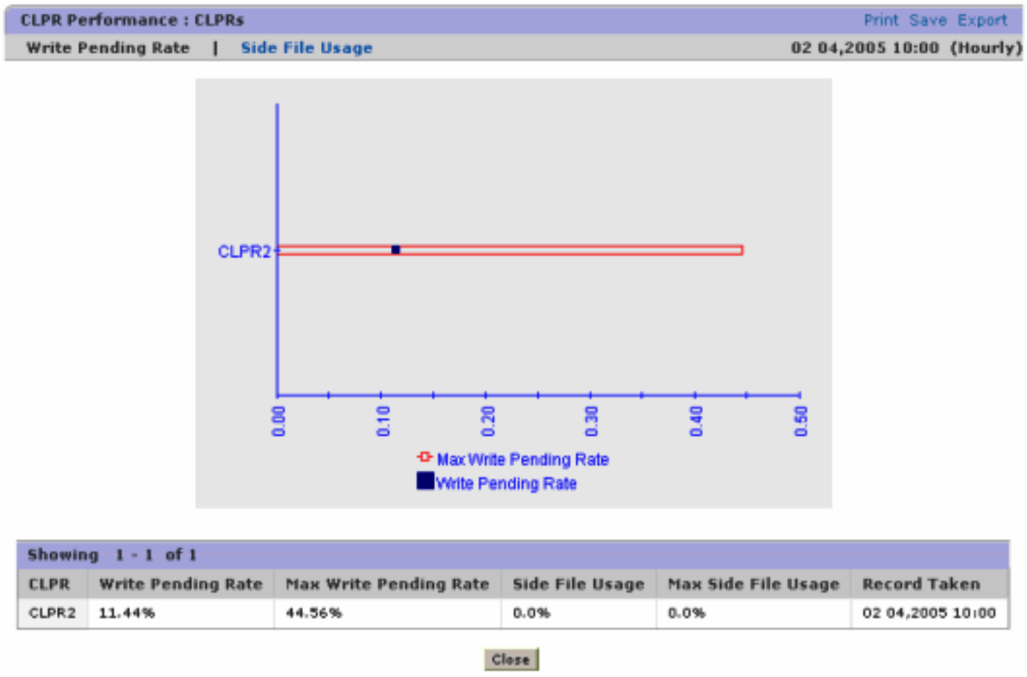


Figure 1.14 Performance: CLPR Performance

Reports generated from Main Console share these attributes when displayed:

- The time frame and Collection Interval displayed are determined by your current **Report Window** settings.
- Each report generated from Main Console contains a chart accompanied by a table of the underlying metrics data.
  - The metrics data table displays a maximum of 99 rows at a time. When the metrics contain more than 99 rows, Tuning Manager displays **Next** and **Previous** hyperlinks. (Use the **Next** and **Previous** hyperlinks to navigate in groups of 99 rows.)
  - Although charts are plotted using raw data, tables of data appearing along with charts do make use of rounding to make the display more manageable.
  - When multiple subtables are available for display, you can jump directly to each section of the table. Numbered hyperlinks appear for this purpose.
  - Each chart shown in a report generated from Main Console displays a maximum of 8 resources as individually labeled items. The Tuning Manager charts label all additional resources as **Other**.
  - In the information area (Favorite Charts), which is between the information area (Sub Resource Section) and Information area (Advanced Information) of Main Console, you can insert the charts for reports that you reference often so that you do not need to select the reports each time to display the charts.

1.7.2 Reports Generated from Performance Reporter

Reports displayed with Performance Reporter are available in the information area (Advanced Information) of the Main Console when you select **Performance Reporter** from the **Go** menu in the Main Console task bar. When you start Performance Reporter from the information area (Advanced Information), the Performance Reporter window appears and shows the top folders in the report folder tree for the selected agent. You can open the folders and select the reports to be displayed. When you start Performance Reporter from the **Go** menu, the Performance Reporter main window is displayed without an agent selected.

Note: For information about Main window components, see section 1.14.1.

Performance Reporter directly collects information from the Store database of an Agent to display historical data and directly accesses real-time data to display real-time data. A historical report displays data from a specified interval of time. A real-time report displays temporarily collected, current data.

Any of the following three report types can be selected, as appropriate to the analysis objectives for the performance data:

- **Historical report (single Agent)**: This type of report displays one Report window for each Agent. When multiple Agents are selected, the report displays as many windows as the number of Agents you have selected.

  A single-Agent historical report handles the following record types:

  - Single instance: Records that use a single instance as their evaluation target. A record for which only one row is created for one data collection is called a single-instance record.
  - Multiple instances: Records that use multiple instances as their evaluation target. A record for which multiple rows are created for one data collection is called a multiple-instance record. This can be useful, for example, in comparing data in the same field in multiple Agents.

- **Historical report (multiple Agents)**: This type of report displays all selected Agents in a single window, regardless of whether a single report or multiple reports are selected.

- **Real-time report (single Agent)**: Displays current data, temporarily collected, for a single Agent. The collected values can be displayed in order, and ranked. Note that past data cannot be obtained for display, since it is not stored in the Store database. Real-time reports (single Agent) support data from single-instance or multiple-instance records.

Additionally, for more detailed information you can also display drilldown reports from primary reports. For example, you can select a desired date on a daily report and access an hour-by-hour report for that date. For details about displaying drilldown reports, see section 5.3.6.3.

Note: Some reports displayed with Performance Reporter do not initially show graphs; however, you can easily add a graph to a report by copying the report from the provided system reports and customizing the report. For details about customizing reports, see section 5.3.

1.7.3 Solution Sets

Each Agent provides a solution set containing predefined reports that have fields pre-selected for display in the reports. You can use Performance Reporter to select the reports from the solution set to define your own reports either by creating new reports or customizing the fields displayed in the reports of the solution set. The solution sets facilitate the setup for monitoring the operating status of monitored objects. You can customize a solution set as appropriate to your environment.

The reports in the solution set are located in the folders that you open in Performance Reporter when you select the **Reports** tab and then select a folder in System Reports. The following example shows the reports available in the Monthly Trend folder of the solution set for Agent for Platform (Windows).

```
<Windows>
 +-- <Operating System>
     +-- <Monthly Trend>
     |   +-- CPU Trend
     |   +-- CPU Trend (Multi-Agent)
     |   +-- Memory Available Trend (Multi-Agent)
     |   +-- Process Trend
     |   +-- Server Activity Summary Trend (Multi-Agent)
     |   +-- Server Sessions Trend (Multi-Agent)
    ...
```

Each report in the solution set displays information stored in the fields of a record. The fields of the record to be displayed are pre-defined for the report in the solution set. For example, the System Summary Overview (PI) record stores performance data, taken at specific intervals, about the entire system and the CPU Trend report in the solution set for UNIX uses fields of the System Summary Overview (PI) record (CPU %, Kernel CPU %, and User CPU %) to display the historical data on CPU usage at a specific host on a daily basis over the past month.

The System Summary Overview (PI) record stores many other metrics in fields and you can select those metrics to define your own reports. For details about the reports in the solution sets and the fields in the records provided with each Agent, see the *HiCommand Tuning Manager Hardware Reports Reference*, *HiCommand Tuning Manager Operating System Reports Reference*, or *HiCommand Tuning Manager Application Reports Reference*. For details about how to use a solution set to define a report, see Chapter 5.

1.7.4 User-defined Reports

You can use Performance Reporter and the solution sets provided by each Agent to define your own reports displayed with Performance Reporter which collect metrics directly from each Agent's Store database. User reports make it easier to perform comprehensive analysis of the operating status of objects being monitored by an Agent.

Note: Knowledge of the Tuning Manager data model is required when you want to define your own reports. For a brief overview of the data model, see section 1.5. For details about the data model for each Agent, see the *HiCommand Tuning Manager Hardware Reports Reference*, *HiCommand Tuning Manager Operating System Reports Reference*, or *HiCommand Tuning Manager Application Reports Reference*.

Performance Reporter provides a wizard that you can use to define the new reports. The wizard provides windows for selecting the type of Report displayed with Performance Reporter, the metrics (referred to as fields in the data model) to be displayed in the report, the charts, related drilldown reports, and the time period for the data to be displayed in the report.

For details about defining a user report, see Chapter 5.

1.8 Avoiding Performance Problems

Tuning Manager can monitor thresholds that are set for the data collected by Agents. When the collected data reaches a threshold, Tuning Manager issues a warning to a user by sending an e-mail or executing a command. The user can take action upon receipt of the warning, and prevent problems in operations.

Tuning Manager provides two types of warnings: Alerts and alarms.

- **Alert**: Tuning Manager issues this warning when the data collected by Agents reaches the threshold set for report data that can be displayed by Main Console. You can use the Main Console GUI to set thresholds and specify how to notify the users.

  For details on alerts, see Chapter 6.

- **Alarm**: Tuning Manager issues this warning when the data collected by Agents reaches the threshold set for report data that can be displayed by Performance Reporter. You can use the CLI to set thresholds and specify how to notify the users.

  For details on alarms, see the *HiCommand Tuning Manager Agent Administration Guide*.

1.8.1 About Setting and Using Alarms

This section gives an overview of how to set and use alarms and gives the general procedure for creating and using alarms. For details on alarms, see the *HiCommand Tuning Manager Agent Administration Guide*.

To set alarms, the following methods are available:

- Defining a new alarm table and alarms

  This method creates an alarm table appropriate for the system environment and then defines alarms. You can add more alarms to the alarm table later.

- Using an existing alarm table or alarms

  The following methods are available:

  - Using the solution set

    The solution set is a group of preset alarms defining necessary information that is provided by each Agent. If the solution set is used, the alarms provided in the solution set take effect when the Agent starts.

  - Customizing the solution set

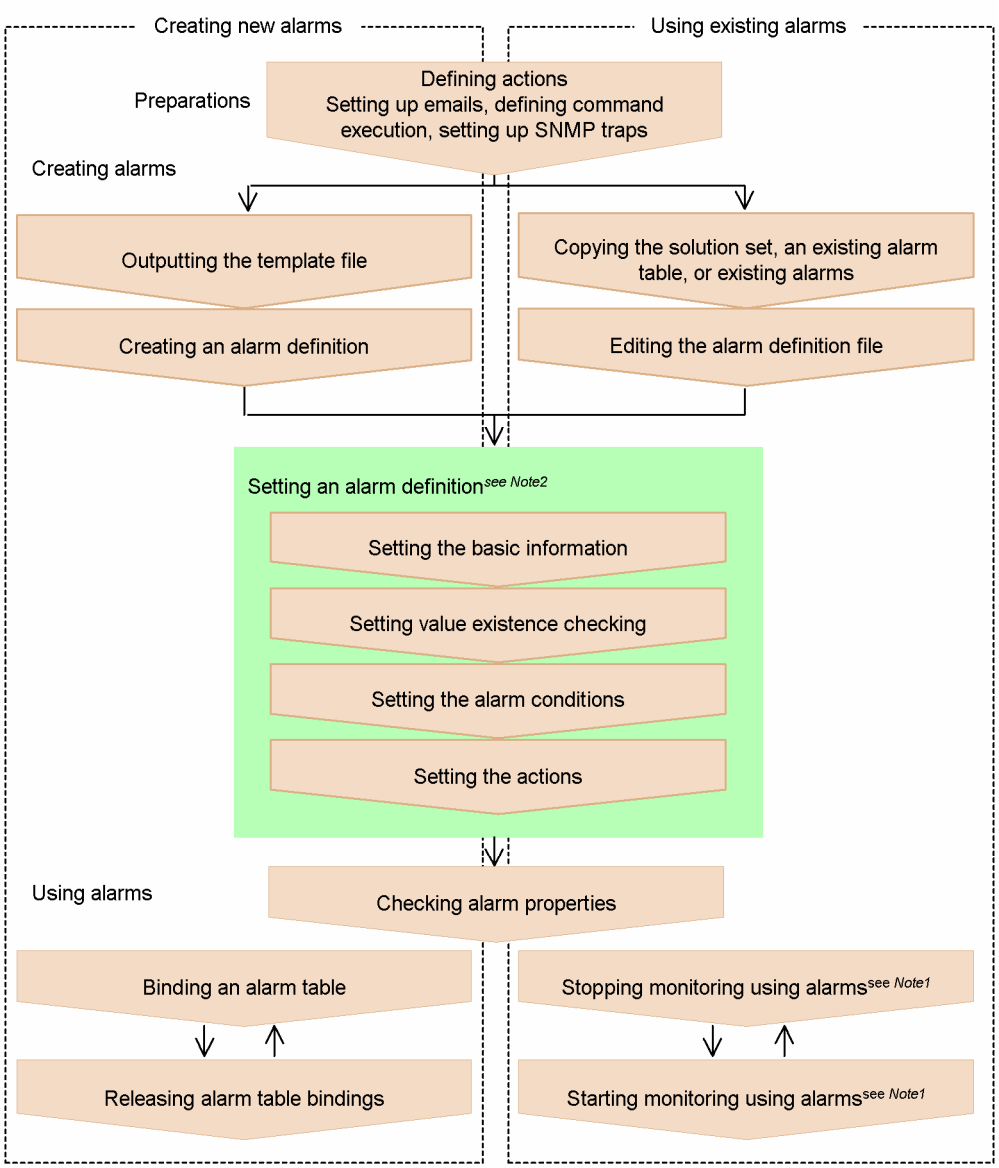
    This method copies the solution set and then customizes the copy as appropriate for the system environment.

  - Using an existing alarm table or alarms

    This method copies an existing alarm table or alarms and then customizes the copy.

To use alarms, you must associate (bind) an alarm table defined by one of the above methods to the applicable monitoring Agents.

Figure 1.15 shows the general procedures for creating, setting, and using alarms.



Legend: ( ): Subsection to be referenced

Note1: Perform this step as necessary.

Note2: If you are using existing alarms, edit the alarm definitions as appropriate.

Figure 1.15 Procedures for Setting and Using Alarms

1.8.2 Using Commands to Set and Use Alarms

Table 1.3 describes the commands for setting and using alarms. For details about the commands for setting and using alarms that are provided by the services of Tuning Manager series programs, see the *HiCommand Tuning Manager Command Line Interface Guide*.

Table 1.3 Overview of Commands for Setting and Using Alarms

Phase	Command name	Description
Preparations	`jpcahprp update`	▪ If you want to be notified by email when an alarm event occurs at an Agent, use this command to set the email senders. ▪ If you want a command to be executed automatically when an alarm event occurs at an Agent, use this command to change the Action Handler property on the host where the command is to be executed.
	`jpctgprp create`	If you want to send an SNMP trap when an alarm event occurs at an Agent, use this command to change the Trap Generator property.
Creating alarms	`jpcalarm export`	Outputs the template of an alarm definition file. If you want to create an alarm definition file without using the template, use this command to create an alarm definition file by following the syntax rule of an alarm definition file.
	`jpcalarm check`	Checks whether the contents of the created alarm definition file are valid.
Using alarms	`jpcalarm bind`	Binds an alarm table to an Agent.
	`jpcalarm active`	Activates an alarm.
Other	`jpcalarm copy`	Copies an alarm table or an alarm.
	`jpcalarm delete`	Deletes an alarm table or an alarm.
	`jpcalarm import`	Imports an alarm definition file.
	`jpcalarm inactive`	Inactivates an alarm.
	`jpcalarm list`	Displays definition information of an alarm table and an alarm, or displays binding information.
	`jpcalarm unbind`	Releases the binding of an alarm table bound to Agents.

Note: For details about the fields for which alarms are set and the alarms for the solution set, see the following manuals:

- *HiCommand Tuning Manager Hardware Reports Reference*
- *HiCommand Tuning Manager Operating System Reports Reference*
- *HiCommand Tuning Manager Application Reports Reference*

1.9 Solving Performance Problems

The Tuning Manager software agents continually gather hundreds of performance metrics and store them for instant recall, if needed. Chapter 7 explains how the Main Console and Performance Reporter are used together to view metrics and solve a performance problem.

1.10 Planning for System Monitoring

Figure 1.16 shows the workflow when planning system monitoring with Performance Reporter.

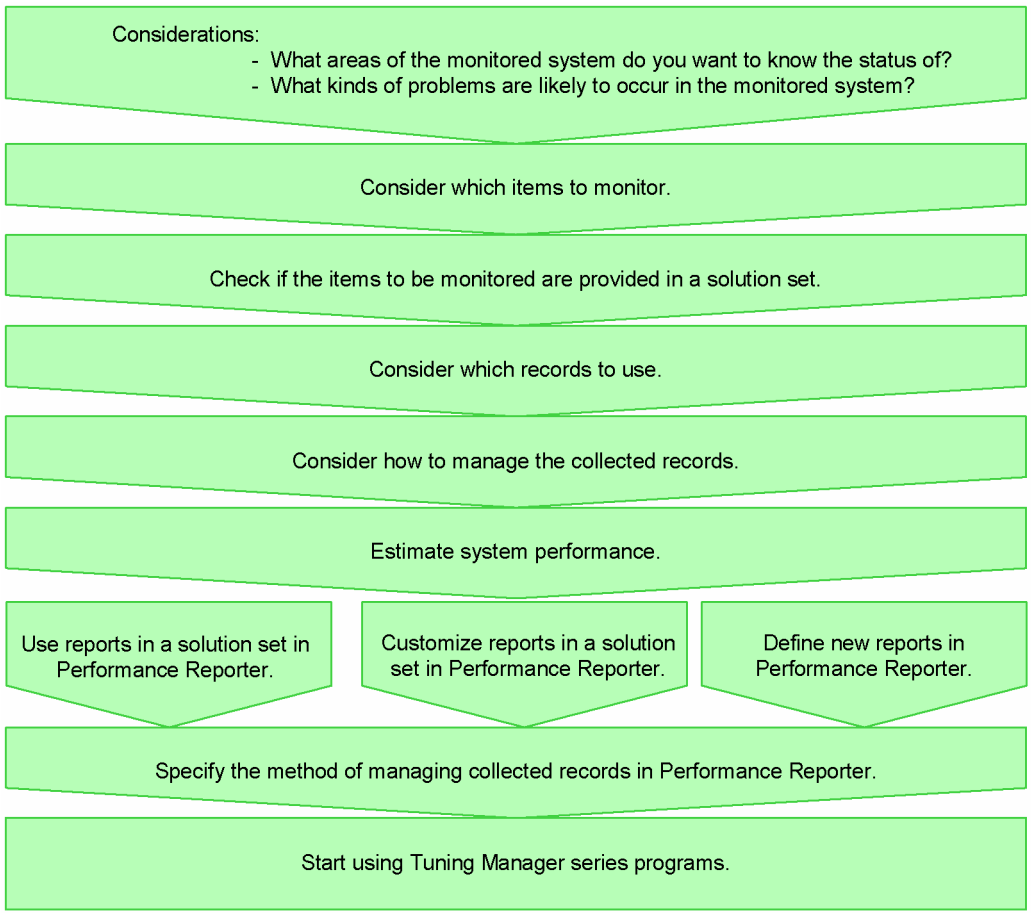


Figure 1.16 Planning How to Monitor Your System with Performance Reporter

The following steps provide additional details about the tasks that are outlined in Figure 1.16. We recommend that you follow this procedure to understand the status and potential challenges of a system to be monitored by the Tuning Manager series programs:

1. Carefully consider the following to gain an appropriate understanding of the detailed status and problems of a system to be monitored by Performance Reporter:
   - What areas of the monitored system do you wish to know the status of?
   - What kinds of problems are likely to occur in the monitored system?
2. Consider which items to monitor. To maintain an understanding of the status and problems of a monitored system, determine the items to monitor. For example, when a Windows host is used as a shared server, a scarcity of free space on a logical disk drive may cause the shared server to run abnormally. In this case, the monitoring item to select would be Ratio of free space on logical disk drive.
3. Check if the items to be monitored are provided in a solution set. The Tuning Manager series programs provide various sets of pre-defined reports called solution sets. Using Performance Reporter, solution sets can be displayed as graphs or tables. First, check if the item to be monitored is provided in a solution set.

   For details about solution sets, see the chapter that describes solution sets in the *HiCommand Tuning Manager Hardware Reports Reference, HiCommand Tuning Manager Operating System Reports Reference*, or *HiCommand Tuning Manager Application Reports Reference*.
4. Consider which records to collect in order to understand the status of the items to be monitored. Increasing the number of records in which performance data is collected may adversely affect disk capacity and system performance. When configuring the records to be collected, set only items that must be monitored, based on consideration of the requirements for collecting performance data, such as required disk capacity and record collection interval.

   For an overview of the records, see the chapter that describes the overview of data handled in Tuning Manager series programs in the *HiCommand Tuning Manager Agent Administration Guide*. For details about records, see the chapter that describes records in the *HiCommand Tuning Manager Hardware Reports Reference, HiCommand Tuning Manager Operating System Reports Reference*, or *HiCommand Tuning Manager Application Reports Reference*.
5. Consider how to manage the collected records. The disk capacity needed differs depending on whether or not the collected records are stored in a Store database and, if so, the data recording format, save criteria, and so on. Before estimating system requirements, you must consider how the collected records will be managed.

   For information about how to manage collected records, see the chapter that describes management of a Store database in the *HiCommand Tuning Manager Agent Administration Guide*.
6. Estimate system performance, considering the number of records to be collected, how they are to be managed, and so on.

7. Define reports based on the items to be monitored.
   - If a solution set contains settings that match the items to be monitored, use the solution set as is.
   - If a solution set contains settings that are similar to the items to be monitored, define reports by customizing the solution set to fit the environment being used.
   - If you wish to define new reports optimized for the environment being used, define new reports.

   For example, to monitor the ratio of free space on a logical disk drive on a Windows host, use the Free Space - Low 10 Logical Drives report in the solution set of Agent for Platform (Windows).

   For details about defining and manipulating reports, see Chapter 5.
8. Configure the management of the collected records. Specify the following items, based on how the collected records will be managed, as considered in step 5.
   - Method to record data in the Store database.
   - Save criteria for the Store database.

   For details about applying these settings, see the chapter that describes Performing Commands from Performance Reporter in the *HiCommand Tuning Manager Command Line Interface Guide*.
9. Start using Tuning Manager Series programs.

1.11 Using Reports to Manage Your System

1. Begin Performance Reporter operation.
2. Collect performance data to analyze changes and trends in system status over time. For example, using the Free Space - Low 10 Logical Drives report of Agent for Platform (Windows), collect performance data for the 10 logical drives of Windows hosts that have the least free space.
3. Display a historical report to understand the status and problems of the monitored device. For information about how to display a report, see Chapter 4.
4. If needed, define and create new reports.
5. Analyze causes based on displayed reports.
6. Effectively use the monitoring results. You can use the monitoring results to prevent problems on monitored systems before they occur, and to quickly isolate the causes of problems that do occur in these systems.

1.12 Using the Command Line Interface

The Tuning Manager command line interface (CLI) provides a simple way to access HiCommand Tuning Manager data. Tuning Manager provides access via the Command Line Interface-Command line programs suited for operation via a telnet connection over TCP/IP or for scripted operations.

Common ways to use the CLI are:

- Manually executing the CLI programs at the command line in the operating system.
- Invoking CLI programs within scripts, macros and development products. Perl, Microsoft Visual Basic and Tcl are among the most common tools used for this purpose. Scripts enable you to integrate Tuning Manager data and automate reporting. (Examples: scheduled execution of scripts, customized reports by parsing/manipulating results.)

Also, some specific tasks that cannot be executed by using the GUI can be executed by the CLI. For example, you can use the jpcasrec update command to connect to an Agent and modify the defined information recording methods, such as the collection interval, of the Store database. The information to be modified is in an XML-format parameter file specified as a command-line argument. You can specify multiple Store database definitions in a single parameter file, and modify them all at once.

To execute a command line program:

1. Log into the server running HiCommand Tuning Manager.
2. (Optional) Change the directory to *installation-folder-for-Performance-Reporter* `/tools`.
3. Type the desired CLI command; for example:

   ```
   installation-folder-for-Performance-Reporter/tools/htm-networks -c -u myUser1 -w
   myPassword
   ```

For details about the installation folder for Performance Reporter, see the *HiCommand Tuning Manager Installation Guide*.

For a complete description of the Tuning Manager CLI commands, see the *HiCommand Tuning Manager Command Line Interface Guide*.

1.13 Operating with a Cluster System

By using a cluster configuration, you can create a highly reliable system that continues to operate even in the event of a system failure. As a result, Tuning Manager series programs can continue operation and monitoring 24 hours a day. Figure 1.17 shows an example of the simplest configuration for a cluster system.

Note: HTM Agent (Agent for RAID Map, Agent for Platform, or Agent for Microsoft Exchange Server) can run on machines in a cluster configuration, but these agents do not fail over. When a failover occurs in a cluster system, HTM Agent continues operation on the physical host.

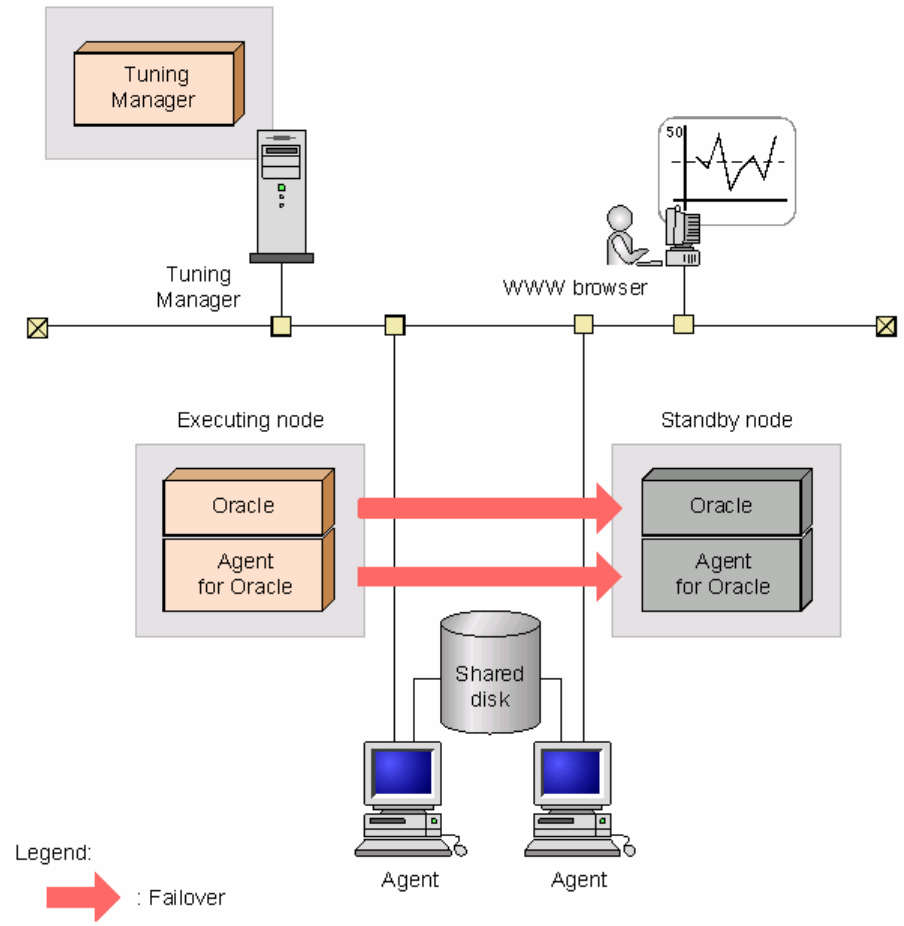


Figure 1.17 Example of a Cluster System

Two identical environments are set up, with one operating normally as the executing node, and the other operating during failure as the standby node.

For details on running Tuning Manager series programs on a cluster system, see the *HiCommand Tuning Manager Server Administration Guide*, *HiCommand Tuning Manager Agent Administration Guide*, or *HiCommand Tuning Manager Installation Guide*.

1.14 Introducing the Graphical User Interface

This section describes the window structure, main components, and functions of the GUI (Graphical User Interface) that you operate when you use functions provided by Tuning Manager. For details on each Tuning Manager function related to the GUI components and the operation procedures, refer to the appropriate location of the documents indicated throughout the section.

For operations that the system administrator performs, such as setting Tuning Manager components, an interface other than the GUI described here is provided. For details, see the *HiCommand Tuning Manager Server Administration Guide*.

In addition to the GUI, Tuning Manager also provides a CLI (Command Line Interface). For details on how to use the CLI, see the *HiCommand Tuning Manager Command Line Interface Guide*.

1.14.1 Using the Main Window

Following is an example of the structure of the Main Window and the functions that you can operate in each frame.

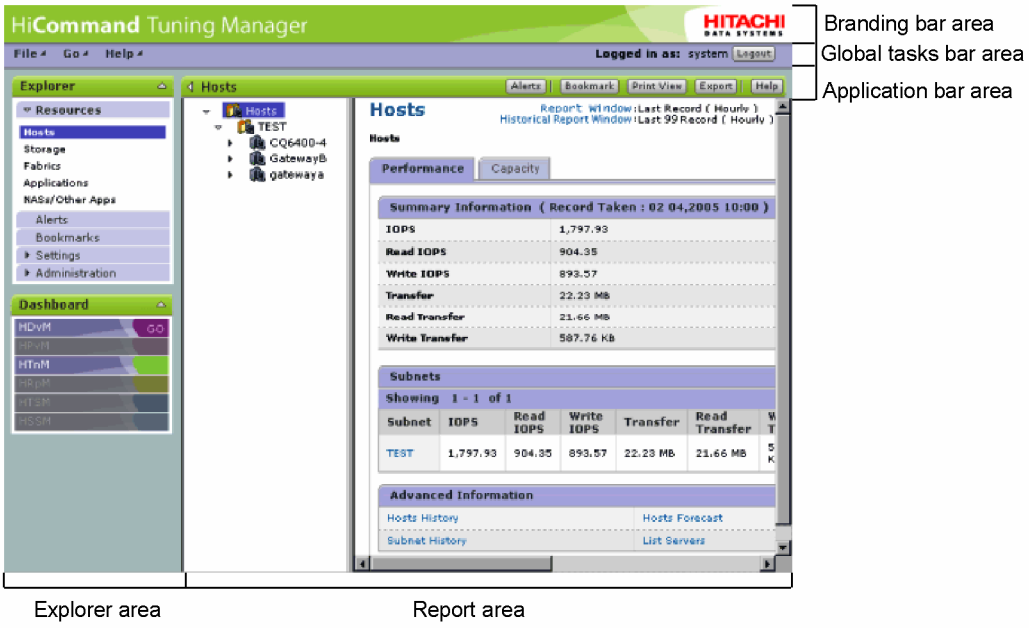


Figure 1.18 Components of the Main Window

Table 1.4 provides a brief description of each frame.

Table 1.4 Description of Frames

Frame	Description
Branding bar area	Indicates that the product is of the HiCommand series. For Tuning Manager, **HiCommand Tuning Manager** is displayed.
Global tasks bar area (See section 1.14.2)	Used for operations such as launching HiCommand Suite applications and displaying Online Help.
Explorer area (See section 1.14.3)	Consists of the **Explorer** menu and **Dashboard** menu. Used for operations such as displaying information for the selected item and launching HiCommand Suite applications.
Application bar area (See section 1.14.4)	Displays the menu for the item selected in the **Explorer** menu.
Report area (See section 1.14.5)	Consists of the navigation area and application area. In those areas, information for the item selected in the **Explorer** menu is displayed.

1.14.2 Global Tasks Bar area

The following operations can be performed from the global tasks bar area:

- Logging out of Tuning Manager (See section 2.3)
- Launching Performance Reporter or Device Manager (See section 2.6)
- Launching Online Help
- Displaying version information (product version, login mode, license information)
- Displaying the user IDs of currently logged-in users and other information

1.14.3 Explorer area

The Explorer area consists of the **Explorer** menu and the **Dashboard** menu. From the **Explorer** menu you can access the main functions that Tuning Manager provides. From the **Dashboard** menu, you can launch HiCommand Suite applications.

1.14.3.1 Explorer Menu

This is the entry for most Tuning Manager functions. Table 1.5 describes the functions that are available and information that is displayed in the **Explorer** menu.

Table 1.5 Functions Available and Information Displayed in the Explorer Menu

Explorer menu item	Operable function	Displayed information
Resources	This item is for selecting the target resources for which reports are displayed. Select this item to view the reports on capacity and performance information for resources that Tuning Manager monitors. For details on the functions used to display reports, see section 3.2.	Clicking this item displays resource categories (**Hosts**, **Storages**, **Fabrics**, **Applications**, and **NAS/Other Apps**) below. If you click one of the displayed categories, the resources that Tuning Manager currently monitors are displayed in the navigation area in tree structure (Resource Tree). In the application area, performance information for the resource selected in Resource Tree is displayed.
Alerts	Select this item to use the alert function. The alert function notifies users of system status by sending email or executing commands, when a performance value or the used capacity for the resource that Tuning Manager monitors exceeds the preset threshold. For details, see Chapter 6.	Clicking this item displays Resource Tree in the navigation area. In the application area, Alert List for the resource selected in Resource Tree is displayed.
Bookmark	Select this item to use the bookmark function. You can save frequented or important pages as bookmark links for later reference. For details, see section 3.4.	Clicking this item displays bookmark folders and bookmarks saved directly below the default folder in the tree structure in the navigation area. In the application area, the list of bookmark folders and bookmarks are displayed for the item selected in the navigation area.
Settings	Select this item to perform operations such as editing a user profile, specifying a threshold value, and editing license information. For details on editing a user profile, see section 2.4. For details on specifying a threshold value, see section 2.5. For details on displaying license information, see the *HiCommand Tuning Manager Server Administration Guide*.	Clicking this item displays resource categories (**User Profile**, **Threshold**, and **License Info**) below. Clicking **User Profi**le displays the form for editing a user profile in the report area. Clicking **Threshold** displays the form for specifying a threshold value. Clicking **License Info** displays the form for editing license information in another window.
Administration	This item provides the functions necessary for administrators to perform day-to-day operations.	This item is displayed only when you are logged in with Administrator permissions. For details, see the *HiCommand Tuning Manager Server Administration Guide*.

1.14.3.2 Dashboard

You can launch HiCommand Suite applications from the **Dashboard** menu. Clicking **Go** beside an installed HiCommand Suite application launches the application. For an application that is not installed, **Go** is displayed in gray and clicking it does not launch the application.

You can use the **Dashboard** menu in Single sign-on mode only. You cannot use it in Standalone mode. For details on Single sign-on mode and Standalone mode, see the *HiCommand Tuning Manager Server Administration Guide*.

1.14.4 Application Bar area

The menu for the item selected in the **Explorer** menu is displayed in the application bar area. Table 1.6 describes the menu items displayed in the application bar area and their functions.

Table 1.6 Items Displayed in the Application Bar area and Their Functions

Menu item	Function	Condition for display
Alerts	Displays the alert list for the resource for which the report is displayed. For details on alerts, see Chapter 6.	Displayed when an item other than **NASs/Other Apps** is selected in the **Explorer** menu.
Bookmarks	Saves the selected resource or the alert list for the resource as a bookmark. For details on bookmarks, see section 3.4.	Displayed when a resource item other than **NASs/Other Apps** or **Alerts** is selected in the Explorer menu.
Delete	Deletes the bookmark for a resource that does not exist.	Displayed when **Bookmark** is selected in the **Explorer** menu. ***Note:*** This item is displayed only when you select, from the bookmark list, a bookmark for which the corresponding resource does not exist.
Export	Exports the displayed report or alert list to a CSV file. For details on how to export reports and alerts, see section 3.3.	Displayed when a resource item other than **NASs/Other Apps** or **Alerts** is selected in the **Explorer** menu.
Help	Displays Online Help.	-
Print View	Prints the displayed report or alert list. For details on printing, see section 3.5.	Displayed when a resource item other than **NASs/Other Apps** or **Alerts** is selected in the **Explorer** menu.
Rename	Changes the subnetwork name displayed in Resource Tree to a more recognizable name. Only users with Admin or Manager permissions can use this function. For details, see the *HiCommand Tuning Manager Server Administration Guide*.	Displayed when **Subnetwork** is selected in the navigation area.
Resources	Displays the report for the resource for which the alert list is displayed.	Displayed when **Alerts** is selected in the **Explorer** menu.

1.14.5 Report area

The report area consists of the navigation area and application area, and displays detailed information for the resources that Tuning Manager monitors, and information about alarms and bookmarks. Figure 1.19 describes the structure of the report area when **Resources** is selected in the explorer area.

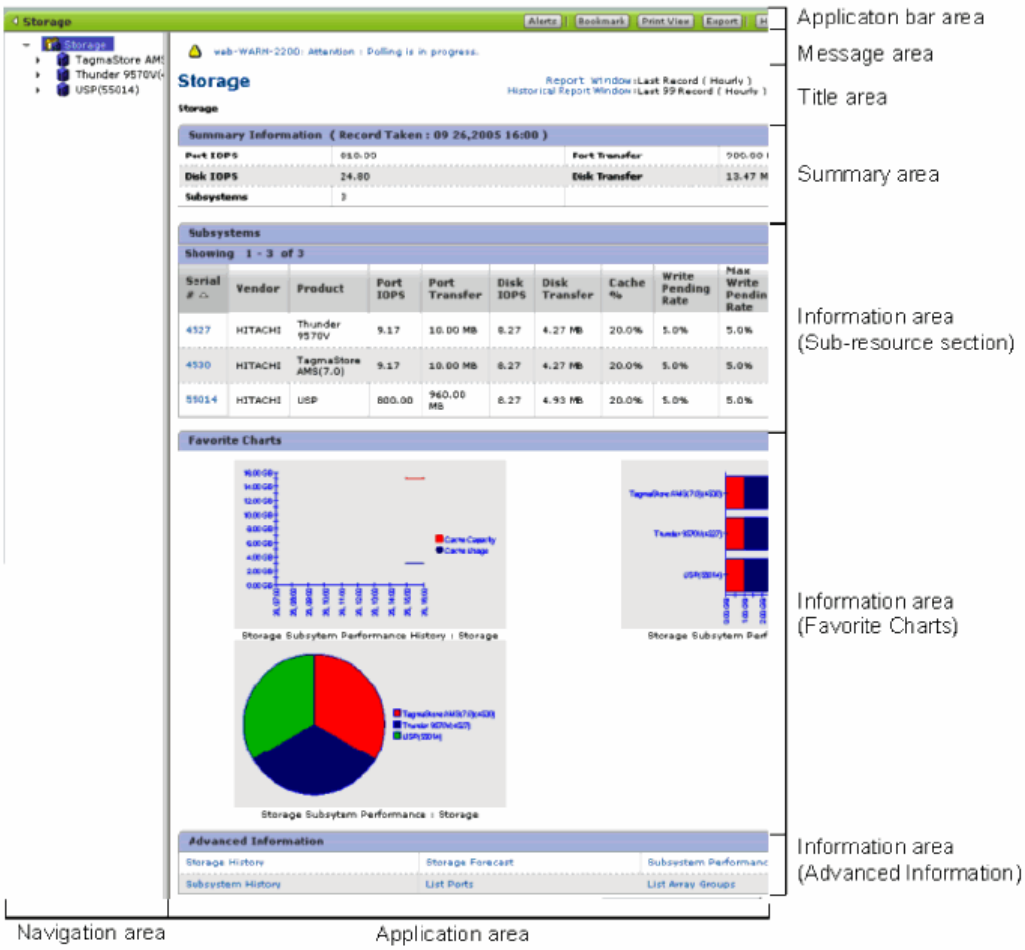


Figure 1.19 The Structure of the Report area

1.14.5.1 Navigation area

Resources and bookmarks for the item selected in the **Explorer** menu are displayed in the tree structure.

1.14.5.2 Application area

Detailed information for the item selected in the navigation area is displayed in the application area. Table 1.7 describes the structure of the application area when **Resources** is selected in the explorer area.

Table 1.7 Structure of the Application area

Area name	Description
Message area	Warning and error messages for licenses and polling are displayed.
Title area	Texts such as the title of the application area, path to the resource (Crumb Trail), and monitoring date are displayed. For details on how to set the monitoring date, see section 3.1.3.
Tab area	If **Resources** > **Hosts** or **Resources** > **Applications** is selected in the explorer area, the tabs (**Performance** and **Capacity**) for switching information to view are displayed. If **Alert** is selected in the explorer area, tabs (**View**, **Define**, **Action**, **Bind**, and **Reset**) for operating alert functions are displayed. For details, see Chapter 6.
Summary area	Summary information for the resource selected in the navigation area is displayed.
Information area	The area is divided into the following three sections: ▪ Sub Resource Section Displays information for the resources located directly below the resource selected in the navigation area. For example, if **Subsystem** is selected in the navigation area, the reports for Ports, Array Groups, and Logical Disks are displayed in Sub Resource Section. (The displayed report can be switched by clicking the tabs.) ▪ Favorite Chart Displayed if you registered a chart for a detailed report displayed from the information area (Advanced Information). The information is updated every time the corresponding resource is selected in the navigation area. If no chart is registered as a Favorite Chart, this section is not displayed. For details on Favorite Chart, see section 3.2.3. ▪ Advanced Information Tuning Manager provides many reports on historical trends and predictions. In Advanced Information, the list of reports available for the resource selected in the navigation area is displayed. If you click the link to each report, the chart and the table with basic information are displayed. When the link to Performance Reporter is displayed, you can display reports from Performance Reporter by launching Performance Reporter.

1.14.6 Using Correct Values for Data Entry

Table 1.8 describes the valid values for Tuning Manager tasks when the values are entered by users who do not have administrative privileges. For restrictions on values entered by administrators, see the *HiCommand Tuning Manager Server Administration Guide*.

Table 1.8 Correct Values for Data Entry

Tuning Manager Component	Entry field	Permitted values	Maximum field length	Minimum field length	Notes
Login Form:	User ID	No restrictions	25	1	Tuning Manager checks for a valid user ID entry.
	Password	No restrictions	25	1	Tuning Manager checks for a valid password entry.
Edit: (Subnetwork Alias)	Name	No restrictions	25	1	-
Save Bookmark:	Name	No restrictions	100	1	-
Edit Bookmark:	Name	No restrictions	100	1	-
Create Folder:	New Folder	No restrictions	100	1	-
Profile-Account Info	Password	No restrictions	25	1	If there are no entries in **Password** and **Confirm Password**, the password will not be updated.
	Confirm Password	No restrictions	25	1	If there are no entries in **Password** and **Confirm Password**, the password will not be updated.
	First Name	No restrictions	40	1	First character must be alphanumeric
	Last Name	No restrictions	40	1	same as above
	Email	0 to 9 a to z A to Z _ . @ -	60	1	Must begin with 0-9 or a-Z; Tuning Manager checks for a valid email address format.

Tuning Manager Component	Entry field	Permitted values	Maximum field length	Minimum field length	Notes
Profile-Threshold	Filesystem over capacity	0 to 9	6	1	Must be greater than 0 and less than 100. Limited to two places after the decimal.
Reports-Save Report	Name	No restrictions	100	1	-
History Report Period Setting	From year	0 to 9	4	4	Must be expressed as a 4-digit year value between 1970 and the current year.
	From Hour	0 to 9	2	1	Valid values range from 0 to 23.
	To Year	0 to 9	4	4	Must be expressed as a 4-digit year value between 1970 and the current year.
	To Hour	0 to 9	2	1	Valid values range from 0 to 23.
	Number of Records	0 to 9	2	1	Valid values range from 0 to 99.

Tuning Manager Component	Entry field	Permitted values	Maximum field length	Minimum field length	Notes
Alerts-Alert Definition	Name	No restrictions	100	1	-
	Occurrences During	0 to 9	3	1	-
	Intervals	0 to 9	3	1	-
	Warning Condition	0 to 9 and period (.)	10	1	Must begin with 0 to 9. GB/KB: >= 0, limited to 2 decimal places %: >0 and <100, limited to 2 decimal places Growth %: Any number, limited to 2 decimal places DBL: >=0 and <100, limited to 2 decimal places Counts: Whole number >= 0
	Critical Condition	Same as above	10	1	same as above

Tuning Manager Component	Entry field	Permitted values	Maximum field length	Minimum field length	Notes
Alerts-Action Definition	Name	No restrictions	100	1	-
	Email Host	Any valid ASCII character	500	1	Email host must be accessible when defined.
	Email To	0 to 9 a to z A to Z _ . @ -	500	1	Must begin with alphanumeric character. Tuning Manager checks for a valid email address format.
	Email Message	Any valid ASCII character	500	0	-
	User ID	No restrictions	500	1	-
	Password	No restrictions	500	1	-
	SNMP Destination	Any valid ASCII character.	500	1	Must be a valid IP address or a hostname.
	SNMP Community	Any valid ASCII character, except spaces	500	1	-
	SNMP Message	Any valid ASCII character	500	0	-
	Command	Any valid ASCII character	500	1	-
	Command Parameters	Any valid ASCII character	500	0	-
	Log Message	Any valid ASCII character	500	1	-
Report Window	Date	Any year between 1970 and the current year	4	4	-

Chapter 2 Logging into Tuning Manager

This chapter provides information about logging in to Tuning Manager.

- Logging In (see section 2.1)
- Setting Your Browser (see section 2.2)
- Logging Out (see section 2.3)
- Changing Account Information (see section 2.4)
- Setting the Threshold (see section 2.5)
- Launching Other Applications (see section 2.6)

2.1 Logging In

There is no default user account for accessing Tuning Manager. Please see your system administrator to obtain your User ID and password.

1. In the Web browser, enter the URL supplied by the administrator for your site.

   The Title window appears, and then the Login Window appears automatically.

   Note: The URL must be terminated with a slash. (`...TuningManager/`)

2. Type your Tuning Manager User ID.

   The method for authenticating a user in Tuning Manager differs depending on the mode.

   – Standalone mode:
     The user is authenticated using the user account registered in the Tuning Manager local database. User IDs are not case sensitive.

   – Single sign-on (SSO) mode:
     The user is authenticated using the user account registered in the common database for HiCommand Suite applications.

     In this mode, the system administrator configures whether user IDs are to be case sensitive. Contact the system administrator to check whether the user IDs are case sensitive.

   For details on Single sign-on mode and Standalone mode, see the *HiCommand Tuning Manager Server Administration Guide*.

3. Type your Password.

4. Click **Login** on the Login window.

Notes:

- You cannot log in to the Tuning Manager GUI through multiple browser windows that you opened on a single client machine. Regardless of whether the Tuning Manager you attempt to log in to is on a single server or different server, Tuning Manager operations from multiple browser windows on the same client machine are not supported.
- Please contact your administrator if you encounter any messages related to your site license.
- As a security precaution, Tuning Manager will log out users after 30 minutes of inactivity. The timeout period is not configurable.
- If an attempt to log in to Tuning Manager fails, make sure that the Tuning Manager services have started, or contact your administrator. For details on how to start the Tuning Manager services, see the *HiCommand Tuning Manager Server Administration Guide*.
- For details on how to set your browser, see section 2.2.

2.2 Setting Your Browser

The following are the browser versions supported by Tuning Manager:

- Microsoft Internet Explorer V6.0 or later
- Mozilla™ 1.7.8.00 or 1.7.12.01 (Solaris only)

Table 2.1 shows the required browser settings. For details on the items and how to set them, refer to the documentation for the applicable browser.

Table 2.1 Browser Settings

Item	Settings	
	Internet Explorer	**Mozilla**
Cookies	Enable this item.	
File Download	Enable this item.	Not applicable
Image Display	Enable this item.	
Java Virtual Machine (JVM™)	Enable the JVM. ***Note:*** If the JVM is not installed in your version of Windows, you must install the program.	Not applicable
JavaScript™	Enable this item.	
Languages	Set the language you want to use. ***Note:*** Tuning Manager displays the date in a following format, corresponding to the language set for the browser: If English (en_us) is set: MM,dd,yyyy For a language other than English: dd MM yyyy	Set the language you want to use. ***Note:*** ▪ Tuning Manager displays the date in a following format, corresponding to the language set for the browser: If English (en_us) is set: MM,dd,yyyy If a language other than English: dd MM yyyy ▪ Set the same language for the browser and the X-terminal. If these settings are not the same, the character string in the title bar may be displayed incorrectly.
Page Cache	Specify that the latest information is displayed each time the user accesses a page.	
Popup Blocker	Disable this item. ***Note:*** Also make sure that other utilities that block pop-up windows are not installed.	Not applicable
Security Policies	Specify **Medium** as the security level.	Not applicable

2.3 Logging Out

You can log out of Tuning Manager in either of the following two ways:

- In the Global Tasks Bar area, select **File** and then **Logout**.
- In the Global Tasks Bar area, click **Logout**.

2.4 Changing Account Information

You can use the User Profile window to edit account information of a logged-in user.

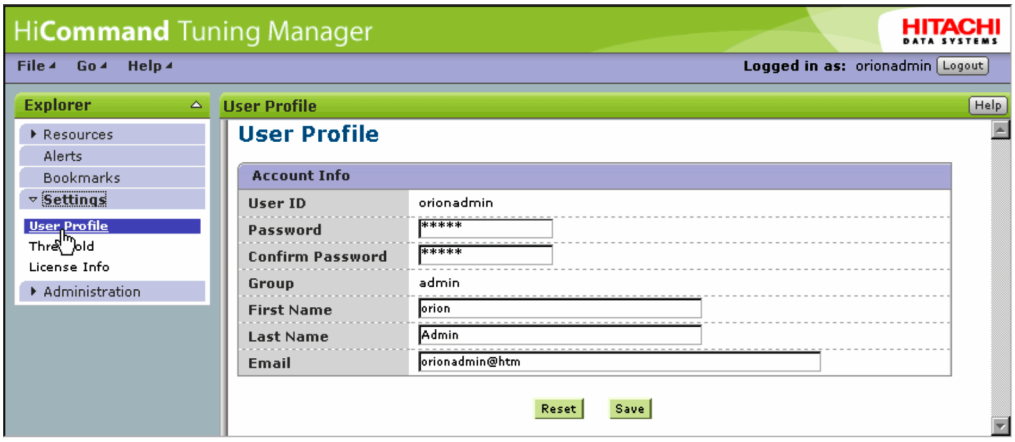


Figure 2.1 Profile Section (in Standalone Mode)

Note: Account information is editable in standalone mode only.

Use this form to edit your standalone account information including:

- Your password
- First and last name
- Email address

To edit a user's account information:

1. In the **Explorer** area, select **Explorer**, **Settings**, and then **User Profile**.

   Tuning Manager displays your account information in the Information area.

2. Type in the items.
3. Click **Save** to store your changed profile. (Or click **Reset** to abandon changes.)

2.5 Setting the Threshold

You can specify a threshold (a percentage) for the used storage capacity of a filesystem monitored by Tuning Manager.

To set the threshold:

1. In the **Explorer** area, select **Explorer**, **Settings**, and then **Threshold**.
2. Enter the percentage of filesystem capacity that you want to specify as the point at which filesystem usage is considered excessive. (Leave this field blank to eliminate monitoring of filesystem capacity.)

   Note: This field accepts values from 0 to 100.

2.6 Launching Other Applications

Tuning Manager provides a different user authentication method for the stand-alone mode and single sign-on mode. This section describes how to launch other applications in the stand-alone mode.

For details on the single sign-on mode, see the chapter that describes user management in the *HiCommand Tuning Manager Server Administration Guide*.

2.6.1 Launching HiCommand Suite Applications and Tools

You can launch the following two HiCommand Suite applications from Main Console:

- Performance Reporter
- Device Manager

Note: To start Device Manager, you must set up the Device Manager login window URL. For details on how to perform this procedure, see the chapter describing the tool configuration in the *HiCommand Tuning Manager Server Administration Guide*.

To launch HiCommand Suite Applications and Tools:

1. In the Global Tasks Bar area, click **Global** and then **Go**.

   All registered HiCommand applications are displayed.

2. Select the applications you want to launch; for example, select **Device Manager**.

There are two ways of launching Performance Reporter. For details, see section 2.6.2.

2.6.2 Launching Performance Reporter

You can launch Performance Reporter from Tuning Manager in either of the following ways:

- Launch Performance Reporter by clicking **Global** and then **Go** in the Global Tasks Bar area of Tuning Manager.

  In this case, Performance Reporter displays the main level, and enables you to move within an application.

- Launch Performance Reporter from the Information area (Advanced Information), with the agent specified by Tuning Manager.

  In this case, Performance Reporter displays the Report Tree Selection window of the selected agent. If you want to display the Main window when Performance Reporter is launched, edit the `user.properties` file. For details on how to edit this file, see the chapter that describes tool configuration in the *HiCommand Tuning Manager Server Administration Guide*.

2.6.3 Launching Storage Navigator

Tuning Manager can launch Storage Navigator applications. Before launching a Storage Navigator application, ask your administrator if the launch settings for the Storage Navigator application have been set.

To launch a Storage Navigator application:

1. Choose a resource for which you want to launch the Storage Navigator application in the Navigation area.

   If the selected resource is either a subsystem or a subresource of a subsystem that supports the Storage Navigator application, a pull-down menu for launching Storage Navigator applications will be displayed below the information area (Advanced Information).

2. From the pull-down menu, click the menu that you want to launch.

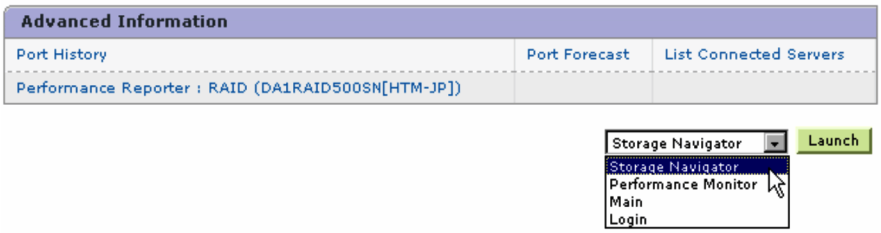


Figure 2.2 Launching Storage Navigator applications

Table 2.2 Storage Navigator Commands

Command	Displayed window
Performance Monitor	For Universal Storage Platform V/VM series, the Performance Monitor window is displayed. For resources other than Universal Storage Platform V/VM series, the Storage Navigator window is displayed with only the Performance Monitor function buttons displayed.
Main See ***Note***	The Main window of Storage Navigator (with the buttons for all the available functions) is displayed. This is the window displayed immediately after logging in Storage Navigator.
Login	The Login window of Storage Navigator is displayed.

Note: This menu is only displayed for administrative users.

Please note that only one window can be displayed at one time when an item **Performance Monitor** or **Main** is selected from the Storage Navigator menu. However, more than one Login window can be launched.

Chapter 3 Working with Reports from the Main Console

Some Tuning Manager reports are displayed by using Main Console, and some are displayed by using Performance Reporter. This chapter describes the reports that are displayed by using Main Console.

With Tuning Manager, you can also use the command line interface (CLI) to display reports. For details about commands, see the *HiCommand Tuning Manager Command Line Interface Guide*.

- Overview (see section 3.1)
- Generating Reports (see section 3.2)
- Exporting Reports (see section 3.3)
- Bookmarking Reports (see section 3.4)
- Printing Reports (see section 3.5)

3.1 Overview

The Main Console displays the metrics collected by an Agent in formats such as graphs and tables. The definitions necessary for displaying the metrics graphically, as well as the graphs and tables based on those definitions, are called reports.

By displaying appropriate reports according to monitored targets, the system performance can be analyzed, and the storage and capacities of filesystems can be monitored.

3.1.1 Features of Reports Displayed with Main Console

The reports displayed by using Main Console allow you to perform the following operations:

- Obtain an overview of the system, perform comparative data analysis, and understand trends
- Display data that is collected hourly
- Display data stored in the central repository (HiRDB)
- Display general data collected by the Agent
- Display data from single-instance records
- Display detailed information for each report item with a single click

Note: Formats of graphs to be displayed and time ranges are fixed.

By analyzing the reports displayed by Main Console, your organization can:

- Identify storage subsystems on the network.
- Determine how many storage server hosts exist on your whole network and on its subnetworks.
- Measure storage capacity network-wide and at progressively lower levels of your network.
- Quantify filesystems, total capacity, amount used and amount remaining.
- Detect and prevent capacity shortages.
- Rearrange files and filesystems for effective capacity and performance use.
- Detect and prevent storage server performance bottlenecks.
- Determine when to acquire additional storage host capacity.
- Understand the relationship between the host's filesystems, logical devices and corresponding disks.
- Understand the RAID configuration and the necessary connections (Connected Ports, Connected Array Groups, Connected Logical Disks, Connected CLPRs, and Connected Subsystems) of the storage device associated with a host's filesystems.
- Ensure that the logical volumes are configured correctly for the applications accessing data stored in the host's filesystems.

Notes:

- The metrics displayed on Main Console are a part of data that Agent collects. To view the data that is not displayed on Main Console, use Performance Reporter. For details about data collected by the Agent, see the following manuals:
  - *HiCommand Tuning Manager Hardware Reports Reference*
  - *HiCommand Tuning Manager Operating System Reports Reference*
  - *HiCommand Tuning Manager Application Reports Reference*
- Tuning Manager cannot provide metrics for certain resources under certain circumstances. These are the result of limitations within certain operating systems, software and/or hardware. For detailed information, see Appendix A.

3.1.2 Types of Reports Displayed with Main Console

For each resource, you can display reports relating to its capacity and performance. The following five types of reports are available from the Main Console, to match the purpose of the metrics analysis:

- Resource Summary

  Displays key measures of capacity or performance for the resources at the level selected in the Navigation area.

- Sub-resource Summary

  Displays key measures of capacity or performance for the resources below the level selected in the Navigation area.

- History

  Displays key data that was collected from the resource for a specified time period.

- Forecast

  Predicts future values by using data that was collected from the resource in the Last Record at the configured time intervals.

- List

  Displays in table format key data about resources.

3.1.3 Specifying a Reporting Timeframe

The Report Window Setting window is used in Tuning Manager to specify a time frame and period for reporting purposes. The settings specified in the Report Window Setting window are active for the login session, and are applied to reports and charts that are displayed by using the Advanced Information hyperlink.

At the start of each session (a session starts after each new login and ends when you log out), default settings are restored in the Report Window Setting window. By default, Last Record is selected and Time Interval is set to Hourly. If you want to analyze other time periods, make sure to specify the settings again in the Report Window Setting window after you log in.

Note: In an environment in which the time zone is set using the GMT + *XX:YY* format (*YY* must not be zero), Tuning Manager handles the data collected at *XX:YY* as the data collected at *XX*:00.

To specify settings in the Report Window Setting window:

1. In the Title area in the Application area, click the **Report Window** hyperlink.

   The Report Window Setting window appears.

2. Select the time:

   Select **Last Record**, or specify the month, day, year, and time. Specify 24:00 to include all possible data points for the specified date. A **Data Point** is a specified time for when data is to be collected, in order to determine the hourly average.

3. Specify the Period interval.

4. Click **Save**.

   A Confirmation window appears.

5. Click **OK**.

   The new time interval that is specified in the Report Window Setting window is displayed in the Title area.

   Tuning Manager performs a new database filtering operation and refreshes the display for your selected resource to conform with your newly specified settings.

Changing Settings of the Report Windows Setting Window and Moving Resources

To provide accurate datasets for any settings you specify in the Report Window Setting window, Tuning Manager keeps historical data intact. This is evident if you move a storage-related host on a given day and then request data of an earlier time period.

Example:

As a part of network reorganization, your network system administrator moves Server 1 from Subnetwork A to Subnetwork C on May 1, 2004. (This occurs outside of Tuning Manager.)

On June 10, 2004 you load Tuning Manager. April 15, 2004 is the date specified in the Report Window Setting window. In this case, Tuning Manager will include Server 1 as one of the servers on Subnetwork A. If you change the date in the Report Window Setting window to May 15, 2004, Tuning Manager shows Server 1 as a part of Subnetwork C.

3.1.4 Data Rounding Rules and Displayed Values

When Tuning Manager presents data for daily, weekly and yearly periods, the values are the result of aggregating and averaging hourly data. For example, a daily value for **Used** metrics is the average of all hourly data points for a given day.

- The values displayed are the result of aggregating and averaging of the raw data (for daily, monthly, and yearly periods). To obtain the result, Tuning Manager sums the raw hourly values and then averages. Then Tuning Manager displays a rounded whole number in table displays. This is for presentation purposes only. The database repository stores raw values and graphical charts are plotted to those raw values.
- Many of the measured data items are stored as decimal values but are displayed as whole numbers in the Summary area of each window.

For information on rounding as this affects the behavior of alerts, see section 6.6.

3.1.5 Data Aggregation Rules and Calculations

When communications fail for long periods, or an Agent disconnects, or an Agent's host machine is taken offline, data cannot be collected. Even if data is not collected for a long time, you can still collect it by using the method shown in section 3.1.5.1.

Note: Unavailable data can be the result of one or more contributing factors. A resource may have been taken offline for maintenance or replacement. Communications may have been removed or interrupted. Refer to the *HiCommand Tuning Manager Messages Reference*.

3.1.5.1 Averaging Data for an Individual Resource

Data monitored by Tuning Manager is commonly recorded on an hourly basis.

When daily values are displayed, these are aggregated from the hourly data points collected during the 24-hour period.

Averaging operations work as follows:

1. Each available hourly value is aggregated for that resource.
2. The aggregate of the hourly values is then divided by the number of available data points. (Any anticipated hourly periods remaining uncollected are not included in the divisor.)

Goal:

If for any reason, one or more hours are not available for summing, the averaged value is not diluted by including unavailable data points in the sum or divisor.

Example:

Server B is taken offline for 3 hours on Tuesday. To obtain the day's free capacity on Server B, Tuning Manager sums up free capacity values for each of Tuesday's 21 available hourly data points and then divides that total by 21.

$$\text{value} = \frac{\Sigma \ (\text{21 available hours})}{21}$$

Figure 3.1 Example Aggregation Formula for One Day Interval (Free Space)

3.1.5.2 Aggregation After Startup

Tuning Manager is subject to a configurable ceiling on the initial data collection period. At startup, Tuning Manager will collect all available agent data within that maximum time period.

This data collection ceiling is only a factor if agents have been running for a time period that exceeds the Tuning Manager startup collection maximum. When you startup Tuning Manager under those circumstances, earlier time periods will not be collected. Therefore uncollected agent data are not included in the aggregated data.

3.1.5.3 Summarizing and Aggregating Sub-resource Data

At each level of the Navigation area, Tuning Manager displays summary values for its sub-resources. (The subnetwork values are summations of its servers, and the server values are summations of its filesystems.)

1. Calculate hourly aggregate values for the parent resource (for each attribute):

   Aggregate the hour's value for all sub-resources to create a parent value.

2. Assemble all hourly parent values:

   Repeat previous step for each hour in the time period.

3. Calculate the parent's aggregate value for time period:

   Aggregate all hourly parent resource values across all time periods.

3.2 Generating Reports

From the Main Console, you can perform the following tasks with the displayed reports:

- Change the order of data in the Device File column by changing the sort order of data in the I/O Response Time column (descending order)
- Register the graphs that are often viewed to Favorite Charts for ongoing display
- Change the display conditions to display the past history data and the forecast data
- Display the information used to determine whether the cause of the performance bottleneck originated from the server or storage.

3.2.1 Displaying Reports with Main Console

This section describes how to display a report.

Note: When Tuning Manager is polling, displaying the resource information might take a long time. If it takes a long time, check whether the polling processing is being executed. To check the polling processing status, in the Explorer area, select **Administration**, **Polling Status**, and then **Agents Status**.

To display a report:

1. In the Explorer area, choose the **Explorer** menu and then **Resources**. Then select the resource for which you want to display reports.

   Information about the top-level resource appears in the Report area.

2. In the tree in the Navigation area, select the level you want to expand.

   Information about the selected level appears in the Application area.

3. In the Tab area, choose the **Performance** or **Capacity** tab.

   Table 3.1 lists the information displayed in each area.

Table 3.1 Area Names in the Application Area and Displayed Information

Area name	Displayed information
Summary area	This area displays a table that summarizes the primary values about the resource level selected in the resource tree. This information is useful as an overview of resources.
Information area (Sub Resource Section)	This area displays a table showing the basic information about the resources at the level lower than that of the resource for which information is displayed in the Summary area. This information is useful as an overview of the resources at the next lower level. Sorting the table allows you to find the resource that has a particular value.
Information area (Advanced Information)	This area displays a list of reports in which historical trends and forecast values are displayed. Clicking the link for each report displays graphs and the basic information table. This information is useful for viewing details about a resource, or information about the servers or storage connected to the resource.

4. In the information area (Advanced Information), select the report, which you want to display.

   A report type is set for each report shown in the information area (Advanced Information). These types are described in Table 3.2.

Table 3.2 Report Types

Report type	Description
Resource Summary	Displays key measures of capacity or performance for the resources at the level selected in the Navigation area.
Sub-resource Summary	Displays key measures of capacity or performance for the resources below the level selected in the Navigation area.
History	Displays key data that was collected from the resource for a specified time period.
Forecast	Predicts future values by using data that was collected from the resource in the Last Record at the configured time intervals.
List	Displays in table format key data about resources.

The display of reports in the information area (Advanced Information) can be changed as required. The display type that can be changed differs depending on whether the report is related to performance or to capacity. Table 3.3 shows the display types that can be changed for each report.

Table 3.3 Display Types That Can Be Changed for Each Report

Report type	Display types that can be changed		
	Changed using a tab	Changed using a hyperlink	
Performance	IOPS	▪ IOPS ▪ Read IOPS ▪ Write IOPS	
	Transfer	▪ Transfer ▪ Read Transfer ▪ Write Transfer	
Capacity	Capacity	▪ Capacity ▪ Used ▪ Free	▪ Bar-Graph ▪ Pie-Graph

Note: The display of some reports cannot be changed.

3.2.2 Sorting Data Tables

Advanced Information reports consist of a chart with an accompanying data table.

- To sort the data by a column other than the default column, click the column heading.
- To toggle the sort order from ascending to descending, click the column heading again.

Every table can be sorted. The column which controls the current sort displays an arrow.

- An upward arrow on a column indicates the table is sorted ascending on that column.
- A downward arrow on a column indicates the table is sorted descending on that column.

Note: Data can be sorted on only one column at any time.

3.2.3 Displaying a Favorite Chart

This section describes the **Favorite Charts** display.

- You can save many Advanced Information charts for routine display.
- If you save a chart, it appears in **Favorite Charts** in the Information area for that particular resource. Tuning Manager reloads these charts every time you select that particular resource in the Navigation area.
- All eligible charts display a **Save** hyperlink.
- Displaying **Favorite Charts** by clicking **Favorite Charts** in the Information area enables you to edit and print reports, and export data.

Note: **Favorite Charts** does not appear in the Information area until you have saved at least one Advanced Information report.

3.2.3.1 Adding a Favorite Chart

Favorite Charts are Advanced Information graphs saved for ongoing display in **Application area**.

If you save a chart, it appears in the information area (Favorite Charts) for that particular resource. Tuning Manager reloads these charts every time you select that particular resource in **Navigation area**.

Note: All eligible charts display a Save hyperlink.

To save a chart:

1. In **Advanced Information** in the Information area, select the information for which you want to display an **Advanced Information** report.
2. Click **Save**.

   Tuning Manager displays a window where you specify the description for a chart.
3. Type in a chart description. This will appear as a caption below the chart when it appears in **Favorite Charts** in the Information area.
4. Click **Save**.

   The confirmation window appears.
5. Click **OK** to close the confirmation window.

   The saved chart appears in **Favorite Charts** in the Information area.

Notes:

- The tables accompanying charts are saved with your current sort settings. For more information on sorting, see section 3.2.2.
- When you register a report to **Favorite Charts**, the date and time that was specified in the Report Window Setting window is assigned to the report. Even if you change the settings in the Report Window Setting window later, the display for the report saved in **Favorite Charts** will not be updated.
- **Favorite Charts** does not appear in the Information area until you have saved at least one **Advanced Information** report.

3.2.3.2 Deleting a Favorite Chart

To remove a chart from **Favorite Charts** in the Information area:

1. In **Navigation area**, select the desired level to display the charts that you want to delete.
2. In **Favorite Charts** in the Information area, click **Edit**.

   The Delete Saved Reports window appears.
3. For each report you want to remove from **Favorite Charts**, select its checkbox.
4. Click **Submit**.

   A confirmation dialog box appears.
5. Click **OK** to confirm deletion.

3.2.4 Setting Display Conditions for History Reports

The first time you request a history report in a session, Tuning Manager uses the settings in the Report Window Setting window to determine the last possible ending point and time interval. When you edit the history report, you can alter the following values:

- Interval
- Time frame
  - Relative method: select a finite number of intervals. The history report is created by using past data that is collected based on the interval settings specified in the Report Window Setting window. For more information, see section 3.1.3.
  - Absolute method: specify a start date/time and ending date/time.

To edit a history report:

1. Display the report.
2. Click **Edit**.

   The dialog box for editing report parameters appears.
3. Specify a time interval.
4. Determine whether to use the absolute or relative method for the time frame:
   - For the **absolute** method, specify the starting and ending dates/times
   - For the **relative** method, specify the Time Interval setting in the Report Window Setting window (that is, the last possible time period you want to appear in the report), and then specify the last number of records (Last *n* records).
5. Click **Update** (or click **Cancel** to cancel the changes).

   The report is regenerated and the window refreshes.

Note: By changing the settings for any history report you are setting the defaults for any other history reports you request during this session. (You may again edit reports to change settings as necessary.)

3.2.4.1 History Report Defaults

When you invoke the History Editing dialog box for the first time in a session, these are the defaults:

- For History reports, the data collected in **Last Record** are used.
- History reports are dependent on the interval setting specified in the Report Window Setting window. If the interval is currently set to Hourly, then your history report will use Hourly data.
- If you are viewing a forecast you have previously customized (edited) and saved to **Favorite Charts**, this report has been saved with your customizations (and not with the application-defined defaults).
- If you have customized a History report at any time during a session and you display an unsaved History report, then that newly displayed History will inherit the customization settings of your most recently customized History.

3.2.4.2 Sub-resource History Reports

If you are using the relative method of specifying history records for a sub-resource history report, the Last Record is the latest record time posted within the group of sub-resources.

Your network may be reorganized and updated after you have saved reports. Tuning Manager behaves as follows when you add resources to the network some time after you save a sub-resource report:

- If a report requires you to specify the sub-resources you want included (as in a sub-resource history report), the report will not incorporate newly introduced sub-resources.

  To report including the newly introduced sub-resource(s):

  - Delete the obsolete report. See section 3.2.3.2.
  - Move the Navigation area to the appropriate parent resource level, then open the specified report.
  - Edit the report including the new resource(s).
  - Save the report. See section 3.2.3.1.
- For sub-resource reports that do not require you to specify the sub-resources, the report will display data for the newly added resource(s) on subsequent viewings.

3.2.5 Setting Display Conditions for Forecast Reports

When the Forecast editing dialog box is invoked for the first time in a session, the default values are used:

- Forecasts use data collected in the Last Record and recent time intervals to project future values.
- Forecasts use retrospective historical data moving back from Last Record for projecting future values.
- Forecasts are dependent on the interval setting specified in the Report Window Setting window. If the interval is currently set to Hourly, then your forecast will use Hourly data.

Note: If you are viewing a forecast you have previously customized (edited) and saved, this report has been saved with your customizations (and not the application-defined defaults).

When editing a report, you can change the following values:

- Time interval
- History
- Forecast starting point
- Forecast
- Forecast accuracy

To edit a Forecast report:

1. Display the report.
2. Click **Edit**.

   The dialog box for editing report parameters appears. See Figure 3.2.
3. In the **Time Interval** field, specify a time interval.
4. In the **History** field, specify how many data points (records in the Tuning Manager's database) should be used as a historical sample (the basis for building a forecast).
5. To determine the **Starting from** data point:
   - Select **Last Record** defined in the Glossary or **Absolute Start Date/Time**.
   - If you select **Absolute Start Date/Time**, then fill in values for the date and time of a period available in the Tuning Manager database. This date will be used as the most recent historical point from which the forecast will be projected.
6. In the **Forecast** field, specify how many records to be included in the forecasted period.

   Note: Good forecasts depend on a reasonable historical sample. At a minimum, a forecast should be based on 3 history data intervals. For the best possible results, specify a higher number of history intervals. We recommend maintaining a history-to-forecast interval ratio of at least 4:1. (Example: If you are seeking two forecast periods, specify at least eight history intervals.)
7. Specify the **Confidence Level**.
8. Click **Update**.

The report is regenerated and the window refreshes.

Note: When you customize (edit) a forecast, you are setting the values that will appear in any non-customized forecasts you request during this session. You may edit subsequent forecasts to change settings as necessary.

If you want multiple forecasts to share the same customizations, request each forecast and then save each one.

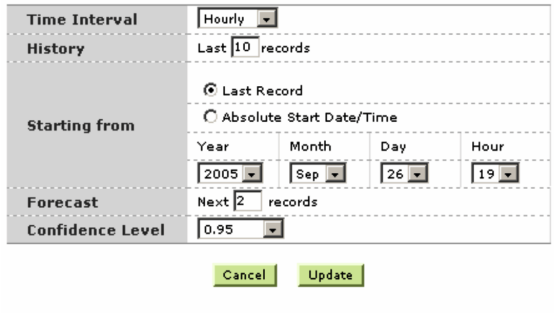


Figure 3.2 Edit Dialog Box for a Forecast

3.2.6 Analyzing Whether Performance Bottlenecks Exist on the Host or Array

Tuning Manager provides a method of analyzing whether performance bottlenecks exist on the host or array. The objective of analyzing host and array performance is to determine, based on the I/O Response Time, whether deterioration in system performance is being caused by the host or by the array.

As shown in Figure 3.3, two checkpoints are provided on the I/O path. The I/O Response Time values obtained at the checkpoints are compared in the window.

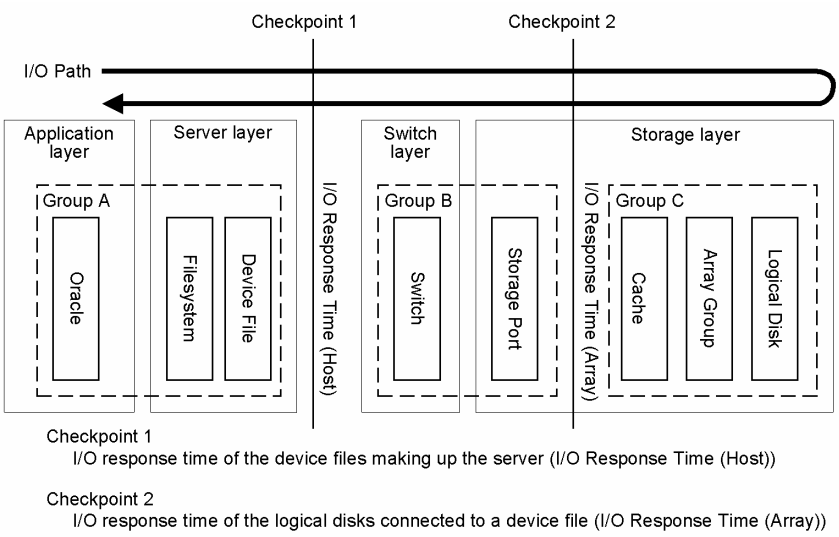


Figure 3.3 System Model Diagram

By comparing the values shown in Table 3.4, you can determine which part of the system is causing a deterioration in system performance.

Table 3.4 Performance Deterioration Patterns and Their Causes

Checkpoint		Cause of performance deterioration
I/O Response Time (Host)	I/O Response Time (Array)	
Fast	Fast	Group A (Server environment including the CPU and LAN)
Slow	Fast	Group B (SAN environment including switches and ports)
Slow	Slow	Group C (storage subsystem environment)

Figure 3.4 shows an example of the window displayed for analyzing host and array performance.

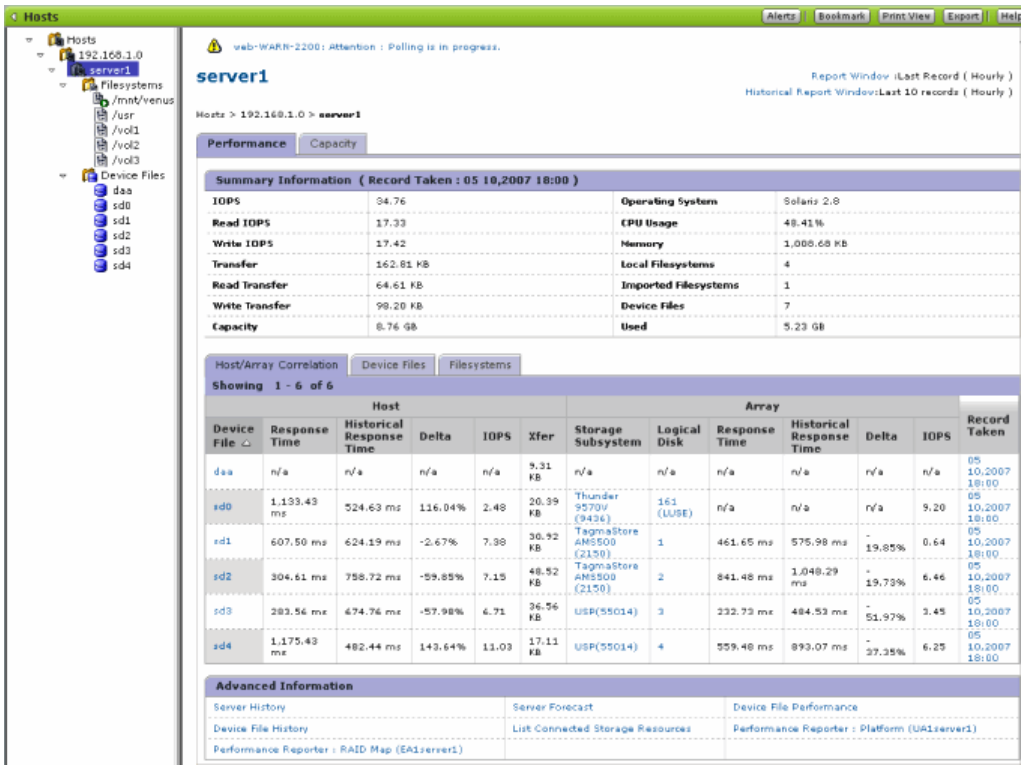


Figure 3.4 Window for Analyzing Host and Array Performance

The window for analyzing host and array performance is displayed for the following layers in the resource tree: Server, Filesystem Folder, Filesystem, Device File Folder, and Device File. This window does not apply to alerts.

Table 3.5 shows the information displayed for each layer.

Table 3.5 Displayed Information by Layer

Layer	Records to be displayed
Server	Information about all the device files that exist on the server and about the logical devices connected to the device files
Filesystem Folder	Information about the device files that make up all the file systems that exist on the server and about the logical devices connected to the device files
Filesystem	Information about the device files that make up a file system and about the logical devices connected to the device files
Device File Folder	Information about all the device files that exist on the server and about the logical devices connected to the device files
Device File	Device file information and information about the logical devices connected to the device file

The purpose of specifying settings in the Historical Report Window Setting window is to:

- compare the I/O response times of the host and the array.
- obtain values with past average values.

3.2.6.1 Setting intervals for calculating average values

When specifying settings in the Historical Report Window Setting window, you can set intervals for calculating average values.

To specify settings in the Historical Report Window Setting window:

1. In the Title area in the Application area, click the Historical Report Window hyperlink.

   The Historical Report Window Setting window appears.

2. Select **Enter absolute time** (see ***Note***) if you want to use a date range, or select **Or, enter last N records** if you want to use the number of records. When specifying the:
   - **Enter absolute time** setting, enter the start date and end date that you want to compare.
   - **Or, enter last N records** setting, enter the number of records that you want to compare with each other.

   Note: On the pull-down menu, select a year from **1970** to the current year, a month from **Jan** to **Dec**, a day from **01** to the last day of the month, and a time from **00** to **23**. If you do not select **Enter absolute time**, the current time is displayed. If you select **Enter absolute time**, the previous setting is displayed.

3. Click **Update**.
4. Click **Cancel** to close the Historical Report Window Setting window.

   The settings specified in the Historical Report Window Setting window are now set.

3.2.6.2 Displaying Output Results

The output results are displayed as the **Host/Array Correlation** tab in the Information area (Sub Resource section) when the resource is Server, Filesystem Folder, Filesystem, Device File Folder, or Device File.

Calculations of Historical Response Time and Delta values

Figure 3.5 shows the calculations when a number of records are specified. Figure 3.6 shows the calculations when a period is specified.

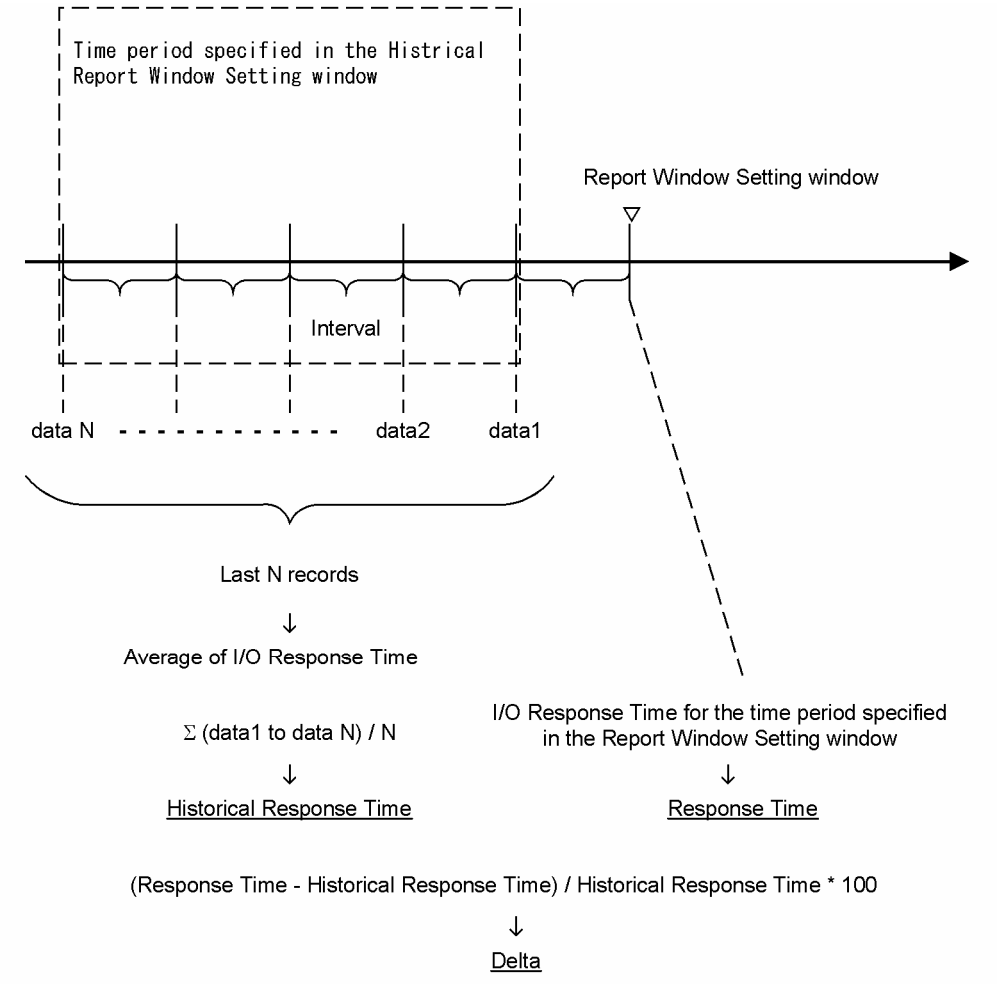


Figure 3.5 Calculations When a Number of Records are Specified

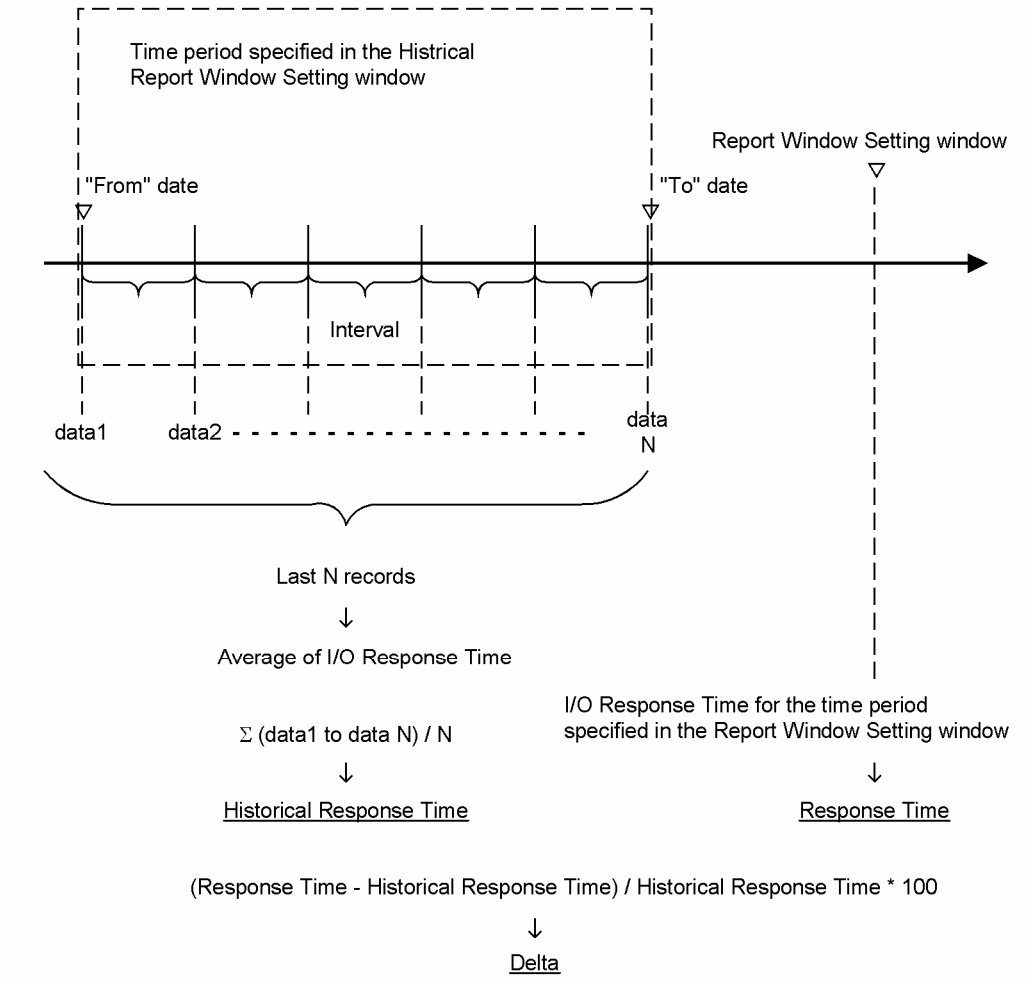


Figure 3.6 Calculations When a Period is Specified

- The date specified in the Report Window Setting window may be a date that is earlier than the date specified in the Historical Report Window Setting window. In this case, also use the same calculation to obtain the delta value.
- Tuning Manager uses the following calculations when the total number of records N is obtained from the period or from the number of records specified in the Historical Report Window Setting window.

  a) When all N data items exist

  Historical Response Time = ∑(data1 to dataN) / N

  b) When M of N data items exist, but L data items are missing

  Historical Response Time = ∑(data1 to dataN) / M (Nonexistent data is ignored.)

  c) When there is no data

  Historical Response Time = n/a

- When the Report Window link in the Main window is clicked and the time period is then changed in the Report Window Setting window, the range shown for the specified number of records (**Last N records**) changes as shown in Figure 3.7.

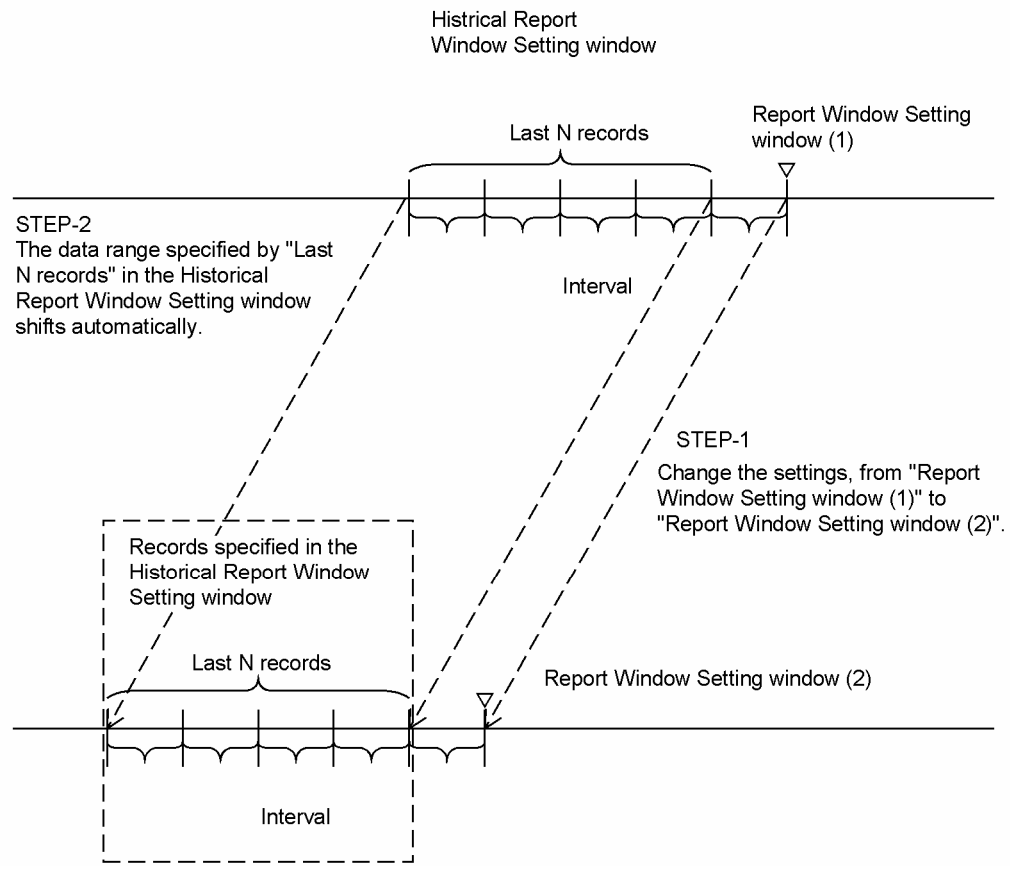


Figure 3.7 Relationship Between Report Window Settings and Number of Records

3.3 Exporting Reports

Tuning Manager exports reports to a CSV file format. This file format is suitable for use in spreadsheet applications such as Microsoft Excel, and desktop database programs. The CSV data which is obtained by the export function will be output in the UTF-8 character set.

3.3.1 Example CSV Output

- The first row displays the column heading of the original data table.
- Every following row in a CSV file represents a new row in the source data table.
- Each row displays the data items in the same sequence (column order) as the displayed table.
- Each item in a row is delimited by a double quote character.
- Each row is terminated by a new line.
- The last row in a data table includes an extra new line.
- Each value in a row (except the last item) is followed by a comma.

An Advanced Information report displays this data table:

Showing 1 - 10 of 10

Port △	Port IOPS	Port Min IOPS	Port Max IOPS	Port Transfer
USP (55014):CL1-A	30.00	40.00	60.00	40.00 MB
USP (55014):CL1-B	40.00	50.00	70.00	50.00 MB
USP (55014):CL1-C	50.00	60.00	80.00	60.00 MB
USP (55014):CL1-D	60.00	70.00	90.00	70.00 MB
USP (55014):CL1-E	70.00	80.00	100.00	80.00 MB
USP (55014):CL1-F	30.00	40.00	60.00	40.00 MB
USP (55014):CL1-G	40.00	50.00	70.00	50.00 MB
USP (55014):CL1-H	50.00	60.00	80.00	60.00 MB
USP (55014):CL2-G	60.00	70.00	90.00	70.00 MB
USP (55014):CL2-H	70.00	80.00	100.00	80.00 MB

Figure 3.8 Example Data Table in Advanced Information Report

An export operation creates a CSV file that includes the following output:

```
Port Performance : SLPR0,,,,,,,
"Report Date: 09 26,2005 18:00",Span: Hourly,,,,,,
Port,Port IOPS,Port Min IOPS,Port Max IOPS,Port Transfer(KB)
USP(55014):CL1-A,30,40,60,"40,960.00"
USP(55014):CL1-B,40,50,70,"51,200.00"
USP(55014):CL1-C,50,60,80,"61,440.00"
USP(55014):CL1-D,60,70,90,"71,680.00"
USP(55014):CL1-E,70,80,100,"81,920.00"
USP(55014):CL1-F,30,40,60,"40,960.00"
USP(55014):CL1-G,40,50,70,"51,200.00"
USP(55014):CL1-H,50,60,80,"61,440.00"
USP(55014):CL2-G,60,70,90,"71,680.00"
USP(55014):CL2-H,70,80,100,"81,920.00"
```

CSV files are easily imported into popular spreadsheet programs.

	A	B	C	D	E
1	Port Perf	ormance : SLPR0			
2	Report Da	Span: Hourly			
3	Port	Port IOPS	Port Min	Port Max	Port Transfer(KB)
4	USP(55014	30	40	60	40,960.00
5	USP(55014	40	50	70	51,200.00
6	USP(55014	50	60	80	61,440.00
7	USP(55014	60	70	90	71,680.00
8	USP(55014	70	80	100	81,920.00
9	USP(55014	30	40	60	40,960.00
10	USP(55014	40	50	70	51,200.00
11	USP(55014	50	60	80	61,440.00
12	USP(55014	60	70	90	71,680.00
13	USP(55014	70	80	100	81,920.00

Figure 3.9 CSV Imported Into Microsoft Excel

3.3.2 Exporting Resource Summary Reports

To export a Resource Summary report:

1. In the Application Bar area, click **Export**.

   The dialog box for saving a file appears.

2. Save the CSV file in an appropriate location.

3.3.3 Exporting Advanced Information Reports

To export an Advanced Information data table:

1. Display an Advanced Information report.
2. Click **Export**.

   The web browser displays a file saving dialog box.
3. Specify a file name.
4. Submit the file saving dialog box.

Note: When exporting Forecast report data, Tuning Manager only includes the forecasted data points. For data on the historical sample, generate the corresponding historical report.

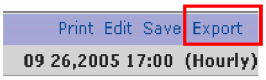


Figure 3.10 The Export Hyperlink

3.4 Bookmarking Reports

Use the Bookmark feature to save frequently used Tuning Manager pages as links for future access. Tuning Manager saves them in its own bookmark list.

You cannot copy or move saved bookmarks to other folders.

3.4.1 Adding a Bookmark Folder

1. In the Explorer area, select **Explorer** and then **Bookmarks**.
2. Click the bookmark folder expand icons as necessary to open the level where you want to insert a new bookmark folder.

   The bookmark tree opens.
3. Navigate as necessary to the folder that will serve as the container for the new folder.
4. Click the hyperlink for the containing folder.
5. Click **New Folder**.
6. Type in the name for the new folder.
7. Click **Save** to retain the new folder name. (Or click **Cancel** to abandon.)

3.4.2 Registering a Bookmark

To register a new bookmark:

1. In the Application Bar area, click the **Bookmark** button.

   Bookmark Setting appears in the Application area. The root of the Bookmark Tree is displayed by default.
2. If you want to save a new bookmark in a subfolder, click the icons as necessary to change the folder level.

   Note: To add bookmark folders, see section 3.4.1.
3. Type a phrase to uniquely describe this page in the **Save bookmark as** field. (Maximum length: 100 characters.)
4. Click **Save** to add this bookmark to the list.

   The Confirmation window indicates success.
5. Click **Close** to close the Confirmation window.

3.4.3 Accessing a Bookmark

To access a bookmarked information page:

1. In the Explorer area, select **Explorer** and then **Bookmarks**.

   The Bookmark tree is displayed in **Navigation area** and the Bookmark list appears in the Application area.

2. Click the icons to expand nodes in the Bookmark tree until the desired bookmark folder is opened.

   The bookmarks contained in the desired bookmark folder are displayed in the Navigation area.

3. Click the hyperlink for your chosen bookmark.

   The bookmarked page is displayed in the Report area.

   Even if you click the **Bookmark** link in the Application area, the bookmarked page is displayed in the Report area.

3.4.4 Changing the Name of a Bookmark

To change the description for a bookmark you previously saved:

1. In the Explorer area, select **Explorer** and then **Bookmarks**.

   The Bookmark tree appears in the Navigation area. The top-level node of this tree is **Bookmarks**.

2. Click the icons to expand nodes in the Bookmark tree as necessary to display bookmark folders and the bookmarks they contain.

3. Click the folder hyperlink for the folder holding the bookmark you want to edit.

   The **Bookmark** list for that folder appears in the Application area.

4. Click the **Rename** link.

   A Bookmark Setting window appears with the current bookmark description.

5. Type a replacement phrase to uniquely describe this page in the **Save bookmark as** field. (Maximum length: 100 characters.)

6. Click **Save** to add this bookmark to the list. (Or click **Cancel** to abandon this bookmark.)

7. Click **Close** to close the Confirmation window.

3.4.5 Deleting a Bookmark

To delete a bookmark you previously saved:

1. In the Explorer area, select **Explorer** then **Bookmarks**.

   The Bookmark tree appears in the Navigation area. The top-level node of this tree is **Bookmarks**.

2. Click the icons to expand nodes in the Bookmark tree as necessary to display bookmark folders and the bookmarks they contain.

3. Click the folder hyperlink for the folder holding the bookmark you want to delete.

   The **Bookmark** list for that folder appears in the Application area.

4. Click **Delete**.

   A confirmation dialog box appears requesting your confirmation.

5. Click **OK** to confirm deletion. (Or click **Cancel** to abandon changes.)

   If you clicked **OK**, the Bookmarks List no longer displays the deleted bookmark.

3.4.6 Deleting a Bookmark Folder

1. In the Explorer area, select **Explorer** and then **Bookmarks**.

2. Click the bookmark folder expand icons as necessary to open the level where you want to insert a new bookmark folder.

   The bookmark tree opens.

3. Navigate as necessary to the level that contains the folder you want to delete.

4. Click the hyperlink for the containing folder.

5. In the Application area, click the **Delete** hyperlink for the folder you want to remove.

   A confirmation dialog box appears.

6. Click **OK** to delete the folder. (Or click **Cancel** to abandon.)

3.5 Printing Reports

To print a report displayed in the Main Console, use either of the following methods:

- Click **Print View** in the Application Bar area.

  Use this when printing Summary area or Information area (Sub Resource Section) reports.

- Click the **Print** hyperlink in the Advanced Information Report window.

  Use this when printing information area (Advanced Information) reports.

Chapter 4 Working with Reports from Performance Reporter

Some Tuning Manager reports are displayed by using Main Console, and some are displayed by using Performance Reporter. This chapter describes the reports that are displayed by using Performance Reporter.

With Tuning Manager, you can also use the command line interface (CLI) to display reports. For details about commands, see the *HiCommand Tuning Manager Command Line Interface Guide*.

- Overview (see section 4.1)
- Generating Reports (see section 4.2)
- Exporting Reports (see section 4.3)
- Bookmarking Reports (see section 4.4)
- Printing Reports (see section 4.5)

4.1 Overview

Performance Reporter displays the performance data collected by an Agent in formats such as graphs and tables. The definitions necessary for displaying this data graphically, as well as the graphs and tables based on those definitions, are called **reports**.

4.1.1 Features of Reports Displayed with Performance Reporter

The reports displayed by using Performance Reporter allow you to perform the following operations:

- Analyze trends and performance in detail
- Display detailed data by the minute
- Specify display formats of graphs and change time ranges
- Display data from the local Agent's data store (the Store database) for historical reports
- Display all data collected by an Agent
- Display data from single-instance records or multiple-instance records

4.1.2 Types of Reports Displayed with Performance Reporter

Performance Reporter can display both historical reports and real-time reports. A historical report displays data from a specified interval of time. A real-time report displays temporarily collected, current data.

Any of the following three report types can be selected, as appropriate to the analysis objectives for the performance data:

- Historical report (single Agent): This type of report displays one Report window for each Agent. When multiple Agents are selected, the report displays as many windows as the number of Agents you have selected. A single-Agent historical report handles the following record types:
  - Single instance
    Records that use a single instance as their evaluation target. A record for which only one row is created for one data collection is called a single-instance record.
  - Multiple instances
    Records that use multiple instances as their evaluation target. A record for which multiple rows are created for one data collection is called a multiple-instance record. This can be useful, for example, in comparing data in the same field in multiple Agents.
- Historical report (multiple Agents): This type of report displays all selected Agents in a single window, regardless of whether a single report or multiple reports are selected.
- Real-time report (single Agent): Displays current data, temporarily collected, for a single Agent. The collected values can be displayed in order, and ranked. Note that past data cannot be obtained for display, since it is not stored in the Store database. Real-time reports (single Agent) support data from single-instance or multiple-instance records.

4.2 Generating Reports

You can use Performance Reporter to generate reports. For details about how to start Performance Reporter, see section 2.6.2.

4.2.1 Displaying Reports with Performance Reporter

1. In the Navigation frame, choose the **Agents** tab. The Agent hierarchy is displayed.
2. In the Navigation frame, select the desired Agent from the Agent hierarchy.
3. In the Method frame, choose **Display Report**.
4. From the report hierarchy, choose the name of the report you wish to display (see Figure 4.1).

If you start Performance Reporter by specifying an Agent in the Main Console, the Performance Reporter Main window displays the report hierarchy, so you can skip steps 1 to 3.

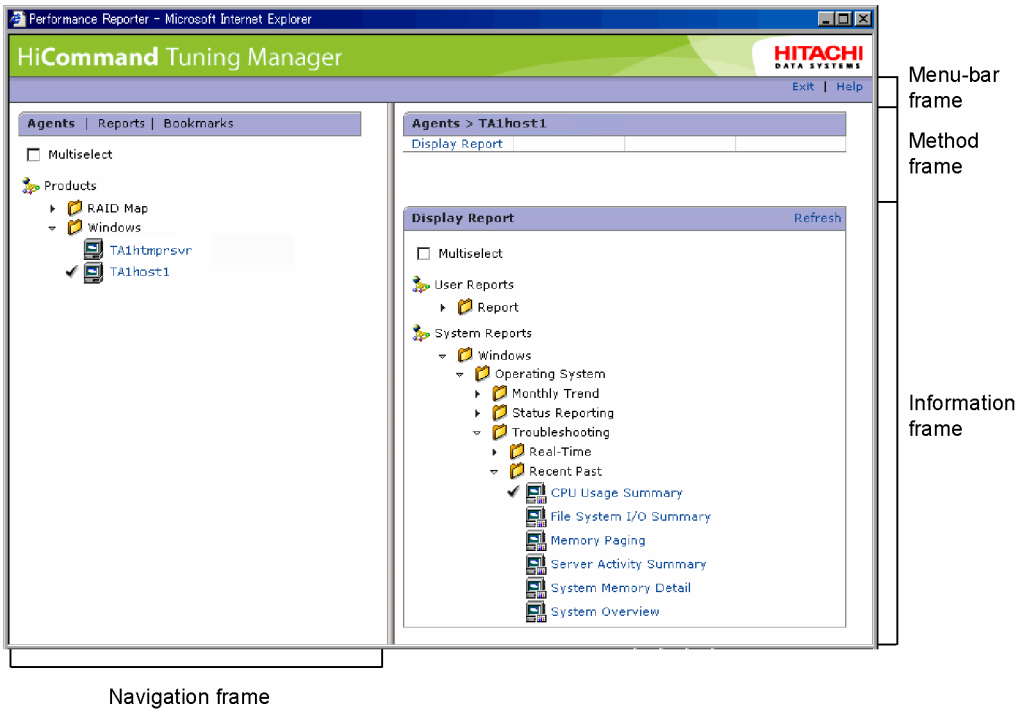


Figure 4.1 Performance Reporter Main Window After Specifying a Report

4.2.2 Displaying Historical Reports

An historical report uses performance data that is stored in the Agent's Store database. To display an historical report, you must have specified Log = Yes in the jpcasrec update command so that the performance data to be displayed in the report will be stored in the Store database. Since Log = No is set by default for historical reports stored in the Advanced folder for a solution set, you must change the setting to display these reports.

For details about the jpcasrec update command, see the *HiCommand Tuning Manager Command Line Interface Guide*. For details about operating and managing the Store database, see the *HiCommand Tuning Manager Agent Administration Guide*.

4.2.3 Displaying Real-time Reports

A real-time report, indicating the current states of monitoring targets, uses the performance data collected by the Agent each time a report is displayed. This performance data is not stored in the Store database. For this reason, you do not need to make settings for storing performance data in the Store database. For details about the commands, see the *HiCommand Tuning Manager Command Line Interface Guide*.

Note: Performance Reporter can display a maximum of 32,767 instances in real-time reports.

4.2.4 Changing Report Displays

When a report is displayed, you can change the data collection period and filter conditions that were set during report definition. You use the **Show Options** tab in the Report window to change report display conditions.

To change report display conditions:

1. From the Performance Reporter Main Window, select the desired report. This will open the **Report** window, **Report** tab. The **Report** tab is the default view. Select the **Show Options** tab.
2. Change conditions as desired, and then select **OK**. The new conditions are applied, and the **Report** window is displayed again.

The display conditions displayed in the Show Options tab differ depending on whether the report is a historical report or real-time report.

4.2.5 About Report Display Formats

Performance Reporter can display reports in various formats:

- Column graph (see section 4.2.5.1)
- Stacked column graph (see section 4.2.5.2)
- Bar graph (see section 4.2.5.3)
- Stacked bar graph (see section 4.2.5.4)
- Pie graph (see section 4.2.5.5)
- Line graph (see section 4.2.5.6)
- Area graph (see section 4.2.5.7)
- Stacked area graph (see section 4.2.5.8)
- List (see section 4.2.5.9)
- Table (see section 4.2.5.10)

4.2.5.1 Column Graphs

A column graph is appropriate for checking the status of each instance or Agent at given intervals. The initial display shows the data collected most recently.

The X axis represents the instance, and the Y axis represents the usage status of the target resource. When multiple fields are set, each instance is shown separately on the X axis. For a single-instance report, each bar indicates a field set for display. For a multiple-instance report, a group of bars indicates an instance, and each bar shows the field(s) set for display.

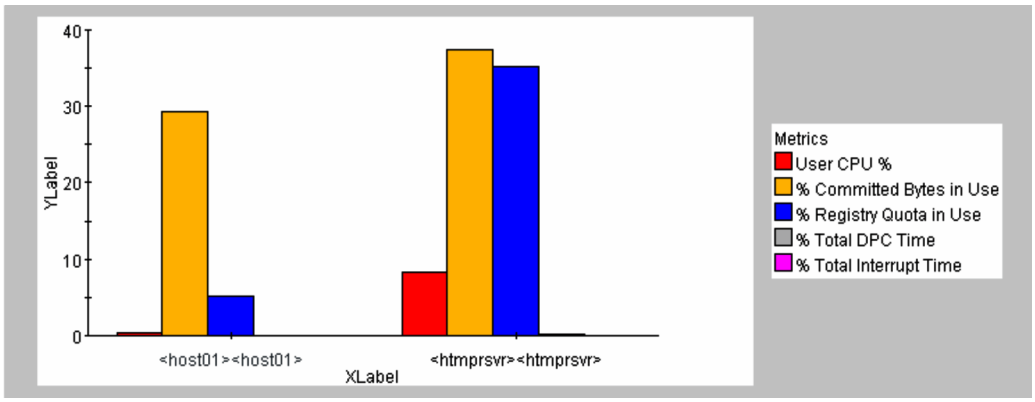


Figure 4.2 Sample Column Graph (Multiple-Instance Report)

4.2.5.2 Stacked Column Graphs

A stacked column graph is appropriate for setting multiple fields for display and displaying the fields for each instance as a stacked bar.

The X and Y axes are the same as for a column graph. If only one field is set, the graph becomes a column graph.

Note: In a stacked column graph, the fields are stacked even if they do not represent related data.

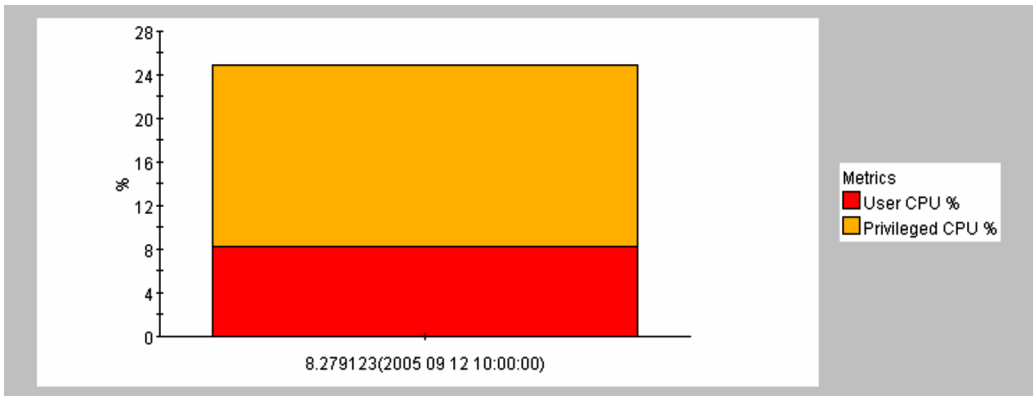


Figure 4.3 Sample Stacked Column Graph

4.2.5.3 Bar Graphs

The display characteristics for a bar graph are the same as for a column graph.

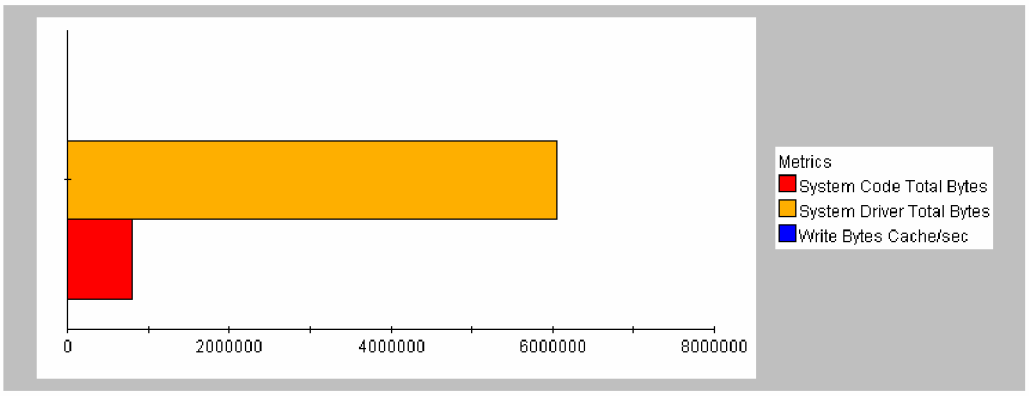


Figure 4.4 Sample Bar Graph

4.2.5.4 Stacked Bar Graphs

The display characteristics for a stacked bar graph are the same as for a stacked column graph.

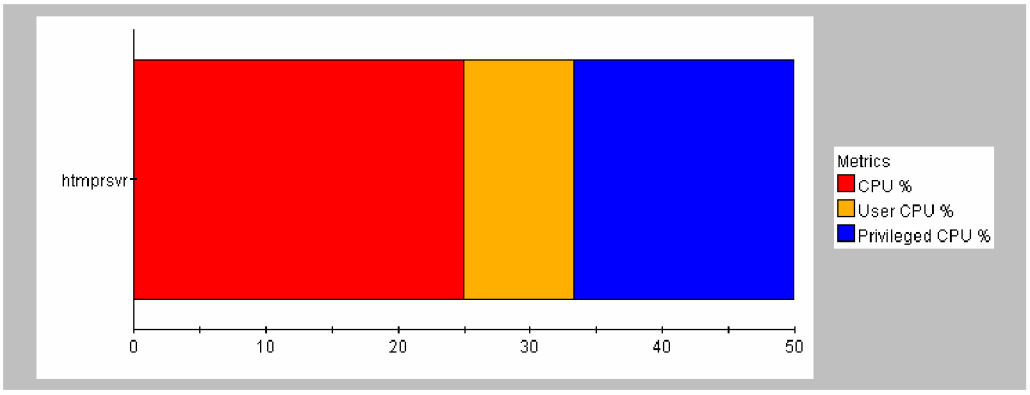


Figure 4.5 Sample Stacked Bar Graph

4.2.5.5 Pie Graphs

A pie graph is appropriate for displaying the value of each data field that is collected as a percentage of the total. For a single instance, only one circle is displayed. For multiple instances, each instance is indicated by a separate circle.

Note: A pie graph does not account for the relationship among the fields.

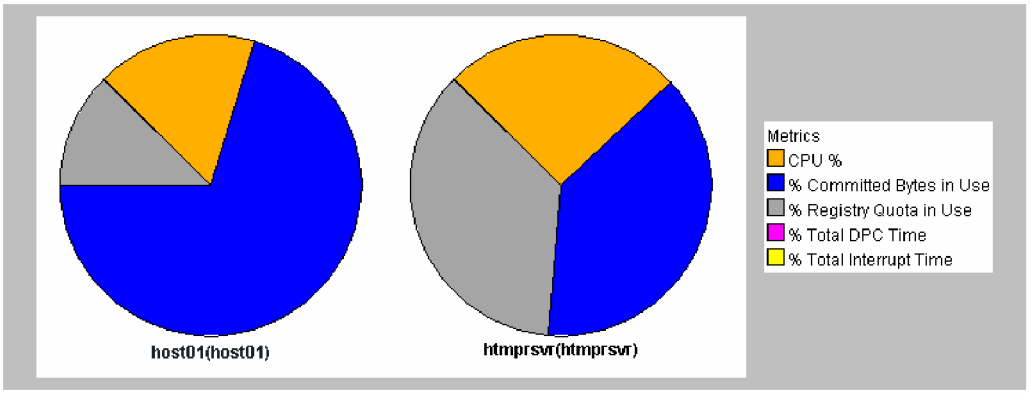


Figure 4.6 Sample Pie Graph Showing Multiple Instances

4.2.5.6 Line Graphs

Line graphs are best suited for viewing changes in values over time for one Agent with a single instance. The X axis represents time, and the Y axis represents the usage status of the target resources. It is also possible to specify multiple Agents or multiple instances, but you can only define one field.

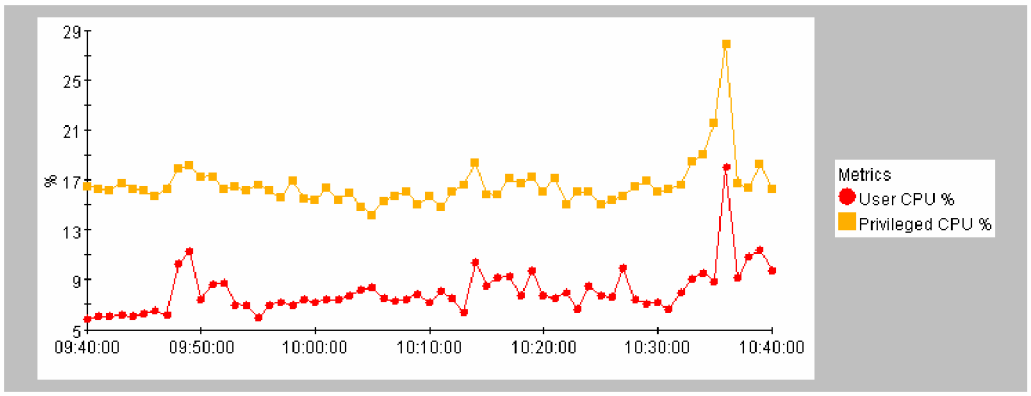


Figure 4.7 Sample Line Graph (Multiple fields, Single Instance)

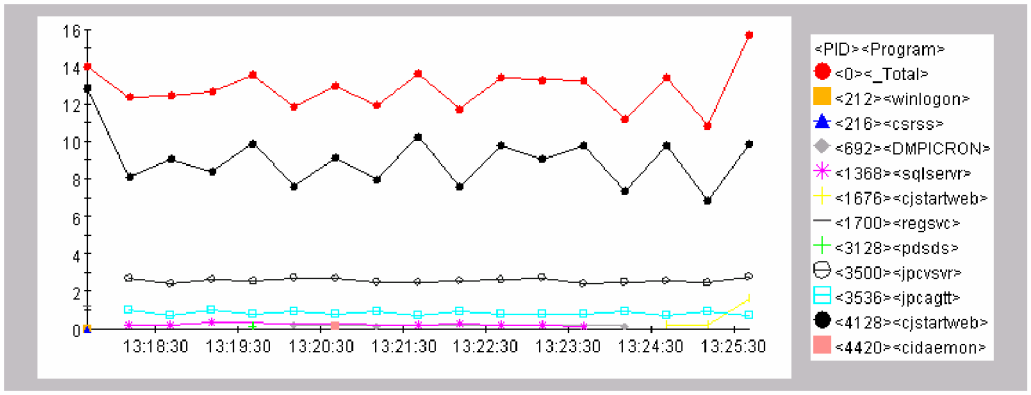


Figure 4.8 Sample Line Graph (Single field, Multiple Instances)

4.2.5.7 Area Graphs

An area graph is used to represent data value changes over time. The display characteristics are the same as for a line graph.

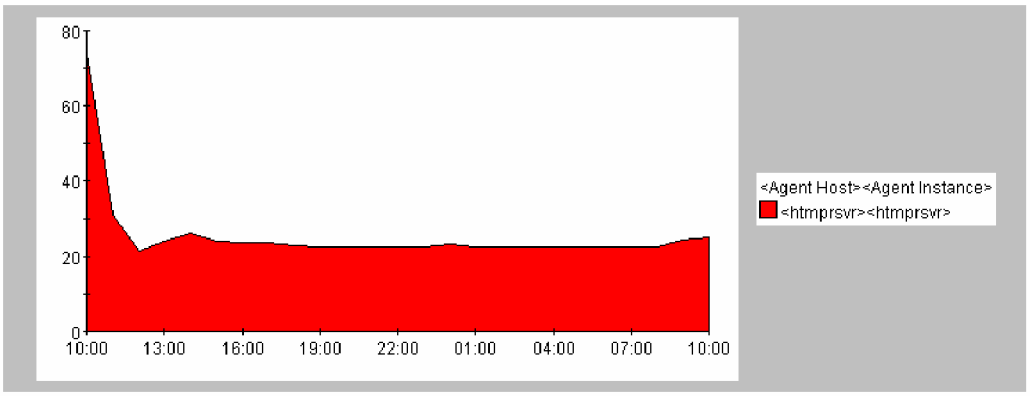


Figure 4.9 Sample Area Graph

4.2.5.8 Stacked area Graphs

The display characteristics for a stacked area graph are the same as for a line graph. Note that the stacked areas do not account for the relationship among the fields.

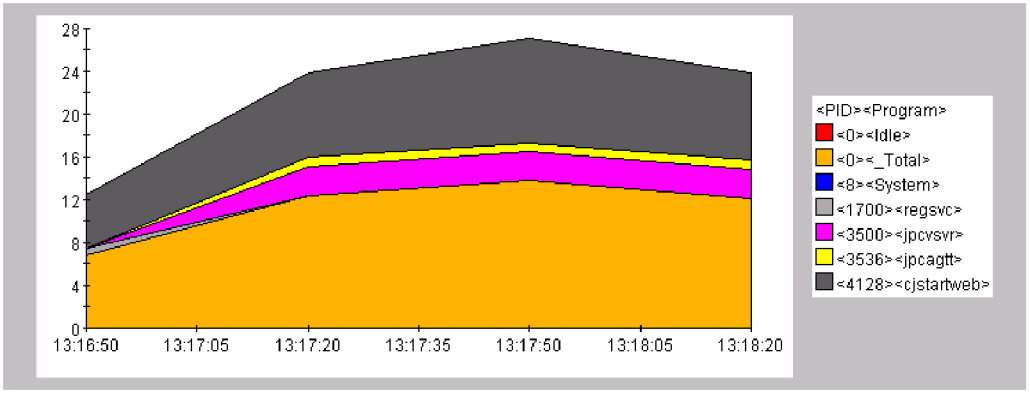


Figure 4.10 Sample Stacked area Graph

4.2.5.9 Lists

Lists enable display of field values for each Agent or instance, and are especially appropriate for displaying multiple Agents or multiple instances. To display the information of another Agent or instance within the same data group, click the page navigation button displayed on the left side of the frame. To display the information of other data groups, click the data group navigation button on the Report window menu bar. Items in blue indicate that there is a drill-down report available for that item.

Figure 4.11 shows a sample list.

1 OF 1

Date and Time	09 14 2005 13:00:00
CPU %	28.0355
Page Faults/sec	188.8508
User CPU %	9.4552
Threads (Total)	14,941.0000

Figure 4.11 Sample List

4.2.5.10 Tables

A table is useful for viewing changes in field values over time. The default view is 20 lines of data in sorted order per page, which can be modified by changing the **displayCountPerPage** value in **config.xml** (see the chapter that describes setup of Performance Reporter in the *HiCommand Tuning Manager Server Administration Guide* for more information on config.xml). To view additional lines, click the page scroll button at the top right of the table. The **Date and Time** field is added as the first and last columns of a table.

First Previous 1 - 20 OF 1440 Next Last

Date and Time	CPU %	Page Faults/sec	User CPU %	Threads (Total)	Date and Time
09 13 2005 14:11:00	22.8287	114.5190	7.0848	975.0000	09 13 2005 14:11:00
09 13 2005 14:12:00	22.7355	115.1712	6.6581	974.0000	09 13 2005 14:12:00
09 13 2005 14:13:00	23.7870	150.6918	6.3467	974.0000	09 13 2005 14:13:00
09 13 2005 14:14:00	22.5923	117.6257	5.9127	973.0000	09 13 2005 14:14:00
09 13 2005 14:15:00	22.7822	107.6135	6.6929	973.0000	09 13 2005 14:15:00
09 13 2005 14:16:00	22.6897	112.3431	5.6531	973.0000	09 13 2005 14:16:00
09 13 2005 14:17:00	23.0769	122.6946	6.3271	977.0000	09 13 2005 14:17:00
09 13 2005 14:18:00	23.3351	158.7509	6.8663	976.0000	09 13 2005 14:18:00
09 13 2005 14:19:00	22.8144	108.7486	7.2985	977.0000	09 13 2005 14:19:00
09 13 2005 14:20:00	23.1424	146.1677	6.7595	976.0000	09 13 2005 14:20:00
09 13 2005 14:21:00	23.1173	119.7761	6.7961	977.0000	09 13 2005 14:21:00
09 13 2005 14:22:00	22.6831	112.3443	5.6183	975.0000	09 13 2005 14:22:00
09 13 2005 14:23:00	23.9164	152.8398	6.7337	975.0000	09 13 2005 14:23:00
09 13 2005 14:24:00	22.7440	113.3136	6.6632	975.0000	09 13 2005 14:24:00
09 13 2005 14:25:00	23.0312	115.2309	6.2484	974.0000	09 13 2005 14:25:00
09 13 2005 14:26:00	23.5853	249.9478	6.6860	983.0000	09 13 2005 14:26:00
09 13 2005 14:27:00	22.8527	120.4111	6.5773	982.0000	09 13 2005 14:27:00
09 13 2005 14:28:00	23.7595	153.1235	6.6947	980.0000	09 13 2005 14:28:00
09 13 2005 14:29:00	22.7871	112.5460	6.5290	980.0000	09 13 2005 14:29:00
09 13 2005 14:30:00	22.8287	117.3238	6.3763	979.0000	09 13 2005 14:30:00

First Previous 1 - 20 OF 1440 Next Last

Figure 4.12 Sample Table

4.2.6 Directly Accessing Reports with Performance Reporter

Launching Performance Reporter by clicking **Global** and then **Go** in the Global Tasks Bar area of Tuning Manager is called Context-Launch.

To start Performance Reporter:

In the Global Tasks Bar area, select **Global** and then **Go**.

The **Go** menu has the submenus listed in Table 4.1.

Table 4.1 Submenus of the "Go" Global Menu

Submenu	Description
Performance Reporter	Launches Performance Reporter.
Device Manager	Launches Device Manager. This submenu is not displayed in SSO mode because the Report Windows of other HiCommand products are displayed on the Dashboard.

4.2.6.1 Stopping Performance Reporter

To close the Main window of Performance Reporter and open a Report window, choose **Exit** from the Menu-bar frame of the Main window.

If the Report Tree Selection window was started from the Main console, choose **Cancel** to close the window. The Report Tree Selection window also closes when a Report window is displayed, or when the user logs out from the Main Console.

If one or more report windows do not close when you close the Main window, you can close them individually by selecting **Close**. Report windows may stay open if you:

- are displaying more than 10 report windows
- are opening any report windows (including drilldown reports) when the Performance Reporter Main window is closed
- have launched more than one instance of Performance Reporter
- entered a URL in the Main window
- used the browser's **Refresh**

Note: Even when there are fewer than 10 windows displayed, auto-refresh processing will be slow if auto-refresh is run for multiple real-time reports. In such cases, auto-refresh processing may also stop because the processing time exceeds the limit.

4.2.6.2 Starting Performance Reporter

To start Performance Reporter, do the following:

1. Start the Main Console. For information about starting the Main Console, see section 2.1.
2. From the Main Console, open the Performance Reporter Main window or the Report Tree Selection window.

You can then display a report by selecting it from among those listed in the Main window or the Report Tree Selection window. For information about starting the Report Tree Selection window from the Main console, see section 2.1.

Note: If an error message is displayed when Performance Reporter is started from the Main Console, confirm that the Performance Reporter services are running. If they are not running, you need to start them manually. For details about starting and stopping the services, see the sections describing the starting and stopping of services in the *HiCommand Tuning Manager Server Administration Guide*.

4.2.6.3 Starting with an Agent Specified

Launch Performance Reporter with an Agent specified when you want to access information collected by a particular Agent.

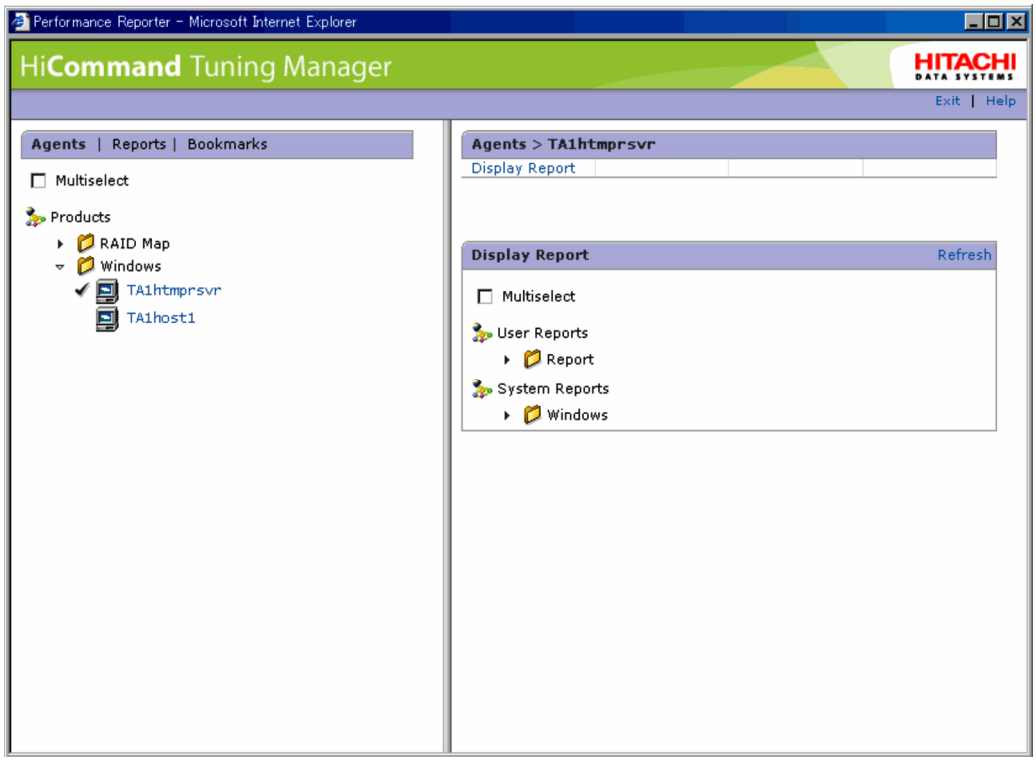


Figure 4.13 Performance Reporter Main Window, Agent Specified

4.2.6.4 Starting without an Agent Specified

Launch Performance Reporter (without specifying an Agent) when you want to:

- access information about a product that is not supported by the Main Console
- reference information not specific to a particular Agent, such as information about the entire network.

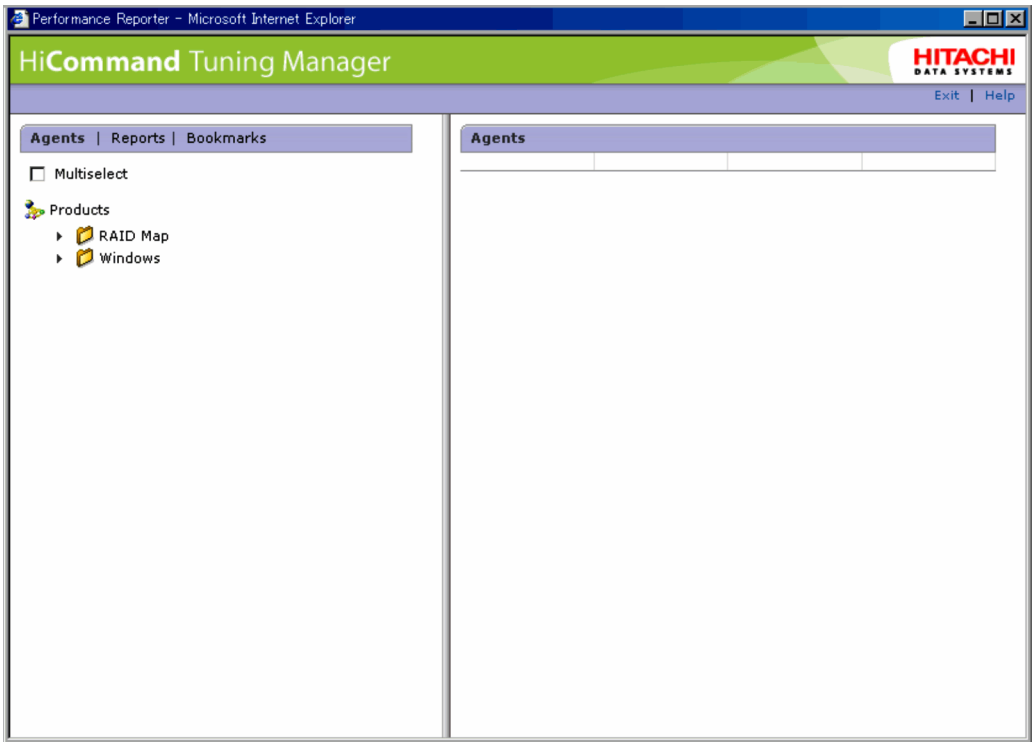


Figure 4.14 Performance Reporter Main Window, Agent Not Specified

The Performance Reporter Main window opens as a separate window. You can open only one Performance Reporter Main window at a time. If you attempt to restart Performance Reporter, you overwrite the current window; no new window opens.

4.3 Exporting Reports

Performance Reporter can export reports as CSV format files. The CSV data which is obtained by 'Export' function will be output in UTF-8 character set.

4.3.1 Example CSV Output

- CSV data is output as Data Header 1, Data Header 2, and Data. Data Header 1 consists of a line space, the report name, and a line space. Data Header 2 consists of either the column headings or the value set for a particular field. Data is displayed as one output row per record.
- The character set is determined by the setting in **characterCode** in `config.xml`.
- The linefeed code is set in **lineSeparator** in `config.xml` (for details about `config.xml` settings, see the chapter that describes Performance Reporter setup in the *HiCommand Tuning Manager Server Administration Guide*).
- The end-of-file code is <EOF>.
- The item delimiter is a comma. If a data value includes a comma (,), a quotation mark (“) or a linefeed code, the entire data value must be enclosed in quotation marks (“ “).
- The date is displayed in the default format set by the locale or as specified in **selectFormat** of `config.xml` (for details about `config.xml` settings, see the chapter that describes Performance Reporter setup in the *HiCommand Tuning Manager Server Administration Guide*).

For details about `config.xml` settings, see the *HiCommand Tuning Manager Server Administration Guide*.

```
System Overview

Date and Time,CPU %,Page Faults/sec,Transition Faults/sec,Bytes Total/sec,Pages/sec,File Data Ops/sec,File Control Ops/sec
2003/06/26 12:48:00,18.174707,198.52946,6.842483,42.97413108355824,1.5186975,714.33014,381.36322
2003/06/26 12:49:00,6.569343,159.13785,3.8541458,0.0,0.2335846,96.66736,102.47341
2003/06/26 12:50:00,7.540395,174.17961,18.450466,0.0,0.41037512,97.436264,122.10721
2003/06/26 12:51:00,7.8487616,207.2928,23.264324,0.0,1.4519341,112.07927,126.54811
2003/06/26 12:52:00,8.678856,223.76566,22.484987,0.0,0.4670472,145.7472,140.69325
2003/06/26 12:53:00,6.9900885,172.43947,14.372737,112.99542310510941,0.40063378,94.36411,114.91289
2003/06/26 12:54:00,6.796875,154.87126,4.4001303,0.0,0.15000445,99.15,103.333336
2003/06/26 12:55:00,6.7412806,162.63734,9.661954,6.16366029499316,0.16658542,99.21499,101.49714
2003/06/26 12:56:00,7.4759054,187.4394,18.822298,0.0,0.4001197,108.2782,114.87991
2003/06/26 12:57:00,6.699687,154.9848,3.9709744,0.0,0.16684766,95.532845,105.092804
2003/06/26 12:58:00,6.6736183,166.4459,10.544688,0.0,0.38374656,96.433784,101.48905
2003/06/26 12:59:00,6.803962,175.80595,19.053848,0.0,0.46716967,98.98644,106.92805
2003/06/26 13:00:00,7.666232,181.4917,8.644846,21.89582617389493,0.5173556,106.25502,115.65059
2003/06/26 13:01:00,98.308174,385.0624,92.78813,2.4654656325417306,0.46643946,940.7767,1371.8188
2003/06/26 13:02:00,94.39958,371.78885,70.2303,75.03123463775609,2.417136,708.0177,750.82886
```

Figure 4.15 Sample CSV Output for System Overview (Text)

System Overview							
Date and Time	CPU %	Page Faults/sec	Transition Faults/sec	Bytes Total/sec	Pages/sec	File Data Ops/sec	File Control Ops/sec
2003/6/26 12:48	18.174707	196.52946	6.842483	42.97413106	1.5186975	714.33014	381.36322
2003/6/26 12:49	6.569343	159.13785	3.8541458	0	0.2335846	96.66736	102.47341
2003/6/26 12:50	7.540395	174.17961	18.450466	0	0.4103751	97.436264	122.10721
2003/6/26 12:51	7.8487616	207.2928	23.264324	0	1.4519341	112.07927	126.54811
2003/6/26 12:52	8.678656	223.76566	22.484987	0	0.4670472	145.7472	140.69325
2003/6/26 12:53	6.9900885	172.43947	14.372737	112.9954231	0.4006338	94.36411	114.91289
2003/6/26 12:54	6.796875	154.87126	4.4001303	0	0.1500045	99.15	103.333336
2003/6/26 12:55	6.7412806	162.63734	9.661954	6.163660295	0.1665854	99.21499	101.49714
2003/6/26 12:56	7.4759054	187.4394	18.822298	0	0.4001197	108.2782	114.87991
2003/6/26 12:57	6.699687	154.9848	3.9709744	0	0.1668477	95.532845	105.092804
2003/6/26 12:58	6.6736183	166.4459	10.544688	0	0.3837466	96.433784	101.48905
2003/6/26 12:59	6.803962	175.80595	19.053848	0	0.4671697	98.98644	106.92805
2003/6/26 13:00	7.666232	181.4917	8.644846	21.89582617	0.5173556	106.25502	115.65059
2003/6/26 13:01	98.308174	385.0624	92.78813	2.465465633	0.4664395	940.7767	1371.8188
2003/6/26 13:02	94.39958	371.78885	70.2303	75.03123464	2.417136	708.0177	750.82886

Figure 4.16 Sample CSV Output for System Overview (Table)

4.3.2 Exporting Reports

Use the GUI or the `jpcrpt` command to export a report. For details about the command, see the *HiCommand Tuning Manager Command Line Interface Guide*.

To export a report using the GUI:

1. Display the report that is to be output to a file. The **Export** link is displayed in the menu bar.
2. Click the **Export** link in the report window. The file download screen is displayed.
3. Name the file, then save it. The default file name is `Export.csv`.

4.4 Bookmarking Reports

With Performance Reporter, you can bookmark a report and perform short-term display of reports. You can use a bookmark to display reports in fewer steps and simultaneously display reports for different Agents, and reports with different report definitions. This section provides an example in Windows to show how to bookmark a report and how to perform operations for the folders, bookmarks, and bookmarked reports that you create.

You bookmark reports using the **Bookmark Registration window.** Figure 4.17 shows the **Bookmark Registration window.**

Note: We recommend that you bookmark no more than 10 reports.

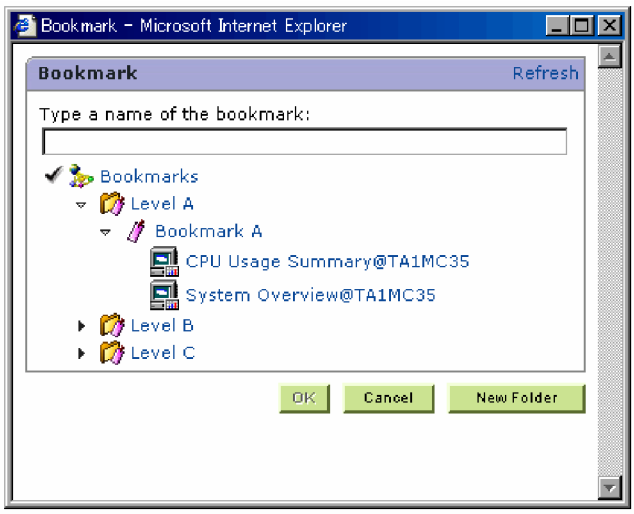


Figure 4.17 Sample Bookmark Registration Window

The **Bookmark Registration** window lets you specify the following settings:

- The **Refresh** link updates the displayed information.
- The **Type a name of the bookmark** field lets you specify the name of the bookmark. Values specified can be from 1 to 64 characters.
- The **Bookmarks** button ( ) displays a hierarchy of bookmark folders, bookmarks, and bookmarked reports.
- The name-of-bookmark-folder ( ) displays a list of stored bookmarks.
- The bookmark-name ( ) displays a list of bookmarked reports.
- The report-name ( ) displays a list of reports. *report-name* is displayed as *report-name* @ *agent-name*. If multiple Agents exist, their names are displayed separately by commas.
- The **New Folder** button creates a new folder and displays the **Bookmark Folder Creation** window.

4.4.1 Registering a Report in a New Bookmark

To create a new bookmark for a report:

1. Click the **Bookmark** link in the common menu of the **Report** window. The **Bookmark Registration** window is displayed, with **Bookmarks** selected in the bookmark hierarchy.
2. To create a new folder for storing bookmarks, click **New Folder**. The Bookmark **Folder Creation** window is displayed.
3. Below **Create a new bookmark folder**, enter the name of the folder in **Name**. You can specify from 1 to 64 characters.
4. Click **OK**. The **Bookmark Registration** window reappears. The **Level A** folder is selected in the bookmark hierarchy.
5. In **Type a name of the bookmark**, enter the name of the report bookmark.
6. Click **OK**. The bookmark for which **Bookmark** A was entered in **Type a name of the bookmark** is created in the **Level A** folder. The report is registered in the created bookmark **Bookmark A.**

4.4.2 Registering a Report in an Existing Bookmark

To register a report in a previously created bookmark:

1. In the common menu of the Report window, click the **Bookmark** link. The **Bookmark Registration** window appears, with **Bookmarks** selected in the bookmark hierarchy.
2. Click the bookmark in which you want to store the report. The clicked bookmark is selected. The "**Add to bookmark '***bookmark-name***'**" is displayed.
3. Click **OK**. The report is registered in the bookmark.

4.4.3 Refreshing a Report in a Bookmark

To refresh a report registered in a bookmark:

1. Click the **Bookmark** link in the common menu of the **Report** window. The **Bookmark Registratio**n window is displayed, with **Bookmarks** selected in the bookmark hierarchy.
2. Click the report within the bookmark that you want to refresh. The clicked report is selected. The "**Report '***registered-report-name***' is updated.**" is displayed.
3. Click **OK**. A message box confirms the refresh.
4. To refresh the selected report, click **OK**.

4.4.4 Working with Bookmark Folders

You can perform the following folder operations in the **Bookmarks** tab of the Navigation frame in the **Main** window:

- Adding a bookmark folder
- Changing the names of a bookmark folder
- Deleting a bookmark folder

Figure 4.18 shows the **Bookmarks** tab of the Navigation frame in the Main window.

Figure 4.18 Bookmarks tab

The following text describes the items displayed in each frame of the Main window:

Navigation Frame

- **Refresh** updates the displayed information.
- The **Bookmarks** button ( ) displays a hierarchy of bookmark folders, bookmarks, and bookmarked reports.
- The *name-of-bookmark-folder* button ( ) displays a list of stored bookmarks.
- The *bookmark-name* button ( ) displays a list of bookmarked reports.
- The *report-name* button ( ) displays a list of reports. *report-name* is displayed as *report-name@agent-name*. If multiple Agents exist, their names are displayed separately by commas.

Method Frame

The methods displayed in the Method frame differ, depending on the object selected. For details, see the explanation for each operation.

Information Frame

The windows displayed in the Information frame differ, depending on the selected method. For information about these windows, see the explanation for each operation.

4.4.5 Adding a Bookmark Folder

To add a folder to a bookmark:

1. In the **Navigation** frame of the **Main** window, select the **Bookmarks** tab. The bookmark hierarchy is displayed.
2. In the bookmark hierarchy, click **Bookmarks** or a folder within to which you want to add a folder. The clicked folder is selected.
3. Select the **New Folder** method in the **Method** frame. The **New Folder** window is displayed in the Information frame.
4. Enter the name of the folder in **New name of the bookmark folder**.
5. Click **OK**. A folder is added to the bookmark hierarchy of the Navigation frame.

4.4.6 Changing the Name of a Bookmark Folder

To change the name of a folder:

1. In the **Navigation** frame of the **Main** window, select the **Bookmarks** tab. The bookmark hierarchy is displayed.
2. In the bookmark hierarchy, click the folder in **Bookmarks** whose name you want to change. The clicked folder is selected.
3. In the Method frame, select the **Rename** method. The **Rename** window is displayed in the **Information** frame. The current name of the folder is displayed in **Current name of the bookmark folder**.
4. Enter the new name for the folder in **New name of the bookmark folder**.
5. Click **OK**. The name of the selected folder is changed.

4.4.7 Deleting a Bookmark Folder

When you delete a bookmark folder, you also delete the folders, bookmarks, and reports within the folder.

To delete a folder:

1. In the **Navigation** frame of the Main window, select the **Bookmarks** tab. The bookmark hierarchy is displayed.
2. In the bookmark hierarchy, click the folder in **Bookmarks** that you want to delete. The clicked folder is selected.
3. In the **Method** frame, select the **Delete** method. A message box confirms the deletion.
4. To delete the selected folder, click **OK**. The selected folder is deleted.

4.4.8 Managing Report Bookmarks

You can perform the following tasks for bookmarks, in the **Bookmarks** tab of the Main window of Performance Reporter.

- Accessing a Bookmark

- Changing the name of a bookmark
- Deleting a bookmark
- Displaying the properties of a bookmark

4.4.9 Accessing a Bookmark

To display a bookmarked report:

1. Select the **Bookmarks** tab in the **Navigation** frame of the **Main** window. The bookmark hierarchy is displayed.
2. In the bookmark hierarchy, click the bookmark containing the report you want to display. The clicked bookmark is selected.
3. In the **Method** frame, select the **Display Report** method. The report registered in the bookmark is displayed in the **Report** tab of the Report window.

4.4.10 Changing a Bookmark Name

To change the name of a bookmark:

1. In the Navigation frame of the **Main** window, select the **Bookmarks** tab. The bookmark hierarchy is displayed.
2. In the bookmark hierarchy, click the bookmark in **Bookmarks** or in the bookmark folder whose name you want to change. The clicked bookmark is selected.
3. In the Method frame, select the **Rename** method. The **Rename** window is displayed in the Information frame. The current name of the bookmark is displayed in **Current name of the bookmark**.
4. Enter the new name for the bookmark in **New name of the bookmark**.
5. Click **OK**. The name of the selected bookmark is changed.

4.4.11 Deleting a Bookmark

To delete a bookmark and its associated reports:

1. In the **Navigation** frame of the **Main** window, select the **Bookmarks** tab. The bookmark hierarchy is displayed.
2. In the bookmark hierarchy, click the bookmark in **Bookmarks** or in a bookmark folder whose you want to delete. The clicked bookmark is selected.
3. Select the **Delete** method in the Method frame. A message box confirming deletion is displayed in the **Information** frame.
4. If you want to delete the selected bookmark, click **OK**. The selected bookmark is deleted.

4.4.12 Displaying Bookmark Properties

To display the properties of a bookmark:

1. In the Navigation frame of the **Main** window, select the **Bookmarks** tab. The bookmark hierarchy is displayed.
2. In the bookmark hierarchy, click the bookmark whose properties you want to view. The bookmark is selected.
3. In the Method frame, select the **Properties** method. The Properties window is displayed in the Information frame (see Figure 4.19).

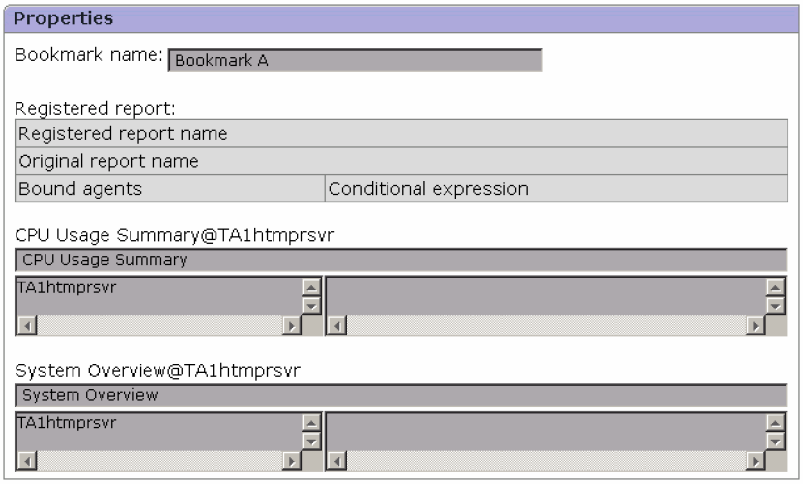


Figure 4.19 Properties Window

Following are descriptions of the items that are displayed in the Properties window:

Bookmark Name

Displays the name of the bookmark.

Registered report

Registered report name

Displays "*report-name* @ *agent-name*" for the name of the report registered in the bookmark. If there are multiple Agents, the Agent name is divided by commas and is displayed.

Original report name

Displays the name of the report registered in the bookmark.

Bound agents

Displays the name of the Agent for the report registered in the bookmark. If there are multiple Agents, the Agent name is displayed every other line.

Conditional expression

Displays the condition expressions of the report registered in the bookmark.

4.4.13 Working with Bookmarked Reports

You can display reports and delete reports in the **Bookmarks** tab of the Main window of Performance Reporter.

4.4.13.1 Displaying a Report

To display a report:

1. In the **Navigation** frame of the **Main** window, select the **Bookmarks** tab. The bookmark hierarchy is displayed.
2. In the bookmark hierarchy, click the report that you want to display. The clicked report is selected.
3. In the **Method** frame, select the **Display Report** method. The selected report is displayed in the **Report** tab of the **Report** window.

You can also change the display conditions in the **Show Options** tab of the displayed **Report** window to refresh a bookmarked report, and re-register a report under a different name.

4.4.13.2 Deleting a Report

To delete a report:

1. In the **Navigation** frame of the **Main** window, select the **Bookmarks** tab. The bookmark hierarchy is displayed.
2. In the bookmark hierarchy, click the report that you want to delete. The clicked report is selected.
3. In the Method frame, select the **Delete** method. A confirmation message is displayed in the Information frame.
4. To delete the selected report, click **OK**. The selected report is deleted.

Note: When you delete the last report registered in a bookmark, the bookmark is also deleted. In this case, a message box confirming the deletion is displayed.

4.5 Printing Reports

Clicking the right mouse button in the frame of the Report window to select **Print** displays the Print Setup dialog box. The Print Setup dialog box differs depending on the OS or printer driver.

Chapter 5 Customizing Reports

Main Console and Performance reporter display reports that are predefined by Tuning Manager. Performance Reporter can display user-defined reports as well. You can use Performance Reporter to create the user-defined reports.

This chapter describes how to create user-defined reports with Performance Reporter.

- Defining Reports Using a Solution Set (see section 5.1)
- Defining Reports Using Commands (see section 5.2)
- Defining Reports Using the Report Wizard (see section 5.3)
- Defining Reports (see section 5.4)
- Displaying Reports (see section 5.5)
- Displaying Report Properties (see section 5.6)
- Setting and Changing Report Display Conditions (see section 5.7)
- Deleting a User-defined Report (see section 5.8)
- Example of Creating a New Report (see section 5.9)
- Example of Customizing a Solution Set (see section 5.10)
- Example of Creating a New Report with an OR Filter Condition (see section 5.11)
- Example of Creating a Line Graph (Single field, Multiple Instances) (see section 5.12)

5.1 Defining Reports Using a Solution Set

A solution set is a collection of reports and alarms that are ancillary to each Agent, and for which all necessary information has already been defined. When using a solution set, you can display pre-defined reports without defining any reports. If you want to display a report other than the reports defined in a solution set, define the report. You can also define a report by customizing a solution set. For an example of customizing a solution set, see section 5.10.

Note: If you are using an agent with a version lower than 5.0, part of the graph display may be distorted. If this occurs, you need to create a customized solution set.

5.2 Defining Reports Using Commands

To display a report, you must first define the display format and display conditions for that report. You define reports in Performance Reporter in either of two ways; by using the Report Wizard or by using commands.

When you use commands, you define a report by specifying the XML parameter file of the report definition information in the jpcrdef create command argument.

The following describes how to use commands to define a report.

To use commands to customize a solution set:

1. In XML format, create a parameter file that specifies items such as the name of the report definition for the target solution set and the folder. Use the **jpcrdef output** command to output the report definition information to an XML parameter file. For details on the **jpcrdef output** command format, an example of coding the parameter file, and parameter details, see the *HiCommand Tuning Manager Command Line Interface Guide*.
2. Edit the output parameter file. You can specify an edited parameter file in the **jpcrdef create** command arguments to define a report.

To use commands to create a new report:

1. Create a parameter file that defines the information needed for the reports you will create.
2. Specify the created parameter file in a **jpcrdef create** command argument to define a new report. For details on the **jpcrdef create** command format, an example of coding the parameter file, and parameter details, see the *HiCommand Tuning Manager Command Line Interface Guide*.

5.3 Defining Reports Using the Report Wizard

The Report Wizard leads you through the steps for defining reports. To define a report using the Report Wizard:

1. Open the Main window of Performance Reporter.
2. Define a report folder.
3. Start the Report Wizard.
4. Define the name and type of the report.
5. Define the fields displayed in the report.
6. Define the display conditions for the fields in the report.
7. Define the display information for the report.
8. Define the display format for the report.
9. Define the drilldown reports.

The definitions for steps 4 through 9 above are performed in the windows of the Report Wizard. The items displayed on each screen, as well as the flow from screen to screen, depend on the settings performed during report definition. Figure 5.1 shows how to use the Report Wizard to define a report.

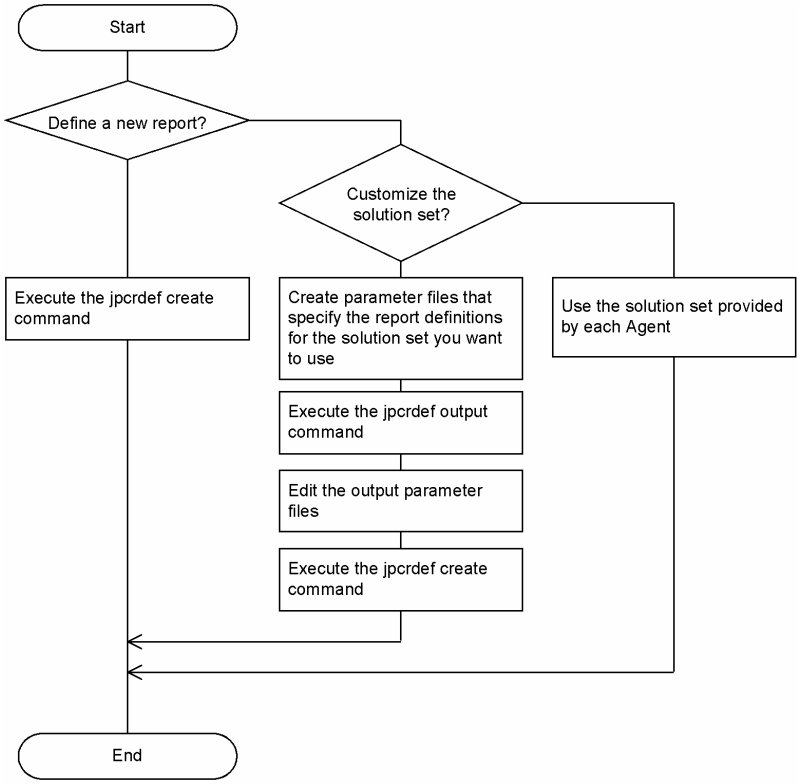


Figure 5.1 Using the Report Wizard to Define a Report

Figure 5.2 shows the Report Wizard window.

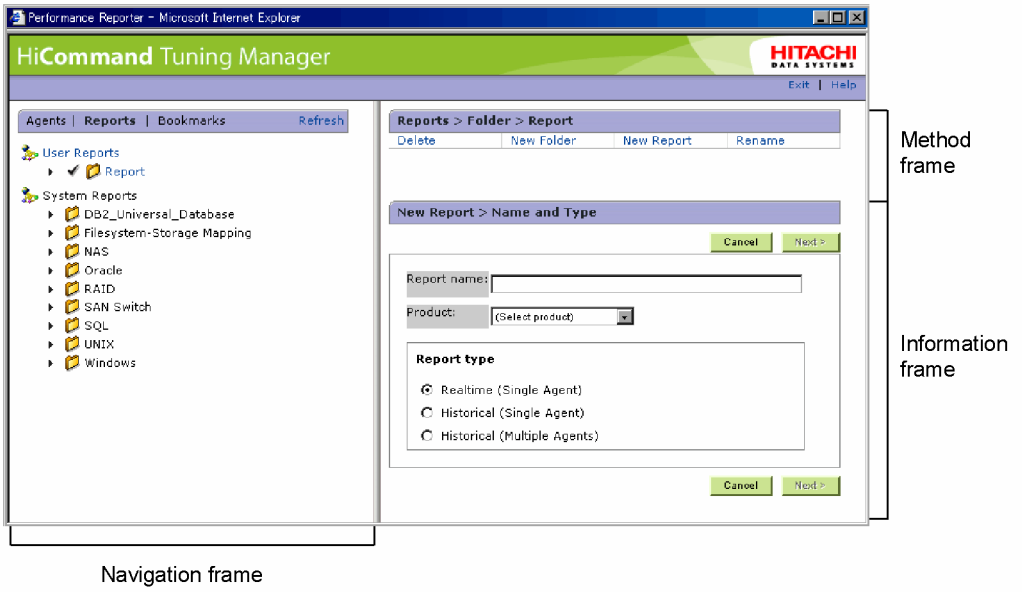


Figure 5.2 Report Wizard Window

The following list describes the items displayed in each frame.

Navigation Frame

- The **Refresh** link updates the displayed information.
- The **User Reports** ( ) area displays a hierarchy of the user-created folders and reports. You can create folders and reports within **User Reports**.
- The **System Reports** ( ) area displays a hierarchy of the folders and reports for the solution set.
- The *name-of-directory-containing-report* ( ) displays the names of the report folders, in alphabetical order. When you select a folder, a list of the reports contained is displayed.
- The *report-name*( ) displays a list of reports.

Method Frame

- The **Delete** link deletes the folder.
- The **New Folder** link defines a new folder.
- The **New Report** link defines a new report. When you choose this, the Report Wizard is displayed in the Information frame.
- The **Rename** link changes the name of the folder.

Information frame

The window displayed in the Information frame differs, depending on the method selected and contents specified. For information about these windows, see the explanation for each definition.

5.3.1 Defining a Report Folder

To define a new folder in which reports are stored:

1. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed.
2. Click **User Reports**, or a folder within in which you want to store reports. The clicked folder is selected.
3. In the Method frame, choose the **New Folder** method. The **New Folder** window is displayed in the Information frame.
4. In **New name of the folder**, enter the name of the folder. For example, to create a new folder named **Htmprsvr**, enter the information in Figure 5.3.
5. Click **OK**. The defined folder is added.

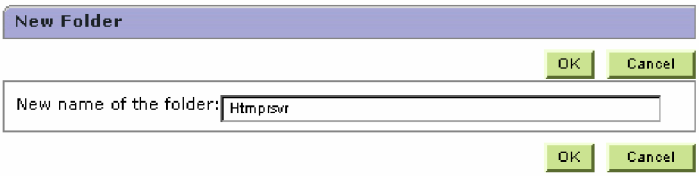


Figure 5.3 Example of a Setting in the New Folder Window

5.3.2 Starting the Report Wizard

To use the Report Wizard to define a report:

1. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed.
2. In the report hierarchy, click the folder in which you want to store the defined report. The clicked folder is selected.
3. In the Method frame, choose the **New Report** method. The New Report > Name and Type window is displayed in the Information frame.

5.3.3 Defining the Name and Type of a Report

To define the name and type of the report:

1. Set the information about the report name and type, in the New Report > Name and Type window. For example, when using Agent for Platform (Windows) and the version 4.0 data model to define a real-time report of the processes with the ten highest CPU usage ratios, make settings as shown in Figure 5.4.
2. Click **Next >**. The New Report > Field window is displayed.

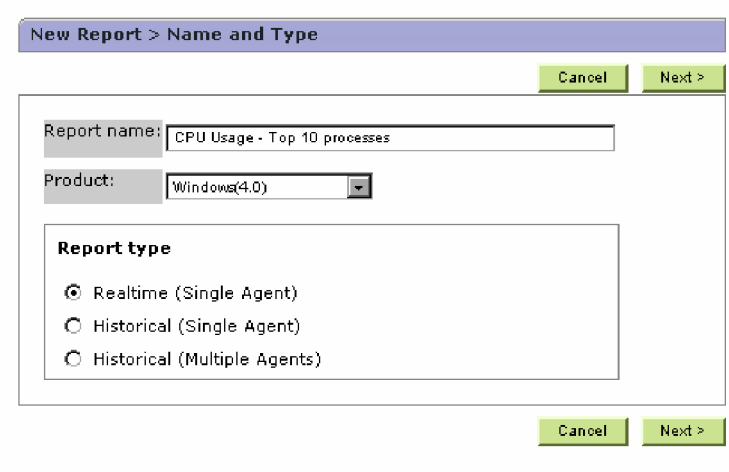


Figure 5.4 Example of Settings for the New Report > Name and Type Window

Following are descriptions of the window's elements:

Report Name

Specify the report name. Values specified can be from 1 to 64 characters.

Product

Select the type of the agent (product) for setting up the report. If several data model versions are installed for one product, select the appropriate one for version of the data model used.

Report Type

Select the type of the report. **Realtime (Single Agent)** is selected by default. The selectable items are as follows:

- **Realtime (Single Agent)**
  - Select this to display a real-time report of performance data by a single agent.
- **Historical (Single Agent)**
  - Select this to display a historical report of performance data accumulated by a single agent.

- **Historical (Multiple Agents)**
  - Select this to display in one window a historical report of performance data accumulated by multiple agents. When this report is to be created, you cannot select multi-row records (multi-instance records) in the New Report > Field window.

Next >

The New Report > Field window is displayed. You can click this when both **Report name** and **Product** are specified.

Finish

The settings are saved, and the New Report > Name and Type window closes. You can click this only when **Report name** and **Product** are specified and the New Report > Field window has changed to the New Report > Name and Type window.

5.3.4 Defining the Fields Displayed in a Report

You define the fields displayed in the report using the New Report > Field window. The records and fields defined here differ, depending on each agent. For information about the records and fields for each agent, refer to the *HiCommand Tuning Manager Hardware Reports Reference*, *HiCommand Tuning Manager Operating System Reports Reference*, or the *HiCommand Tuning Manager Application Reports Reference*.

To define the fields in the report:

1. In the **Record** of the New Report > Field window, select the records that you want to display. The fields for the records selected in **All fields** are displayed.

   For example, in Agent for Platform (Windows), to define a real-time report of the processes with the ten highest CPU usage ratios, set the following three fields for the Process Detail (PD) record:

   - PID (ID_PROCESS)
   - Program (INSTANCE)
   - CPU % (PCT_PROCESSOR_TIME)

   Figure 5.5 shows an example of settings for the New Report > Field window.

2. In **All fields**, click the fields you want to display in the report. The clicked fields are selected. You may select multiple fields simultaneously.
3. Click ▶. The fields selected in **All fields** are displayed in **Selected fields**. Once fields are set in **Selected fields**, you can clear any fields that you do not wish to select by selecting the fields in **Selected fields**, and clicking ◀.
4. Click **Next >**. The New Report > Filter window is displayed.

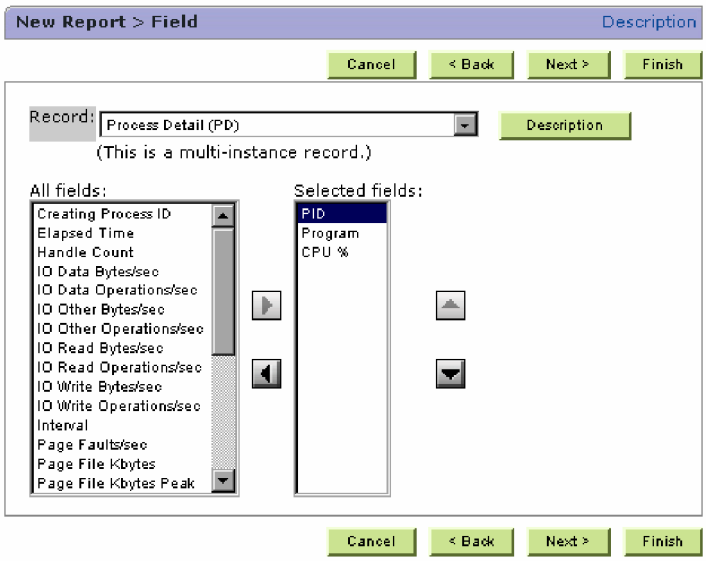


Figure 5.5 Example of Settings for the New Report > Field Window

Following are descriptions of the window's elements:

Record

Select the records that you want to report.

Below **Record**, the record type (single-row record or multi-row record) is displayed. Single-row record refers to a single-instance record, and multi-row record refers to multi-instance records.

If **Historical (Multiple Agents)** is selected for **Report type** in the New Report > Name and Type window, only a single-row record can be selected in **Record**.

Description button

Displays a description of the record belonging to the product defined in the report, in the Record Description window. You can only click this when the description file for the product defined in the report is set up.

All Fields

Displays a list of fields for the selected record. You can use the **Shift** key or **Ctrl** key to select multiple fields.

This is blank by default.

Adds the fields selected in **All fields** to **Selected fields**.

Clears the fields selected in **Selected fields**.

Selected Fields

Displays a list of the fields selected to be displayed in the report. This is blank by default.

Shifts the field selected in **Selected fields** to the field above it.

Shifts the field selected in **Selected fields** to the field below it.

< Back

The New Report > Name and Type window is displayed.

Next >

The New Report > Filter window is displayed. You can click this when **Selected fields** contains a field.

Finish

The settings are saved, and the New Report > Field window closes. You can click this when **Selected fields** contains a field.

5.3.5 Defining the Display Conditions for Fields in a Report

You define display conditions for fields in the report using the New Report > Filter window. You can also specify filter conditions using multiple condition expressions.

To define display conditions:

1. Set the information necessary to define the condition expression. For example, in Agent for Platform (Windows), to define a real-time report of the processes with the 10 highest CPU usage ratios, set the following conditions as filters for the Process Detail (PD) record:
   - When the value of the PID (`ID_PROCESS`) field is not 0:

     Figure 5.6 shows an example of a setting for the New Report > Filter window.
2. Click **Next >**.
   - If **Realtime (Single Agent)** is selected for **Report type** in the New Report > Name and Type window, The New Report > Indication Settings (Real-time) window is displayed. Proceed to section 5.3.5.1.
   - If **Historical (Single Agent)** or **Historical (Multiple Agents)** is selected for **Report type** in the New Report > Name and Type window, The New Report > Indication Settings (Historical) window is displayed. Proceed to section 5.3.5.2.

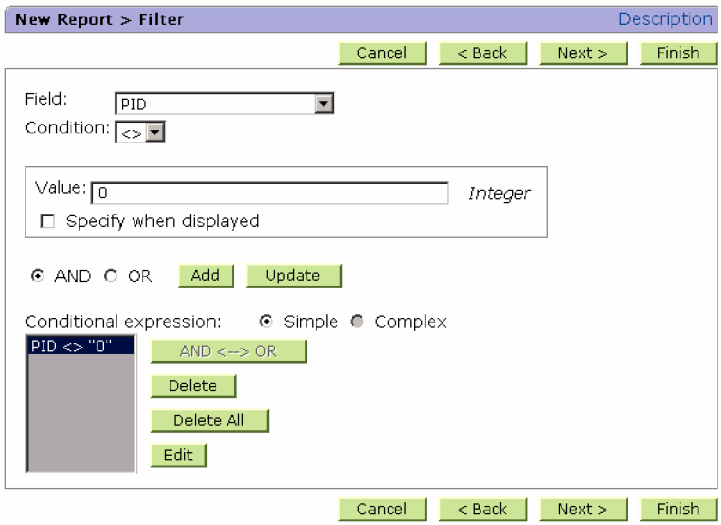


Figure 5.6 Example of a Setting for the New Report > Filter Window

Following are descriptions of the window's elements:

Field

Select the field to be filtered. By default, no field is selected.

Condition

Select the operator that you want to apply to the field. This is blank by default.

Table 5.1 lists the values that can be selected.

Table 5.1 Field Operators

Value	Description
=	The value for **Field** and the value for **Value** are the same.
<	The value for **Field** is less than the value for **Value**.
<=	The value for **Field** is less than or equal to the value for **Value**.
>	The value for **Field** is greater than the value for **Value**.
>=	The value for **Field** is greater than or equal to the value for **Value**.
<>	The value for **Field** and the value for **Value** are different.

Value

Specify the value by which the condition expression is evaluated. This is blank by default.

The specifiable format is shown to the right of **Value**. The specifiable values vary by the field. If **Specify when displayed** is selected, you do not need to specify anything.

Specify when displayed

Select this to specify or change the value for the condition expression when the report is displayed. By default, this is not selected.

AND

Select this to use an **AND** operator to add the condition expression set by **Field**, **Condition**, **Value**, and **Specify when displayed**, to the condition expression displayed in **Conditional expression**.

OR

Select this to use an **OR** operator to add the condition expression set by **Field**, **Condition**, **Value**, and **Specify when displayed**, to the condition expression displayed in **Conditional expression**.

Add

Uses an **AND** or **OR** operator to add the condition expression set by **Field**, **Condition**, **Value**, and **Specify when displayed**, to the condition expression displayed in **Conditional expression**. When you set the first condition expression, the condition expression is set without adding an **AND** or **OR** condition.

Update

Replaces the condition expression selected in **Conditional expression** with the condition expression set by **Field**, **Condition**, **Value**, and **Specify when displayed**. You can select this when **Field**, **Condition**, **Value**, and **Specify when displayed** have been set.

Conditional Expression

Displays a list of created condition expressions. This is blank by default.

Simple

Select this when selecting only one condition expression. This is selected by default, and when only one condition expression exists.

Complex

Select this to select all condition expressions combined with AND and OR operators.

AND<-->OR

Toggles the operator of the condition expression selected in **Conditional expression** between **AND** and **OR**.

Delete

Deletes the condition expression selected in **Conditional expression**. If multiple condition expressions are selected, a confirmation message box is displayed.

Delete All

Deletes all condition expressions for **Conditional expression**.

Edit

Sets the condition expression selected in **Conditional expression**, in the **Field**, **Condition**, **Value**, and **Specify when displayed** fields, making it editable.

< Back

The New Report > Field window is displayed.

Next >

- If **Realtime (Single Agent)** is selected for **Report type** in the New Report > Name and Type window:

  The New Report > Indication Settings (Realtime) window is displayed.

- If **Historical (Single Agent)** or **Historical (Multiple Agents)** is selected for **Report type** in the New Report > Name and Type window:

  The New Report > Indication Settings (Historical) window is displayed.

Even when no condition expression is set in **Conditional expression**, the next screen is displayed. In this case, the condition expression is blank.

Finish

The condition expression set in **Conditional expression** is saved, and the New Report > Filter window closes.

When no condition expression is set in **Conditional expression**, the report is registered without a condition expression.

5.3.5.1 Defining Display Information for Real-time Reports

The display information for a real-time report is defined in the New Report > Indication Settings (Realtime) window. With **Realtime (Single Agent)** is selected for **Report type** in the New Report > Name and Type window, use the following procedure to define display information for a real-time report.

1. Set the items necessary to define display information. For example, in Agent for Platform (Windows), to define a real-time report of the processes with the ten highest CPU usage ratios, set the following conditions for the display information of the real-time report for the Process Detail (PD) record:

   - Display the data in the report as delta values.
   - For the interval by which to automatically update the report display, set the initial value to 60 seconds, and the minimum value to 30 seconds.
   - Display the top ten results, based on the CPU % (`PCT_PROCESSOR_TIME`) field.

   Figure 5.7 shows an example of a setting for the New Report > Indication Settings (Realtime) window.

2. Click **Next >**. The New Report > Components window is displayed.

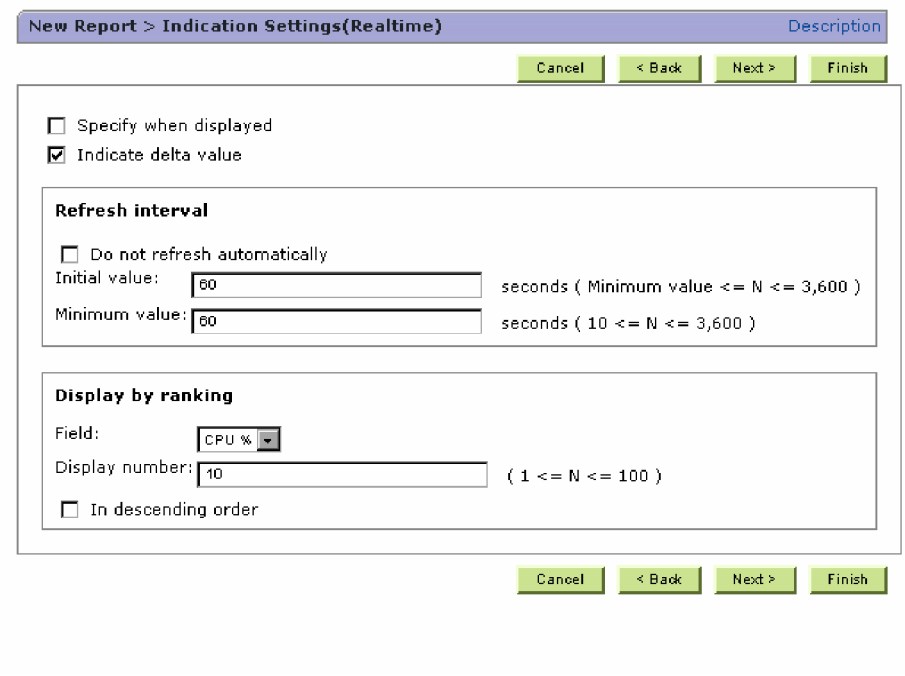


Figure 5.7 Example of a Setting for the New Report > Indication Settings (Realtime) Window

Following are descriptions of the window's elements:

Specify when displayed

Select this to set the display settings when the report is displayed. By default, this is not selected.

Indicate delta value

Select this to display the data in the report as delta values. The data displayed in the report differs depending on the following conditions:

- Whether **Indicate delta value** is selected or not.
- Whether delta values are collected for the record fields displayed in the report or not.
- Whether delta values are collected for the record fields depends on each of the fields. For information about whether delta values are collected into delta values and record fields, see the chapter on records (listing the fields for each record) in the *HiCommand Tuning Manager Hardware Reports Reference*, *HiCommand Tuning Manager Operating System Reports Reference*, or the *HiCommand Tuning Manager Application Reports Reference*.

Table 5.2 explains the correspondence between the conditions and the values displayed in the report. In this table, "Yes" means delta values are collected and "No" means delta values are not collected.

Table 5.2 Conditions and Corresponding Values in Reports

Indication Delta Value Setting	DeltaAattribute of the Field	Displayed Value
Checked	Yes	The difference between the performance data collected previously and that recently collected
Checked	No	The most recently collected value
Not checked	Yes	The cumulative value since collection of performance data started
Not checked	No	The most recently collected value

Refresh interval

Set the auto-refresh interval for when a real-time report is displayed in the Report window.

Do not refresh automatically

Select this to prevent the report display from automatically refreshing. By default, this is not selected.

Initial value

Specify the refresh interval (in seconds), for when the report display is automatically refreshed. The default is `60`.

The values that can be specified are integers from the value specified for **Minimum value** to 3,600.

Minimum value

Specify the minimum value (in seconds) for the refresh interval after which the Report window is displayed. You can change the updating interval when a report is displayed, in **Refresh interval** of the **Show Options** tab.

The default is `60`.

The values that can be specified are integers from 10 to 3,600.

Display by ranking

Set this to display reports with the data of a certain field in ascending or descending order, when multi-row records (multi-instance records) are displayed in reports.

Field

Select the field by which the display is determined and the number of higher and lower items of data to display is as set in **Display number**. You can select from **Field** when multi-row records (multi-instance records) are selected for **Record**, in the New Report > Field window.

Display number

Specify the number of higher and lower items of data to display. This can be specified when a field is selected for **Field**. The default is `10`. The values that can be specified are from 1 to 100.

In descending order

Select this to display data in descending order, when multi-row records (multi-instance records) are displayed in reports. This can be specified when a field is selected for **Field**.

< Back

The New Report > Filter window is displayed.

Next >

The New Report > Components window is displayed.

Finish

The settings are saved, and the New Report > Indication Settings (Realtime) window closes.

5.3.5.2 Defining Display Information for Historical Reports

The display information for a historical report is defined in the New Report > Indication Settings (Historical) window. With **Historical (Single Agent)** or **Historical (Multiple Agents)** selected for **Report type**, use the following procedure to define display information for a historical report.

Note: Keep the following in mind when changing the time settings for a server on which the Agent is running:

- When the time of the server on which the Agent is running is set ahead of the current time, performance information is not displayed for the period from the time of the change until the new time that is set.
- When the time of the server on which the Agent is running is set behind the current time, performance information for the period from the new time that is set until the time of the change is displayed as the overwritten data.

1. Set the items necessary to define display information. For example, in Agent for Platform (Windows), to define a report summarizing CPU usage for each minute over the last hour, set the following conditions for the display information of the historical report for the System Overview (PI) record:
   - Specify the collection period for performance data when the report is displayed.
   - Set the report display interval to 1 hour.
   - Display only the data from the time at which the User CPU % (`PCT_TOTAL_USER_TIME`) fields reached its daily maximum.
   - Set the maximum number of records displayed in a report to 1,440.

   Figure 5.8 shows an example of a setting for the New Report > Indication Settings (Historical) window.
2. Click **Next >**. The New Report > Components window is displayed.

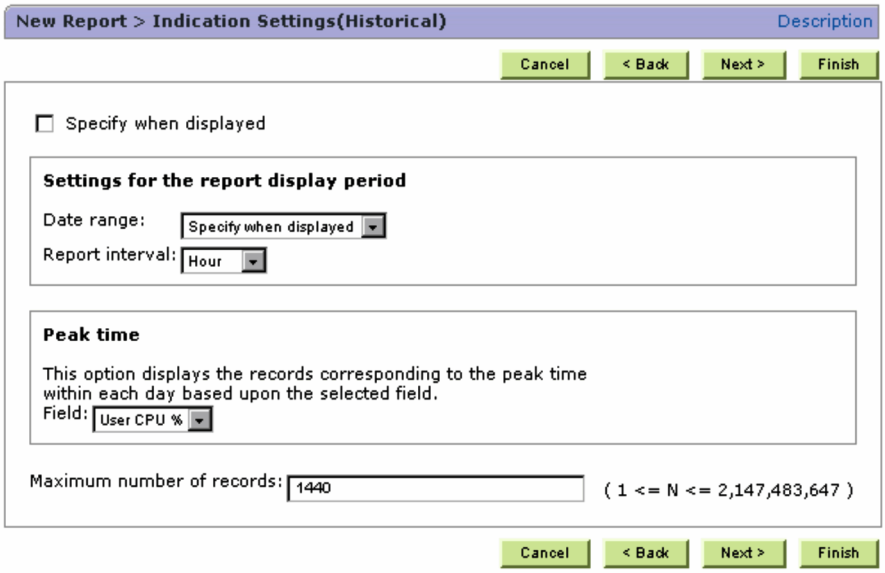


Figure 5.8 Example of a Setting for the New Report > Indication Settings (Historical) Window

The following text describes the items displayed in the New Report > Indication Settings (Historical) window.

Specify when displayed

Select this to set the display settings when the report is displayed. By default, this is not selected.

Settings for the report display period

Set the display period for the report.

Date range

Select the period for which performance data to be displayed in the report is to be collected. **Specify when displayed** is selected by default.

Table 5.3 lists the periods that can be selected for performance data collection.

Table 5.3 Performance Data Collection Periods

Value	Description
Specify when displayed	Specify the period when the report is displayed.
Within the past hour	Display data collected in the past hour.
Within the past 24 hours	Display data collected in the past 24 hours.
Within the past 7 days	Display data collected in the past 7 days.
Within the past month	Display data collected in the past month.
Within the past year	Display data collected in the past year.

Report interval

Select the display interval for the report.

You can select an interval for **Report interval**, when a PI record is selected for **Record** in the New Report > Field window.

Table 5.4 lists the intervals that can be selected for the display interval of the report.

Table 5.4 Report Display Intervals

Value	Description
Minute	Displays the report at one-minute intervals.
Hour	Displays the report at one-hour intervals.
Day	Displays the report at one-day intervals.
Week	Displays the report at one-week intervals.
Month	Displays the report at one-month intervals.
Year	Displays the report at one-year intervals.

Peak time

Set this to display the report only for the time at which the value of a field reached its daily maximum.

Field

Select the field for which the peak time is to be set, when only data from the time at which a certain field reaches its maximum value is displayed. **Field** can be selected when a single-row record (single-instance record) is selected **Record** in the New Report > Field window, and **Hour** is selected for **Report interval**. The default is **(none)**.

Maximum number of records

Specify the maximum number of records to display in the report. The values that can be specified are from 1 to 2,147,483,647. However, the limit value when you initially display a report is the smaller value that either of `maxFetchCount` to be specified in `config.xml` or the maximum number of records is effective.

If the specified value is too large, Performance Reporter fails to display a report, and then the `KAVJS3001-E` message is output. In this case, use the `jpcrpt` command to output the report. For details on the `jpcrpt` command, see the *HiCommand Tuning Manager Command Line Interface Guide*.

< Back

The New Report > Filter window is displayed.

Next >

The New Report > Components window is displayed.

Finish

The settings are saved, and the New Report > Indication Settings (Historical) window closes.

5.3.6 Defining the Display Format

You can select from one of the following three display formats for a report. You can also display multiple display formats.

- Table
- List
- Graph

When **Graph** is selected as the display format, you can select a type of graph. You can also define a drilldown report, when you want to display a detailed report for a record.

5.3.6.1 Defining the Display Format for a Report

The display format of a report is defined in the New Report > Components window.

To define the display format for a report:

1. Set the information necessary to define the display format of the report.

   For example, in Agent for Platform (Windows), to define a real-time report of the processes with the ten highest CPU usage ratios, perform the following settings to display as a table a report for each field in the Process Detail (PD) record, and display as a graph a report of the CPU % (`PCT_PROCESSOR_TIME`) field.

   Figure 5.9 shows an example of a setting for the New Report > Components window.

   Note: You can also select multiple items from **Table**, **List**, and **Graph** as the display format.

2. Click **Next >**. When at least one **Graph** is selected in the New Report > Components window, the New Report > Graph window is displayed. When no **Graph** is selected in the New Report > Components window, the New Report > Drilldown window is displayed.

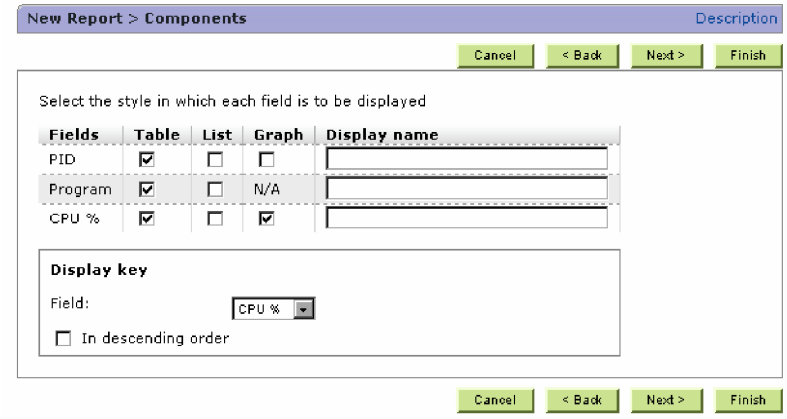


Figure 5.9 Example of a Setting for the New Report > Components Window

Following are descriptions of the window's elements:

Fields

Displays the field selected in the New Report > Field window.

Table

Select this to display the selected field in tabular format, with rows and columns. By default, this is selected.

List

Select this to display the selected field in list format, with one line each, from the top or the list. By default, this is not selected.

Graph

Select this to display the selected field in graph format. If the **Fields** attribute is not a number, this cannot be displayed by graph format (**N/A** is displayed instead). By default, this is not selected.

Display name

Specify the name to be used as the title and column names for a table, list, or graph. This name must be within 24 characters. This is blank by default. If nothing is specified, the name of the field is displayed in the report.

Display key

Set the field to be used as a key.

Field

Select the field to be used as a sort key, when you want to display data sorted in the multi-row records (multi-instance records). You cannot specify **Field** in the following cases:

- If **Historical (Multiple Agents)** is selected for **Report type** in the New Report > Name and Type window.
- If **Line**, **Area**, or **Stacked area** is selected for **Graph types** in the New Report > Graph window.

The default is **(none)**.

In descending order

Select this when you want to display data sorted in the multi-row records (multi-instance records) in descending order. By default, this is not selected. **In descending order** cannot be set in the following cases:

- If **Historical (Multiple Agents)** is selected for **Report type** in the New Report > Name and Type window.
- If **Line**, **Area**, or **Stacked area** is selected for **Graph types** in the New Report > Graph window.

By default, this item is not selected.

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- If **Realtime (Single Agent)** is selected for **Report type** in the New Report > Name and Type window, the New Report > Indication Settings (Realtime) window is displayed.
- If **Historical (Single Agent)** or **Historical (Multiple Agents)** is selected for **Report type** in the New Report > Name and Type window, the New Report > Indication Settings (Historical) window is displayed.

Next >

- If **Graph** is selected in the New Report > Components window, the New Report > Graph window is displayed.
- If **Graph** is not selected in the New Report > Components window, the New Report > Drilldown window is displayed.

Finish

The settings are saved, and the New Report > Components window closes.

5.3.6.2 Defining a Graph Type

If **Graph** is selected in the New Report > Components window, define the graph types and display format in the New Report > Graph window.

To define the graph types and display format:

1. Set the information necessary to define the graph type and display format.

   For example, in Agent for Platform (Windows), to define a real-time report of the processes with the ten highest CPU usage ratios, perform settings with the following conditions to display a graph with a report of the CPU % (`PCT_PROCESSOR_TIME`) field of the Process Detail (PD) record:

   - Set the y-axis to the value of the CPU % (`PCT_PROCESSOR_TIME`) field.
   - Set the x-axis to the name of the Program (`INSTANCE`) field, the value of the part within the parenthesis of the PID (`ID_PROCESS`) field.
   - Set the type of graph to a bar graph.

   Figure 5.10 shows an example of a setting for the New Report > Graph window.

2. Click **Next >**. The New Report > Drilldown window is displayed.

   Note: When not defining a drilldown report, you can click **Finish** to complete the report settings.

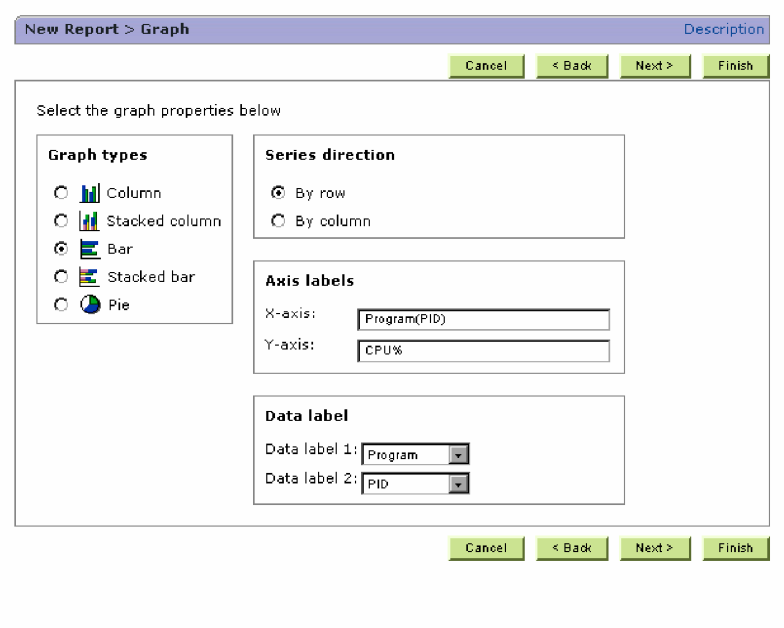


Figure 5.10 Example of a Setting for the New Report > Graph Window

Following are descriptions of the window's elements:

Graph types

Select the graph types. In the following cases, you cannot select graphs of the **Line**, **Area**, or **Stacked area** type:

- If **Historical (Multiple Agents)** is selected for **Report type** in the New Report > Name and Type window, and multiple settings are set for **Graph** in the New Report > Components window.
- If the **Display key** item is selected in the New Report > Components window.
- If a multi-row record (multi-instance record) is selected for **Record** in the New Report > Field window, and multiple items are selected for **Graph** in the New Report > Components window.

The **Column** is selected by default. The following text describes the selection items.

Column

A column graph

Stacked column

A column graph in which multiple items are stacked

Bar

A bar graph

Stacked bar

A bar graph in which multiple items are stacked

Pie

A pie graph

Line

A line graph

Area

A graph expressing change in data as a surface

Stacked area

An area graph in which multiple items are stacked

Show areas of missing data

If data is missing, for reasons such as the fact that the agent was not running, you can select the **Show areas of missing data** check box to prevent this data from being displayed. You can select this check box when **Graph types** is set to **Line**, **Area**, or **Stacked area**, and the following conditions apply:

- **Historical (Multiple Agents)** is selected for Report type in the New Report > Name and Type window, and an item is selected for **Graph** in the New Report > Components window.
- A multi-row record (multi-instance record) is selected for **Record** in the New Report > Field window, and an item is selected for **Graph** with no item selected for **Display key** in the New Report > Components window.

Series direction

Specify whether to have data displayed by row (record) or by column (field). **By row** is selected by default.

By row

Select this to have data displayed by row (record).

By column

Select this to have data displayed by column (field).

Axis labels

Set the x-axis and the y-axis of the report.

X-axis

Specify the character string for the title of the x-axis. This is blank by default.

You can specify a value from 0 to 40 characters.

Y-axis

Specify the string for the title of the y-axis. This is blank by default. You can specify a value from 0 to 40 characters.

Data label

Set the field to be used for the display label of each record.

Data label1

Set the field to be used for the display label of each record.

(none) is selected by default.

You cannot set **Data label1** when one of the following conditions is satisfied:

- **Realtime (Single Agent)** or **Historical (Single Agent)** is selected for **Report type** in the New Report > Name and Type window.
- A single-row record (single-instance record) is selected for **Record** in the New Report > Field window.
- **Line**, **Area**, or **Stacked area** is selected for **Graph types** in the New Report > Graph window.

The fields displayed differ depending on the type of report.

- When **Realtime (Single Agent)** is selected for **Report type** in the New Report > Name and Type window:

  The **Record Time** field is displayed. When a multi-row record (multi-instance record) is selected, the key field is also displayed.
- When **Historical (Single Agent)** is selected for **Report type** in the New Report > Name and Type window:

  The **Date and Time** field is displayed. When a multi-row record (multi-instance record) is selected, the key field is also displayed.
- When **Historical (Multiple Agents)** is selected for **Report type** in the New Report > Name and Type window, the **Date and Time**, **Agent Host**, and **Agent Instance** fields are displayed.

Data label2

Set the field to be used for the display label of each record.

(none) is selected by default.

You cannot set **Data label2** when one of the following conditions are satisfied:

- **Data label1** is not set.
- **Realtime (Single Agent)** or **Historical (Single Agent)** is selected for **Report type** in the New Report > Name and Type window.
- A single-row record (single-instance record) is selected for **Record** in the New Report > Field window.
- **Line**, **Area**, or **Stacked area** is selected for **Graph types** in the New Report > Graph window.

The conditions for the fields displayed are the same as those for **Data label1**.

The value selected for **Data label2** is displayed in parenthesis following the value selected for **Data label1**.

< Back

The New Report > Components window is displayed.

Next >

The New Report > Drilldown window is displayed.

Finish

The settings are saved, and the New Report > Graph window closes.

5.3.6.3 Defining a Drilldown Report

To display a detailed report of data displayed in a report, define a drilldown report in the New Report > Drilldown window.

Figure 5.11 shows the New Report > Drilldown window.

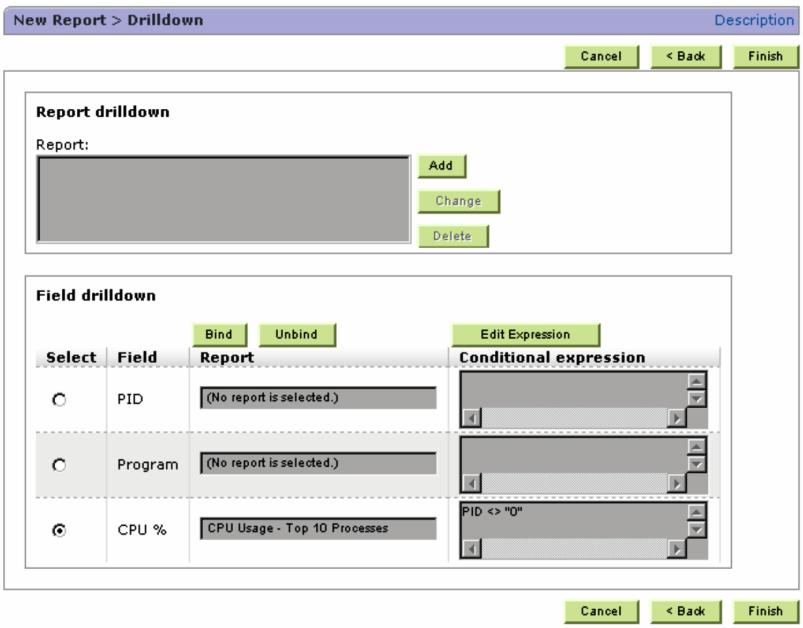


Figure 5.11 New Report > Drilldown Window

Following are descriptions of the window's elements:

Report drilldown

Sets up a drilldown report (report level).

Report

Displays a list of specified drilldown reports (report level). This is blank by default.

Add

Adds a drilldown report to **Report**.

Change

Changes a drilldown report in **Report**.

Delete

Deletes the drilldown report selected in **Report**.

Field drilldown

Sets up a drilldown report (field level).

Bind

Sets up a drilldown report (field level) to the field selected in **Select**.

Unbind

Deletes the drilldown report (field level) for the field selected in **Select**. When the report is deleted, **(No report is selected.)** is displayed in **Report**.

Edit Expression

Modifies the filter condition expression for when the drilldown report is displayed. This can only be selected when a drilldown report (field level) is set up for the field selected in **Select**.

Select

Select the desired **Field**. By default, this is not selected.

Field

The fields for which a drilldown report (field level) can be set up are displayed.

Report

The drilldown reports (field level) set up for the fields are displayed.

Conditional expression

Displays a list of created condition expressions.

< Back

– When coming from the New Report > Components window:

  The New Report > Components window is displayed.

– When coming from the New Report > Graph window:

  The New Report > Graph window is displayed.

Finish

The settings are saved, and the New Report > Drilldown window closes.

There are two kinds of drilldown reports: report-level reports and field-level reports. Report-level reports display reports related to a certain report, while field-level reports display reports related to each field displayed in a certain report. The following text describes how to define each type of drilldown report.

Defining a Drilldown Report (report level)

To define a drilldown report (report level):

1. Click **Add** in the New Report > Drilldown window. The New Report > Drilldown > Select Report window is displayed.
2. Select the drilldown report to link to the report. For example, choose **Process Detail**.

   Figure 5.12 shows an example of a setting for the New Report > Drilldown > Select Report window.
3. Click **OK**. The drilldown report selected for **Report** is displayed in the New Report > Drilldown window.
4. Click **Finish**. The New Report > Drilldown window closes, and the settings for the report are completed.

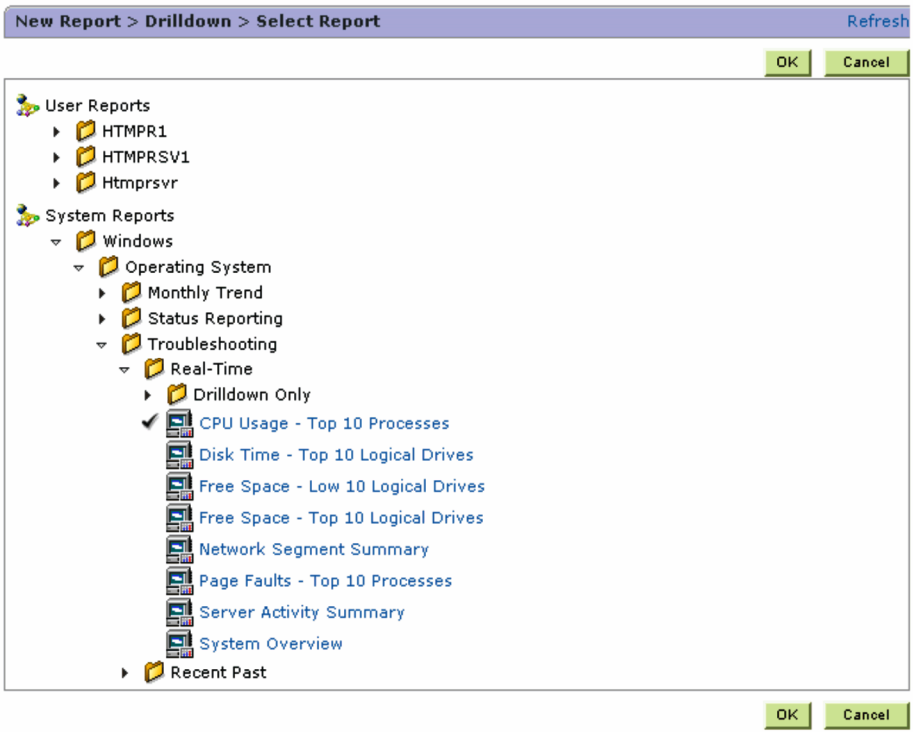


Figure 5.12 Example of a setting for the New Report > Drilldown > Select Report Window

Following are descriptions of the window's elements:

User Reports

Displays a hierarchy of the user-created folders and reports.

System Reports

Displays a hierarchy of the folders and reports for the solution set.

name-of-directory-containing-report

Displays the names of the report folders, in alphabetical order. When you select a folder, a list of the reports contained to the selected folder is displayed.

report-name

Displays a list of reports.

Refresh

Updates the displayed information.

Defining a drilldown report (field level)

To define a drilldown report (field level):

1. From **Field**, choose the field to which you want to link the drilldown report.
2. Click **Select**.
3. Click **Bind**. The New Report > Drilldown > Select Report window is displayed.
4. Select the drilldown report to link to the field.
5. Click **OK**. The drilldown report is displayed, as selected for **Report** in **Field drilldown** in the New Report > Drilldown window.
6. To set the condition expression when the selected field is displayed, click **Edit Expression**. The New Report > Drilldown > Edit Conditional Expression for Drilldown window is displayed.
7. Set the condition expression for the drilldown report; for example, to display a drilldown report showing the processes that have a higher CPU usage rate than those displayed in the Report window, set the condition expression as follows:

   `CPU % > CPU %`

   The `CPU %` on the left indicates the CPU usage rate shown in the drilldown report. This is specified in the first **Field** of the New Report > Drilldown > Edit Conditional Expression for Drilldown window.

   The `CPU %` on the right indicates the CPU usage rate shown in the Report window based on which the drilldown report is displayed. This is specified in **Field**, in **Select value or field**.

   Figure 5.13 shows an example of a setting for the New Report > Drilldown > Edit Conditional Expression for Drilldown window.
8. Click **OK**. The condition expression is set, and the New Report > Drilldown window is displayed. The set condition expression is displayed in **Conditional expression**, in **Field drilldown**.
9. Click **Finish**. The New Report > Drilldown window closes, and the settings for the report are completed.

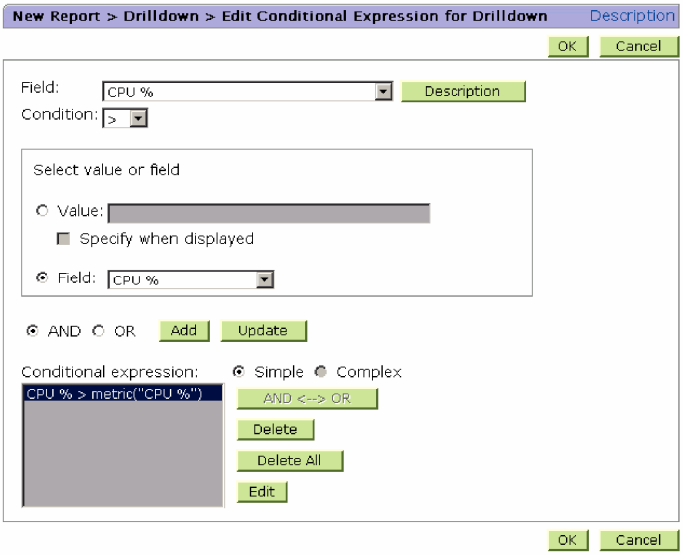


Figure 5.13 Example of a Setting for the New Report > Drilldown > Edit Conditional Expression for Drilldown Window

Following are descriptions of the window's elements. For information about items that are not explained here, see the New Report > Filter window description in section 5.3.5.

Description button

A description of the fields belonging to the record of the drilldown report is displayed in the Field Description window. You can only click when the description file for the product defined in the report is set up.

Select value or field

Value check box

Select this to specify a value in the **Value** text box. By default, this is selected.

Value text box

Specify a value for comparison. This is blank by default. The specifiable values vary by field. If **Specify when displayed** is selected, you do not need to specify anything.

Specify when displayed

Select this to specify the value of the condition expression when the report is displayed. By default, this is not selected.

Field check box

Select this to specify or change the field for comparison.

By default, this is not selected.

Field drop-down list

Select the field for comparison. Nothing is selected by default. The fields displayed differ depending on the type of report.

- When **Realtime (Single Agent)** is selected for **Report type** in the New Report > Name and Type window, the **Record Time** field is displayed. When a multi-row record (multi-instance record) is selected, the **Instance** field is also displayed.
- When **Historical (Single Agent)** is selected for **Report type** in the New Report > Name and Type window, the **Date and Time** field is displayed. When a multi-row record (multi-instance record) is selected, the **Instance** field is also displayed.
- When **Historical (Multiple Agents)** is selected for **Report type** in the New Report > Name and Type window, the **Date and Time**, **Agent Host**, and **Agent Instance** fields are displayed.

5.4 Defining Reports

This section uses an example in Windows to explain how to perform the following tasks:

- Tasks for a report folder

  You can add a folder, change the name of a folder, and delete a folder, under User Reports in which user-defined reports are stored. To organize user-defined reports, perform these tasks.

- Tasks for a report definition

  For user-defined reports, you can copy a report, edit a report definition, change the name of a report, and delete a report. By performing these tasks, you can copy and edit a report definition to create another report definition, or you can change or delete the name of a report to organize reports.

These procedures start from when the Main window of Performance Reporter is opened.

5.4.1 Tasks for a Report Folder

You can perform the following folder operations in the **Reports** tab of the Main window of Performance Reporter:

- Adding a report folder (see section 5.4.1.1)
- Changing the name of a report folder (see section 5.4.1.2)
- Deleting a report folder (see section 5.4.1.3)
- Copying a Report between folders (see section 5.4.1.4)

5.4.1.1 Adding a Report Folder

To add a folder:

1. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed.
2. In the report hierarchy, click **User Reports** or the folders within in which you want to add a folder. The clicked folder is selected.
3. In the Method frame, choose the **New Folder** method. The New Folder window is displayed in the Information frame (see Figure 5.14).
4. In **New name of the folder**, enter the name of the folder.
5. Click **OK**. A folder is added to the report hierarchy in the Navigation frame.

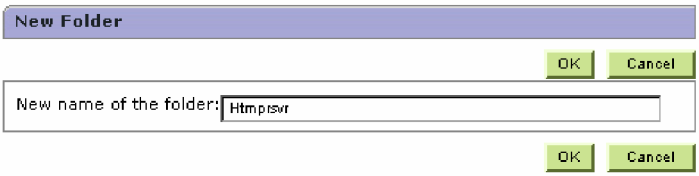


Figure 5.14 New Folder Window

5.4.1.2 Changing the Name of a Report Folder

To change the name of a folder:

1. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed.
2. In the report hierarchy, click the folder, within **User Reports**, whose name you want to change. The clicked folder is selected.
3. In the Method frame, select the **Rename** method. The Rename window is displayed in the Information frame (see Figure 5.15). The current name of the folder is displayed in **Current name of the folder**.
4. Enter the new name of the folder in **New name of the folder**.
5. Click **OK**. The name of the selected folder is changed.

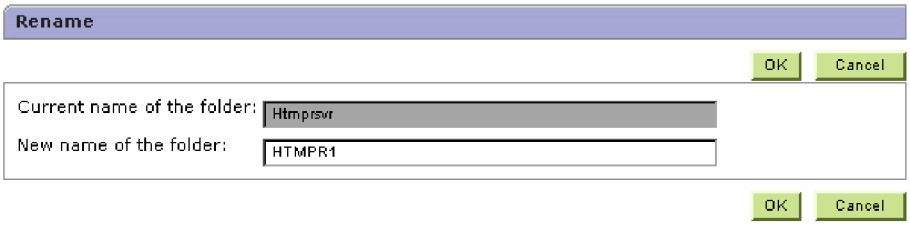


Figure 5.15 Rename Window

5.4.1.3 Deleting a Report Folder

Deleting a folder also deletes the folders and reports contained in that folder. To delete a folder:

1. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed.
2. In the report hierarchy, click the folder, within **User Reports**, that you want to delete. The clicked folder is selected.
3. In the Method frame, select the **Delete** method. A message box confirming deletion is displayed in the Information frame.
4. To delete the selected folder, click **OK**. The selected folder is deleted.

5.4.1.4 Copying a Report between Folders

To copy a report between folders:

1. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed.
2. In the report hierarchy, click the folder containing the report you want to copy. The clicked folder is selected, and a list of the reports and folders within is displayed.
3. In the list of reports, click the report you want to copy. The clicked report is selected.
4. In the Method frame, choose the **Copy** method. The Copy window is displayed in the Information frame, as is the report hierarchy of the copy destination (see Figure 5.16).
5. Click the folder of the copy destination or **User Reports**. The clicked folder of the copy destination or **User Reports** is selected.
6. Click **OK**. The selected report is copied to the copy destination folder or to **User Reports**.

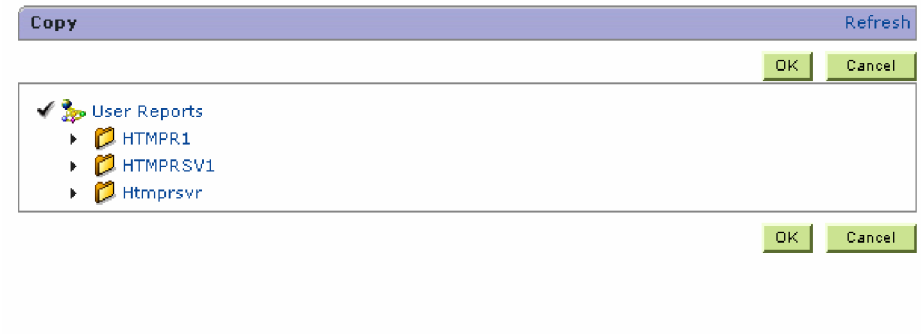


Figure 5.16 Copy Window

5.4.2 Tasks for a Report Definition

You can perform the following tasks for report definitions, in the Reports tab of the Main window of Performance Reporter:

- Editing a report definition (see section 5.4.2.1)
- Changing the name of a report (see section 5.4.2.2)

Note: For information about copying a report, see section 5.4.1.4. For information about deleting custom reports, see section 5.8.

5.4.2.1 Editing a Report Definition

To edit a report definition:

1. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed.
2. In the report hierarchy, click the folder containing the report whose definition you want to edit. The clicked folder is selected, and a list of the reports and folders within is displayed.
3. In the list of reports, click the report whose definition you want to edit. The clicked report is selected.
4. In the Method frame, choose the **Edit** method. The Report Wizard is displayed in the Information frame. For information about the items displayed in each window of the Report Wizard.
5. Once the settings are complete, click **Finish**. The changes will take effect.

Note: When re-selecting **Report type** or **Record**, you will need to perform the settings again for filter conditions, display settings, and other items.

5.4.2.2 Changing the Name of a Report

To change the name of a report:

1. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed.
2. In the report hierarchy, click the folder, in **User Reports**, containing the report whose name you want to change. The clicked folder is selected, and a list of the reports and folders within is displayed.
3. In the list of reports, click the report whose name you want to change. The clicked report is selected.
4. In the Method frame, select the **Rename** method. The Rename window is displayed in the Information frame (see Figure 5.17). The current name of the report is displayed in Current name of the report.
5. Enter the new name for the report in **New name of the report**.
6. Click **OK**. The name of the selected report is changed.

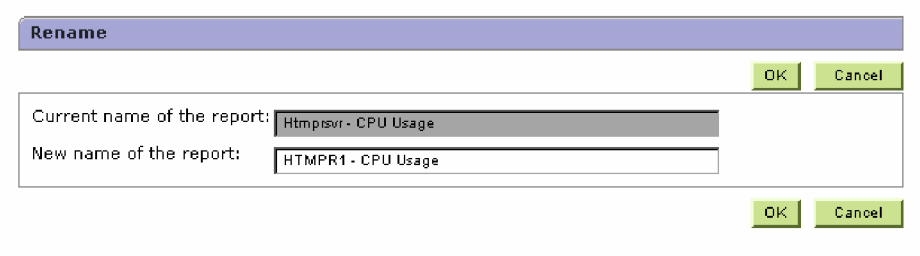


Figure 5.17 Rename Window

5.4.2.3 Exporting a Report Definition

Performance Reporter provides the **jpcrdef output** command for exporting report definitions. You can use the exported data as a backup of report definitions.

For details on the **jpcrdef output** command, see the *HiCommand Tuning Manager Command Line Interface Guide*.

5.4.2.4 Importing a Report Definition

With Performance Reporter, you can import a report definition by specifying the definition information output by the **jpcrdef output** command as the input source for the **jpcrdef create** command. If you export the server data whose report definition is already defined, and import it to another server, you can omit the report definition. For details on the **jpcrdef create** command, see the *HiCommand Tuning Manager Command Line Interface Guide*.

5.5 Displaying Reports

This section describes the procedures for displaying reports, displaying drilldown reports, and printing displayed reports. You can open reports in either of the following ways:

- from the Main window:
  In the Global tasks bar area, click **Go** then **Performance Reporter**.
- from the Report Tree Selection window:
  In the Information area (Advanced Information) of the Report area, click the link preceded by "Performance Reporter.

5.5.1 Displaying Primary Reports

You can display reports from the Main window or from the Report Tree Selection window.

To display reports from the Main window:

1. In the Main window navigation frame, choose Agents. The agent hierarchy is displayed.
2. Select one or more Agents in the Performance Reporter Main Window.
3. Choose **Display Report** in the Main window method frame. A list of reports for the selected Agent is displayed in the information frame.
4. Choose the report to be displayed from the list of report names. Reports are displayed on the **Report** tab.

To display reports from the Report Tree Selection window, select the name of the report you want to display from the list of reports. The report is displayed in the **Report** tab of the Report window.

If you specify a single-agent historical report or a single-agent real-time report for multiple agents, a separate Report window is displayed for each agent. If you specify a multi-agent historical report for multiple agents, one Report window with data for all agents is displayed.

Note: With a historical report for multiple agents, if data could be acquired for at least one agent, but not for one or more of the other agents, no error is displayed. If data could not be acquired for any agents, an error is displayed.

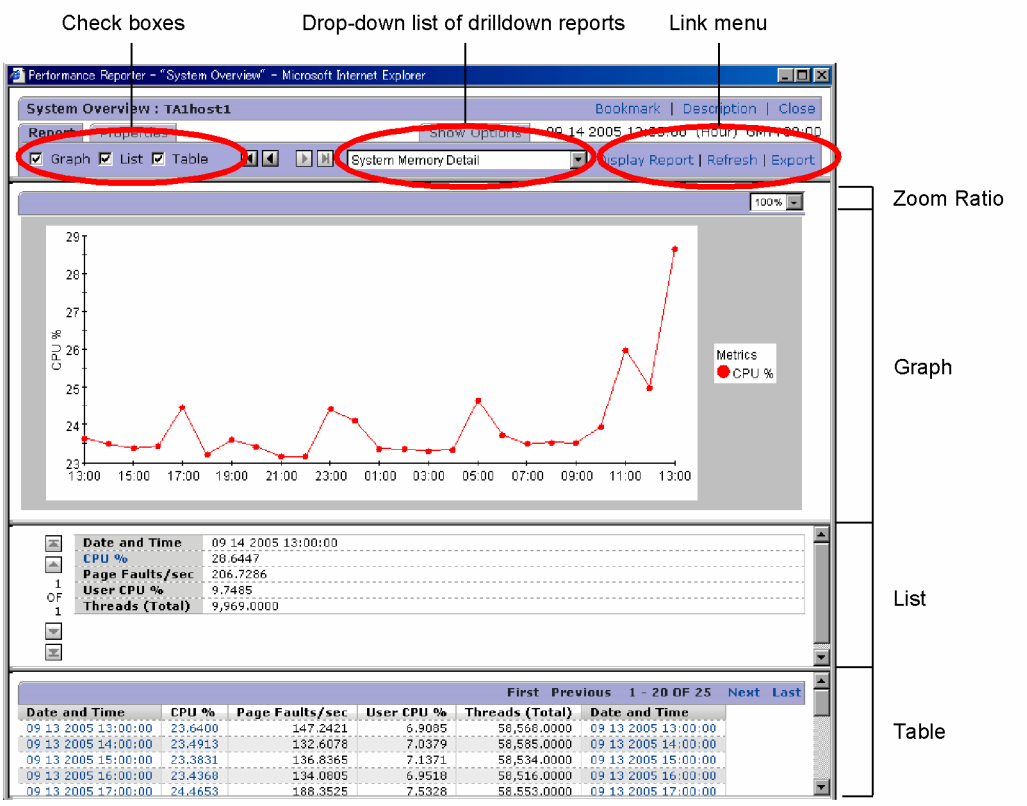


Figure 5.18 Report Window, Report Tab Sample Report

The following describes each display item:

Common menu

Bookmark

Displays the Bookmark Registration window.

Description

Displays a description of the records and fields, in a separate window.

Close

Closes the Report window.

Check boxes

Graph

Select this box to display data in a graph. This box cannot be selected if graph data is not set in the report definition or if there is no applicable data.

List

Select this box to display data in a list. This box cannot be selected if list data is not set in the report definition or if there is no applicable data.

Table

Select this box to display data in a table. This box cannot be selected if table data is not set in the report definition or if there is no applicable data.

Displays the first data or data group.

Displays the previous data or data group.

Displays the next data or data group.

Displays the last data or data group.

Drop-down list of drilldown reports

This is a list of drilldown reports. This list is displayed if drilldown reports (report level) are defined.

Link menu

Display Report

Displays the drilldown reports selected in the drop-down list of drilldown reports. This is not displayed if there are no drilldown reports.

Refresh

Fetches the data again and refreshes it.

Export

Outputs the data, which is acquired for displaying a report, as a file. This is not displayed if there is no data acquired and for a real-time report during automatic updating.

Stop

Stops auto-refresh for a real-time report.

Graph

A graph is displayed. For an overview of graphs, see the description of graphs in section 4.2.5.

Zoom Ratio

Enlarges the displayed graph. You can select 100%, 200%, 400%, 600% or 800% for the zoom percentage. You can enlarge the display to the optimal size when the data of multiple agents or multiple instances is acquired and the size of the displayed graph is small.

List

A list is displayed. If you click the name of a field displayed as a link, a drilldown report (field level) is displayed. For details on the list, see the description of the list in section 4.2.5.

Table 5.5 shows the buttons that are used for moving pages in the list.

Table 5.5 Navigation Buttons for the List Page

Button	Description
	Displays the first agent or instance data in the same data group.
	Displays the previous agent or instance data in the same data group.
	Displays the next agent or instance data in the same data group.
	Displays the last agent or instance data in the same data group.

Table

A table is displayed. If you click the name of a field displayed as a link, a drilldown report (field level) will be displayed. For an overview of tables, see the description of tables in section 4.2.5.10.

Table 5.6 shows the links that are used for moving pages in the table.

Table 5.6 Navigation Links for the Table Page

Link	Description
First	Displays the first page.
Previous	Displays the previous page.
Next	Displays the next page.
Last	Displays the last page.

5.5.2 Displaying Drilldown Reports

Drilldown reports are called from a parent report. You can display drilldown reports by defining them to be displayed in the Report Wizard (see section 5.3). You can also use the command line to define a report definition specifying that drilldown reports are to be displayed. Each drilldown report is displayed in a separate window from the parent report. When you close the parent window, you also close all drilldown report windows.

Display conditions for drilldown reports

There are three types of display conditions that are used to display drilldown reports:

- Filter conditions defined for the parent report for displaying drilldown reports
- Filter conditions defined for a drilldown report for displaying drilldown reports (parent report conditions take precedence if there is a conflict)
- Show Options conditions defined for a drilldown report as `Specify-When-Displayed`

Displaying a drilldown report (report level) by specifying the report name

When there are report-level drilldown reports, the report window's menu bar displays their names on a drop-down list, together with the **Display Report** link. To display a report-level drilldown report, select the name of the desired drilldown report from the drop-down list, and then click the **Display Report** link. If there are no report-level drilldown reports, the menu bar does not contain the list or the **Display Report** link. The number of drilldown reports will depend on the parent report.

Figure 5.19 shows the menu bar in the Report window when a list is displayed.

Figure 5.19 Menu Bar in the Report Window

When a parent report, which is the drilldown source, is a historical report (multi-agent), the drilldown reports of all the agents inherited from the parent report are displayed. Also, when multiple agents are selected and the drilldown report is a historical report (single agent) or real-time report (single agent), a dialog box is displayed to confirm that multiple Report windows should be opened.

Displaying a drilldown report (field level) from a report area

You can display a related drilldown report (field level) by clicking a graph, list, or table in the Report window.

The following sections describe how to display a drilldown report (field level) from a graph, list, or table.

Displaying a drilldown report (field level) from a graph area

You can click a graph area to display a drilldown report (field level). To do so, you need to define the drilldown report to be displayed in the report definition. Figure 5.20 shows an example of a graph area from which a drilldown report can be displayed.

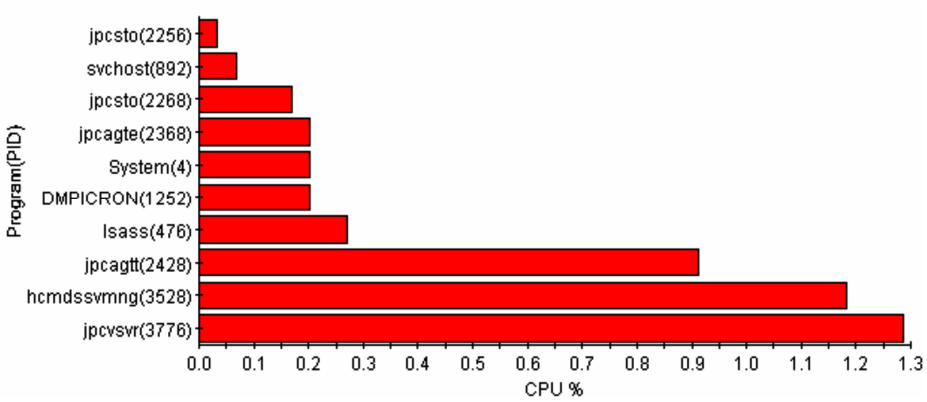


Figure 5.20 Example of a graph area from which a Drilldown Report can be Displayed

Displaying a drilldown report (field level) from a list of item names

Click the desired item name on the list to display a field-level drilldown report. The listed item names that can be selected are displayed as links. Figure 5.21 shows an example of list item names displayed as links.

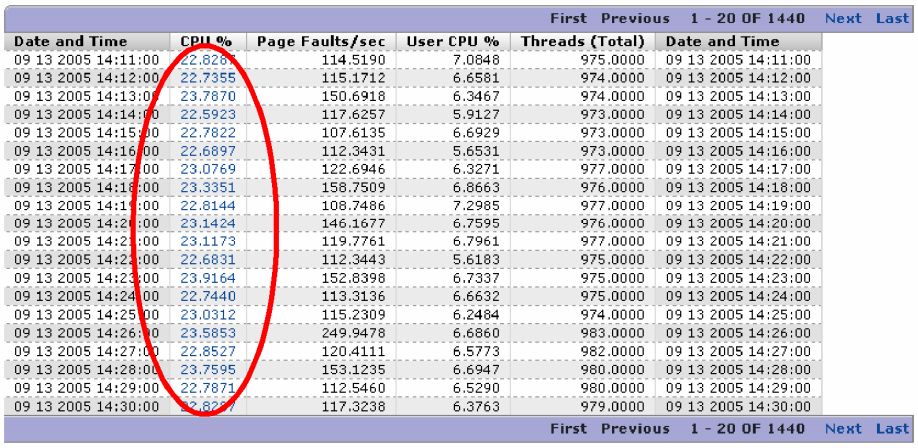
Date and Time	09 14 2005 13:00:00
CPU %	28.0355
Page Faults/sec	188.8508
User CPU %	9.4552
Threads (Total)	14,941.0000

1 OF 1

Figure 5.21 Example of List Names Displayed as Links

Displaying a drilldown report (field level) from a table

Click the desired table value to display a field-level drilldown report. The table values that can be selected are displayed as links. Figure 5.22 shows an example of table values displayed as links.



First Previous 1 - 20 OF 1440 Next Last

Date and Time	CPU %	Page Faults/sec	User CPU %	Threads (Total)	Date and Time
09 13 2005 14:11:00	22.828[illegible]	114.5190	7.0848	975.0000	09 13 2005 14:11:00
09 13 2005 14:12:00	22.7355	115.1712	6.6581	974.0000	09 13 2005 14:12:00
09 13 2005 14:13:00	23.7870	150.6918	6.3467	974.0000	09 13 2005 14:13:00
09 13 2005 14:14:00	22.5923	117.6257	5.9127	973.0000	09 13 2005 14:14:00
09 13 2005 14:15:00	22.7822	107.6135	6.6929	973.0000	09 13 2005 14:15:00
09 13 2005 14:16:00	22.6897	112.3431	5.6531	973.0000	09 13 2005 14:16:00
09 13 2005 14:17:00	23.0769	122.6946	6.3271	977.0000	09 13 2005 14:17:00
09 13 2005 14:18:00	23.3351	158.7509	6.8663	976.0000	09 13 2005 14:18:00
09 13 2005 14:19:00	22.8144	108.7486	7.2985	977.0000	09 13 2005 14:19:00
09 13 2005 14:20:00	23.1424	146.1677	6.7595	976.0000	09 13 2005 14:20:00
09 13 2005 14:21:00	23.1173	119.7761	6.7961	977.0000	09 13 2005 14:21:00
09 13 2005 14:22:00	22.6831	112.3443	5.6183	975.0000	09 13 2005 14:22:00
09 13 2005 14:23:00	23.9164	152.8398	6.7337	975.0000	09 13 2005 14:23:00
09 13 2005 14:24:00	22.7440	113.3136	6.6632	975.0000	09 13 2005 14:24:00
09 13 2005 14:25:00	23.0312	115.2309	6.2484	974.0000	09 13 2005 14:25:00
09 13 2005 14:26:00	23.5853	249.9478	6.6860	983.0000	09 13 2005 14:26:00
09 13 2005 14:27:00	22.8527	120.4111	6.5773	982.0000	09 13 2005 14:27:00
09 13 2005 14:28:00	23.7595	153.1235	6.6947	980.0000	09 13 2005 14:28:00
09 13 2005 14:29:00	22.7871	112.5460	6.5290	980.0000	09 13 2005 14:29:00
09 13 2005 14:30:00	22.8237	117.3238	6.3763	979.0000	09 13 2005 14:30:00

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Figure 5.22 Example of Table Values Displayed as Links

When drilldown reports are displayed from the report area, the information that is inherited in drilldown reports from a parent report depends on the combination of report types. Table 5.7 and Table 5.8 show which information is inherited from a parent report for a drill-down report.

Table 5.7 Information Inherited From Multi-Agent Parent Report

Drilldown Report	Multiple Agents (Historical Report Only)	Single Agent
Data collection interval	Date and Time information of the clicked data line.	For a historical report, same as that to the left. For a real-time report, no information is inherited.
Agent type	The agents of the clicked graph area, list page, or table line.	The agent selected after displaying the parent report.
Report interval	Report definition of the drilldown report. When changed by the **Specify-when-displayed** setting: the value after the change was made.	For a historical report, same as that to the left. For a real-time report, no information is inherited.

Table 5.8 Information Inherited From Single-Agent Parent Report

Drilldown Report	Multiple Agents (Historical Report Only)	Single Agent
Data collection interval	Date and Time information of the clicked data line.	For a historical report, same as that to the left. For a real-time report, no information is inherited.
Agent type	The agent selected when displaying the parent report (see ***Note***)	
Report interval	Report definition of the drilldown report. When changed by the **Specify-when-displayed** setting: the value after the change was made	For a historical report, same as that to the left. For a real-time report, no information is inherited.

Note: For single-agent drilldown reports, instances are not inherited automatically even when the parent report and drilldown report are both multiple instances. If the instances must be inherited, it is necessary to set the field value by specifying the field values in the drilldown condition settings of the parent report.

Displaying a drilldown report (automatic settings) by specifying a time item

When a table is displayed, the **Date and Time** field, **Record Time** field for the real time report, is added as the first and last columns. If the report target record is PI record and the data collection interval is defined in units other than minutes, it is possible to select a **Date and Time** field or **Record Time** field time, and display an appropriate automatic-settings drilldown report. Figure 5.23 shows an example of the **Date and Time** field displayed as a link.

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Date and Time	CPU %	Page Faults/sec	User CPU %	Threads (Total)	Date and Time
09 13 2005 13:00:00	23.6400	147.2421	6.9085	58,568.0000	09 13 2005 13:00:00
09 13 2005 14:00:00	23.4913	132.6078	7.0379	58,585.0000	09 13 2005 14:00:00
09 13 2005 15:00:00	23.3831	136.8365	7.1371	58,534.0000	09 13 2005 15:00:00
09 13 2005 16:00:00	23.4368	134.0805	6.9518	58,516.0000	09 13 2005 16:00:00
09 13 2005 17:00:00	24.4653	188.3525	7.5328	58,553.0000	09 13 2005 17:00:00
09 13 2005 18:00:00	23.2069	129.0676	7.3878	58,512.0000	09 13 2005 18:00:00
09 13 2005 19:00:00	23.6053	135.6857	7.4533	58,713.0000	09 13 2005 19:00:00
09 13 2005 20:00:00	23.4190	133.4091	7.5510	58,571.0000	09 13 2005 20:00:00
09 13 2005 21:00:00	23.1610	131.1478	7.3745	58,573.0000	09 13 2005 21:00:00
09 13 2005 22:00:00	23.1638	128.0626	7.2881	58,487.0000	09 13 2005 22:00:00
09 13 2005 23:00:00	24.4029	189.1710	7.1696	58,557.0000	09 13 2005 23:00:00
09 14 2005 00:00:00	24.0909	146.6974	7.0384	58,546.0000	09 14 2005 00:00:00
09 14 2005 01:00:00	23.3601	126.9726	6.5523	58,462.0000	09 14 2005 01:00:00
09 14 2005 02:00:00	23.3421	126.9453	6.6524	58,466.0000	09 14 2005 02:00:00
09 14 2005 03:00:00	23.3088	126.7266	6.8675	58,481.0000	09 14 2005 03:00:00
09 14 2005 04:00:00	23.3353	126.4405	6.6257	58,458.0000	09 14 2005 04:00:00
09 14 2005 05:00:00	24.6578	191.2363	6.9384	58,551.0000	09 14 2005 05:00:00
09 14 2005 06:00:00	23.7232	141.4132	6.7985	59,023.0000	09 14 2005 06:00:00
09 14 2005 07:00:00	23.4943	129.4535	6.5944	59,134.0000	09 14 2005 07:00:00
09 14 2005 08:00:00	23.5299	128.8303	6.8769	59,130.0000	09 14 2005 08:00:00

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Figure 5.23 Example of a Table Displaying the Date and Time Field as a Link

The automatic-settings drilldown report displayed by specifying a time item has the same report definition as the parent report; however, **Start time** in the drilldown report will be the value of the selected **Date and Time** or **Record Time,** and **Report Interval** will be one more level detailed than the parent report. For example, **Report Interval** of the drilldown report will be **Minute** if **Report Interval** of the parent report is **Hour**.

Note: Only historical reports can display drilldown reports from time items.

5.6 Displaying Report Properties

The Report window's **Properties** tab allows report definition information to be displayed. By displaying the properties, you can check the filter conditions for the report, the data collection period for the report, the auto-refresh interval for data displayed in the report, and other information.

Figure 5.24 shows the Report window's **Properties** tab.

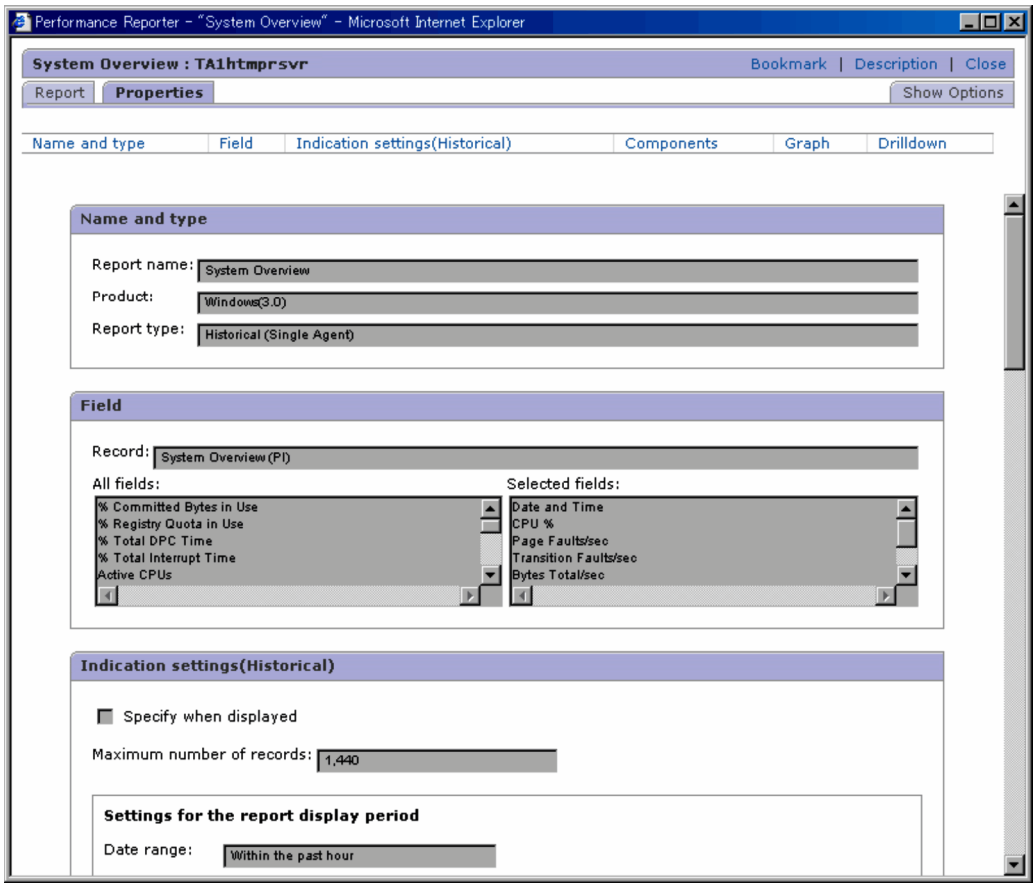


Figure 5.24 Report Window, Sample Properties Tab

Following are descriptions of the window's elements:

Name and type

Report name

Shows the report name (up to 64 characters).

Product

Displays the product name. When multiple Agent data model versions correspond to one product in the used environment, *product-name* (*version*) is displayed in **Product**.

Report type

Displays the report type (**Realtime (Single Agent)**, **Historical (Single Agent)**, or **Historical (Multiple Agents)**).

Field

Record

Displays a selected record ID.

All fields

Displays all fields belonging to the selected record.

Selected fields

Displays the fields that were selected for display in the report.

Conditional expression

Conditional expression

Displays over multiple lines as a list the condition expressions set as a filter for the report. If no filter is set, then nothing is displayed. If setting conditions are unified, parentheses "( )" express the unification.

Indication settings (Historical)

Specify when displayed

This check box determines whether the **Show Options** tab is to be displayed when the report is displayed.

Maximum number of records

Displays the maximum record count that has been set.

Settings for the report display period

Date range

Displays the display target interval for the report. The **Date range** values are **Specify when displayed/Within the past hour/Within the past 24 hours/Within the past 7 days/Within the past month/Within the past year**.

Report interval

Displays the data collection interval for the report. The **Report interval** values are **Minute/Hour/Day/Week/Month/Year**.

Peak time

Field

Displays the contents of the peak time collection field when this characteristic is set. If this characteristic is not set, the display shows **(none)**.

Indication settings (Realtime)

Specify when displayed

This check box determines whether the **Show Options** tab is to be displayed when the report is displayed.

Indicate delta value

This check box determines whether delta values are displayed or not.

Do not refresh automatically

This check box determines whether real-time report is auto-refreshed or not.

If selected: Do not perform auto-refresh.

If not selected: Perform auto-refresh.

Initial value

Displays the auto-refresh interval (in seconds) for data displayed in the report.

Minimum value

Displays the minimum auto-refresh interval (in seconds) for data displayed in the report.

Display by ranking

Field

Displays the name of the field set. This is displayed when there are multiple instances for the data used for the report. If this characteristic is not set, the display shows **(none)**.

Display number

Displays the number of ranked items to display. This is displayed when there are multiple instances for the data used for the report. If this component is not set, the display is blank.

In descending order

Displays whether the ranking display is in descending order. This is displayed when there are multiple instances for the data used for the report.

If selected: Descending order

If not selected: Ascending order

Components

Fields

Displays the field names.

Table

This check box determines whether the applicable field is to be displayed in a table.

List

This check box determines whether the applicable field is to be displayed in a list.

Graph

This check box determines whether the applicable field is to be displayed in a graph. If a field is not a numeric field, `N/A` is displayed because it is not possible to display its data in a graph.

Display name

If this component is set, the display name setting is displayed. Up to 24 characters can be displayed. If this component is not set, the display is blank.

Display key

Field

If this component is set, the value of the display key field is displayed. If this component is not set, the display shows **(none)**.

In descending order

This component sets whether the displayed key values are to be listed in descending or ascending order:

If selected: Descending order

If not selected: Ascending order

Graph

Graph types

Displays the type of graph to be displayed:

- Column
- Stacked column
- Bar
- Stacked bar
- Pie
- Line
- Area
- Stacked area

Series direction

Displays whether the graph series is by row or by column:

- By row
- By column

Show areas of missing data

This check box displays whether to show a break in a graph when displaying a part with missing data.

- If checked: Display the data with a break in the graph.
- If not checked: Do not display a break in the graph.

Axis labels

- **X-axis**

  If this property is set, the X-axis label is displayed. Up to 40 characters can be displayed. If this property is not set, the display is blank.

- **Y-axis**

  If this property is set, the Y-axis label is displayed. Up to 40 characters can be displayed. If this property is not set, the display is blank.

Data label

- **Data label 1**

  If this property is set, Data label 1 is displayed. Up to 40 characters can be displayed. If this property is not set, the display shows **(none)**.

- **Data label 2**

  If this property is set, Data label 2 is displayed. Up to 40 characters can be displayed. If this property is not set, the display shows **(none)**.

Drilldown

Report drilldown

- **Report**

  A drilldown report whose report name is specified is displayed. This report can display up to 64 characters. If this report is not set, the display shows a blank space.

Field drilldown

- **Field**

  This report displays field names related to field-level drilldown reports.

- **Report**

  This report displays report names related to field-level drilldown reports. If this property is not set, the display shows **(No report is selected.)**.

- **Conditional expression**

  This report displays display conditions related to field-level drilldown reports. The condition expressions set as a filter for the report are displayed over multiple lines in a list. If no filter is set, nothing is displayed. If setting conditions are unified, parentheses "( )" express the unification.

Notes:

- The property display contents are the report definition information, not the display setting information. Therefore, even if the display conditions are changed from the **Show Options** tab, the property display information does not change.
- For information about using the Report Wizard to define a report, see section 5.3. For information about entering commands for a report definition, the supported commands, and the command syntax, see the *HiCommand Tuning Manager Command Line Interface Guide*.

5.7 Setting and Changing Report Display Conditions

You can set or change report display conditions at either of two times: when you define a report, and when you display a report.

- **Setting Conditions at Report Definition**

  The display conditions set when you define a report are registered permanently in the Performance Reporter system. These conditions are not affected by such operations as opening and closing windows, or starting and shutting down the system. Such display conditions are registered permanently until the jpcrdef delete command is used to delete them from the Performance Reporter system.

- **Setting Conditions at Report Display**

  You can use the Report window, Show Options tab to set or change the display conditions for a particular report. These settings are effective only while a report is being displayed in that window. Once you close that window or open another window, the display conditions revert to the default for that report.

If you want to set the report display conditions every time reports are displayed, we recommend that you make an appropriate specification for displaying the Show Options tab in the definition of the report.

5.7.1 Setting Conditions at Report Definition

You can define the report display conditions by using the Report Wizard, or by using the `jpcrdef create` command.

The display conditions set when you define a report are registered permanently in the Performance Reporter system. These conditions are not affected by such operations as opening and closing windows, or starting and shutting down the system. Such display conditions are registered permanently until the jpcrdef delete command is used to delete them from the Performance Reporter system.

For information about using the Report Wizard to define a report, see section 5.3. For details about the commands, see the *HiCommand Tuning Manager Command Line Interface Guide*.

5.7.2 Setting Conditions at Report Display

You can use the **Report** window, **Show Options** tab to set or change the display conditions for a particular report. These settings are effective only while a report is being displayed in that window. Once you close that window or open another window, the display conditions revert to the default for that report.

For the **Show Options** tab to be displayed at the time of initial display of a Report window, make an appropriate specification in the definition of the report. The actual Window that will be displayed depends on the combination of report definition items.

There are three types of **Show Options** tabs, depending on the report definition information.

To set the data collection period or collection interval, set the report definition as follows:

- To define a report using the Report Wizard, select **Specify when displayed** in **Indication Settings**, or select **Specify when displayed** for **Date range** in **Indication Settings** for the historical report.
- To define a report using commands, set the **specify when displayed** attribute to **TRUE** or omit the **date-range** subelement when you set the **indication-settings** parameter.

When you specify these settings for report definition, the **Show Options** tab is displayed, as shown in Figure 5.25.

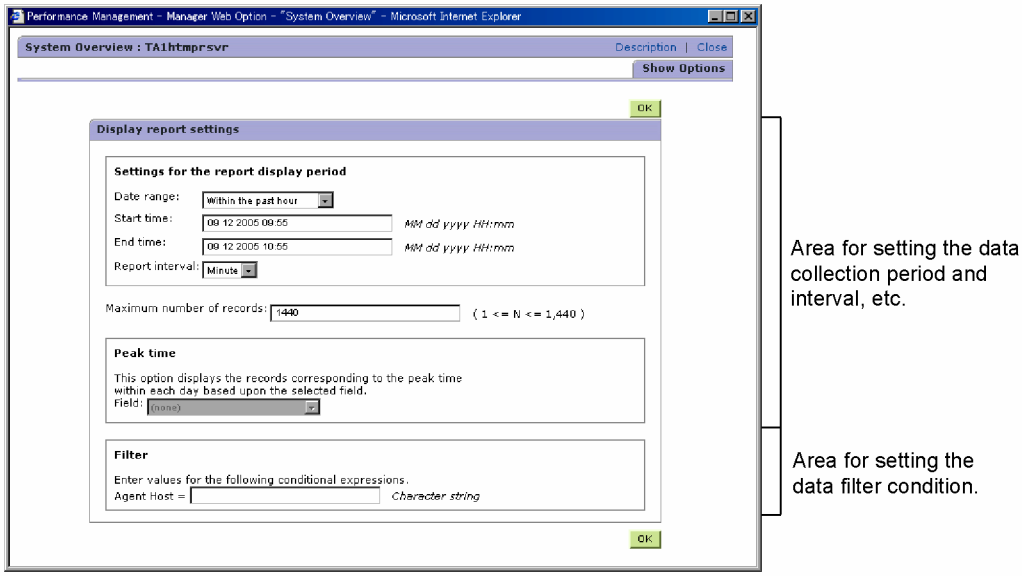


Figure 5.25 Setting the Data Collection Period or Collection Interval with a Report Displayed

The **Settings for the report display period** box allows you to set the parameters for the report.

- **Date range** displays the display target interval for the report. The options are: Specify when displayed, Within the past hour, Within the past 24 hours, Within the past 7 days, Within the past month, or Within the past year.

- **Start time** allows you to specify the beginning of the range of reports. If you enter a value, the date range will change to Specify when displayed. The display format specified for **Start time** changes, depending on the combination of the date format and the Report interval value set in config.xml. Table 5.9 lists the display formats.
- **End time** allows you to specify the end of the range of reports. The values are the same as for the start time. The display format specified for **End time** changes, depending on the combination of the date format and the Report interval value set in config.xml. Table 5.9 lists the display formats.
- **Report interval** allows you to specify the interval. Available options for a PI record are: **Minute**, **Hour**, **Day**, **Week**, **Month**, or **Year**. The value of the report interval changes depending on the **Date range** setting.

  Specify when displayed -> Hour

  Within the past hour -> Minute

  Within the past 24 hours -> Hour

  Within the past 7 days -> Day

  Within the past month -> Week

  Within the past year -> Month

- The **Maximum number of records** field allows you to specify the maximum record count. The value specified in **maxFetchCount** in **config.xml** is an upper limit.
- The **Peak time** box allows you to display the report that contains the largest reported number for the selected field in a 24-hour period.
- The **Field** selection list only appears when a record is a **single instance** and the Report interval setting is **Hour**.

The following interface elements are not shown in Figure 5.25, but may also be visible:

- The **Filter** selection lets you specify a condition expression up to 2,048 bytes long, using integers, decimal values, or character strings. The display format specified for **Start time** and **End time** changes, depending on the combination of the date format and the Report interval value set in config.xml. Table 5.9 lists the display formats.
- The **Indicate delta value** selection lets you display delta values for the real-time report. If this is selected and the attribute of the field set does not support delta values, the delta value will not be displayed and the obtained values will be displayed as-is.
- The **Do not refresh automatically** selection lets you prevent auto-refresh from being performed for the real-time report. When this is not selected, data is collected automatically from the agent, and auto-refresh is performed for the real-time report.
- The **Refresh interval** selection lets you specify an auto-refresh interval for the real-time report. Values range from the Minimum value to 3,600. The default value is the value of Initial value.

- Display by ranking
  - **Field**

    From the list, select the field for which the display for the real-time report should be ranked.
  - **Display number**

    Specify an integer from 1 to 100 for the number of ranked items to display for the real-time report.
- The **In descending order** selection lets you collect and display the data for the real-time report in descending order.
- **OK** displays the report if all required fields are filled.

Table 5.9 Display Formats for Start Time and End Time

Report Interval Value	Date Format [*dd MM yyyy*]	Date Format [*MM dd yyyy*]	Date Format [*yyyy MM dd*]
Minute	[*dd MM yyyy HH*:*mm*]	[*MM dd yyyy HH*:*mm*]	[*yyyy MM dd HH*:*mm*]
Hour	[*dd MM yyyy HH*:00]	[*MM dd yyyy HH*:00]	[*yyyy MM dd HH*:00]
Day	[*dd MM yyyy*]	[*MM dd yyyy*]	[*yyyy MM dd*]
Week	[*dd MM yyyy*]	[*MM dd yyyy*]	[*yyyy MM dd*]
Month	[*MM yyyy*]	[*MM yyyy*]	[*yyyy MM*]
Year	[*yyyy*]	[*yyyy*]	[*yyyy*]

Note: In Table 5.9, “dd” indicates the day, “MM” indicates the month, “yyyy” indicates the year. “HH” indicates the hour, and “mm” indicates the minute.

To set the data filter conditions while a report is being displayed, use the following procedure:

- To define a report using the Report Wizard, select **Specify when displayed** in the **Filter** settings.
- To define a report using commands, specify the **record - condition-expression - expression** parameter. Then, specify **TRUE** in the **Specify-when-displayed** attribute of the **expression** parameter. The hyphens in this expression indicate the hierarchy when you are defining reports. The description **record - condition-expression** means to specify **condition-expression** in the **record** subelement.

When you perform the above settings for report definition, the **Show Options** tab is displayed as shown in Figure 5.26.

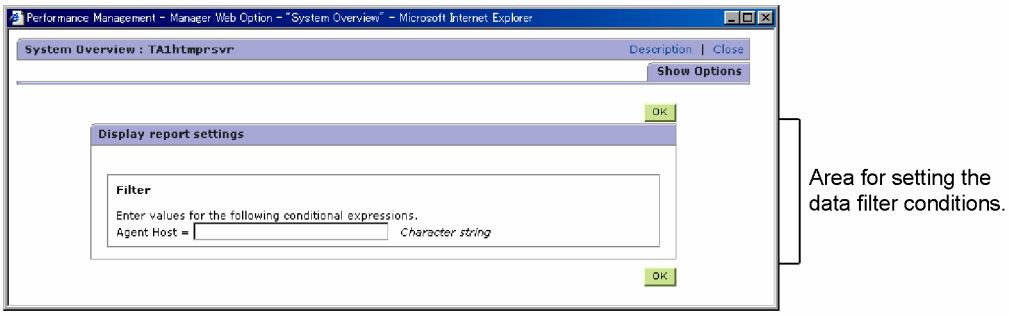


Figure 5.26 Report Window, Show Options Tab, Setting Data Filter Conditions

To set the data collection period, collection interval, or filter conditions, use the following procedure:

- To define a report using the Report Wizard:
  - Select **Specify** when displayed in **Indication Settings**, or select **Specify when displayed for Date range** in **Indication Settings** for the historical report.
  - Select **Specify when displayed** in the **Filter settings**.
- To define a report using commands:
  - Specify **TRUE** in the **specify-when-displayed** attribute of the **indication-settings** parameter. Alternatively, omit the **date-range** subelement of the **indication-settings** parameter.
  - Specify the **record - condition-expression - expression** parameter. Then specify **TRUE** in the **specify-when-displayed** attribute of the expression parameter.

The hyphens in the above expressions indicate the hierarchy when you are defining reports. The description record - condition-expression means to specify a condition-expression in the record subelement. When you apply these settings for report definition, the **Show Options** tab is displayed, as shown in Figure 5.27.

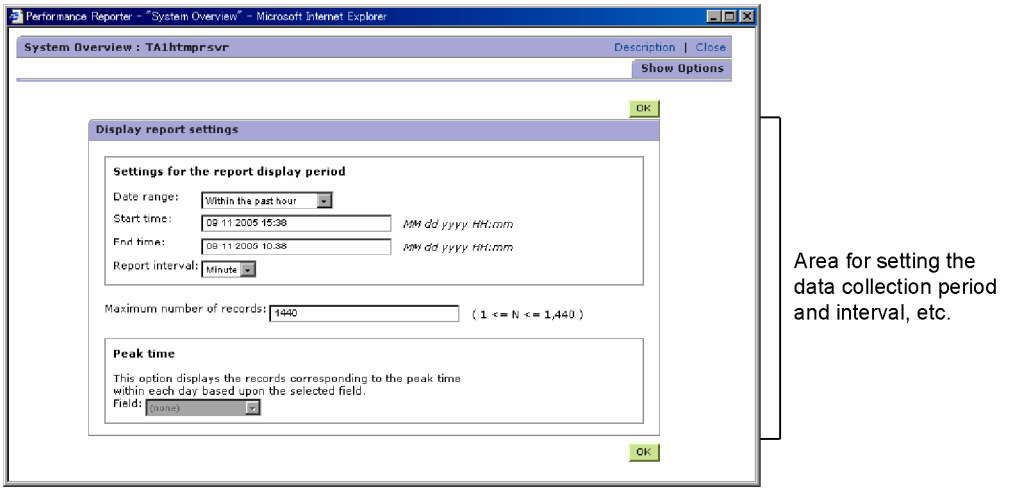


Figure 5.27 Report Window, Show Options Tab, Setting Data Collection, Interval or Filters

5.8 Deleting a User-defined Report

To delete a report:

1. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed.
2. In the report hierarchy, click the folder, in **User Reports**, containing the report you want to delete. The clicked folder is selected, and a list of the reports and folders within is displayed.
3. In the list of reports, click the report you want to delete. The clicked report is selected.
4. In the Method frame, select the **Delete** method. A message box confirming deletion is displayed in the Information frame.
5. To delete the selected report, click **OK**. The selected report is deleted.

5.9 Example of Creating a New Report

Following is an example of creating a new report: Average Response Rate of Device File.

To create the Average Response Rate of Device File report:

1. In the Global Tasks Bar area of Main Console, click **Go** and then **Performance Reporter**. The Main window of Performance Reporter is displayed.
2. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed.
3. In the Navigation frame of the Main window, click **User Reports**.
4. In the Method frame, choose the **New Report** method. The New Report > Name and Type window is displayed in the Information frame.
5. In **Report Name**, enter **Average Response Rate of Device File**. For **Product**, select Windows(5.0).
6. In **Report Type**, select **Historical (Single Agent)**, and then click **Next**. The New Report > Field window is displayed.
7. In **Record**, select `Physical Disk Overview(PI_PHYD)`.
8. In **All fields**, select the following fields: Date and Time, ID, Ave Disk Secs/Xfer, Ave Disk Secs/Read, and Ave Disk Secs/Write. Click **Next >**. The New Report > Filter window is displayed.
9. Select the field `ID`, = for **Condition**, and `Specify when displayed`. Click **Add**, and then select **AND** and **Simple**. `ID = prompt("")` is displayed in **Conditional expression**. Click **Next >**. The New Report > Indication Settings (Historical) window is displayed.
10. Confirm that **Specify when displayed** is shown for **Date range** and select **Minute** for the **Report interval**.
11. In **Maximum number of records**, specify `1440`. Click **Next >**. The New Report > Components window is displayed.
12. Select the **Graph** check box for **Avg Disk Secs/xfer**.
13. In **Display Key**, select **(none)** for **Field**. Click **Next >**. The New Report > Graph window is displayed.
14. Select **Line** for the **Graph type**, and then confirm that **By column** is selected and that **(none)** is shown for both **Data label 1** and **Data label 2**. Click **Finish**. The settings are saved, and the New Report > Graph window closes.
15. In the Navigation frame of the Main window, click the **Agents** tab and then select the Windows Agent and a subsystem below the Agent.
16. In the Method frame, select **Display Report**. The **Average Response Rate of Device File** report is displayed below **User Reports**.

5.10 Example of Customizing a Solution Set

The following example describes how to customize the Port Performance Details report of the RAID solution set to create a Port Performance Details report. The report will display a graph that shows average transfers per second.

To customize the Port Performance Details:

1. In the Global Tasks Bar area of Main Console, click **Go** then **Performance Reporter**. The Main window of Performance Reporter is displayed.
2. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed. The **System Reports** area displays a hierarchy of the folders and reports for the solution set.
3. In the Navigation frame of the Main window, in **System Reports**, click **RAID**, **Troubleshooting**, **Recent Past**, then **Port Performance Details**. The **Port Performance Details** report is selected.
4. In the Method frame, choose the **Copy** method. The Copy window is displayed in the Information frame, as is the report hierarchy of the copy destination.
5. Click **OK**. The **Port Performance Details** report is copied to **User Reports**.
6. In the Method frame, choose the **Edit** method. The Edit > Name and Type window is displayed in the Information frame.
7. In **Report Type**, confirm that **Historical (Single Agent)** is selected, then click **Next**. The Edit > Field window is displayed.
8. In **Record**, confirm that the `Port Summary (PI_PTS)` record is selected.
9. In **All fields**, select the following fields, if not already selected: Port Number, Port Name, Max I/O /sec, Min I/O /sec, Avg I/O /sec, Max xfer /sec, Min xfer /sec, Avg xfer /sec. Click **Next >**. The Edit > Filter window is displayed.
10. Select the field `Port Name`, = for **Condition**, and `Specify when displayed`. Click **Add**, and then select **AND** and **Simple**. `Port Name = prompt("")` is displayed in **Conditional expression**. Click **Next >**. The Edit > Indication Settings (Historical) window is displayed.
11. Confirm that **Specify when displayed** is shown for **Date range** and **Minute** for the **Report interval**.
12. In **Maximum number of records**, specify `1440`. Click **Next >**. The Edit > Components window is displayed.
13. Select the **Graph** check box for **Min xfer /sec**.
14. In **Display Key**, select (none) for **Field**. Click **Next >**. The Edit > Graph window is displayed.
15. Select **Line** for the **Graph type**, and then confirm that **By column** is selected and that **(none)** is shown for both **Data label 1** and **Data label 2**. Click **Finish**. The settings are saved, and the Edit > Graph window closes.
16. In the Navigation frame of the Main window, click the **Agents** tab then select the RAID Agent and a subsystem below the Agent.

17. In the Method frame, select **Display Report**. The **Port Performance Details** report is displayed below **User Reports**.
18. Click the **Port Performance Details** report.
19. Select the **Date range**, **Max records**, and **Port name**, and then click **OK**. The **Port Performance Details** report will be displayed.

5.11 Example of Creating a New Report with an OR Filter Condition

The following example describes how to create an I/O Response Time report that displays a line graph showing the I/O Response time trend for a particular device file. The Platform Agent (Windows) collects the data about the device file.

To create the I/O Response Time report:

1. In the Global Tasks Bar area of Main Console, click **Go** and then **Performance Reporter**. The Main window of Performance Reporter is displayed.
2. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed.
3. In the Navigation frame of the Main window, click **User Reports**.
4. In the Method frame, choose the **New Report** method. The New Report > Name and Type window is displayed in the Information frame.
5. In **Report Name**, enter **I/O Response Time**. For **Product**, select Windows(4.0).
6. In **Report Type**, select **Historical (Single Agent)**, and then click **Next**. The New Report > Field window is displayed.
7. In **Record**, select `Physical Disk Overview(PI_PHYD)`.
8. In **All fields**, select the following fields: Avg Disk Bytes/Xfer, % Disk Read Time, % Disk Time, % Disk Write Time, Avg Disk Bytes/Read, Avg Disk Bytes/Write, Avg Disk Queue Length, Avg Disk Read Queue Length, Avg Disk Secs/Read, Avg Disk Secs/Write, Avg Disk Secs/Xfer, Avg Disk Write Queue Length, and ID. I/O Response Time is equivilent to the Avg Disk Secs/Xfer field. Click **Next >**. The New Report > Filter window is displayed.
9. Select the field `ID`, = for **Condition**, and `Specify when displayed`. Click **Add**, and then select **AND** and **Simple**. `ID = prompt("")` is displayed in **Conditional expression**.
10. Select the field `Disk Bytes/sec`, >= for **Condition**, and `Specify when displayed`. Click **Add**, and then select **OR** and **Simple**. `ID = prompt("") OR Disk Bytes/sec >= prompt("")` is displayed in **Conditional expression**.
11. Click **Next >**. The New Report > Indication Settings (Historical) window is displayed.
12. Select the **Specify when displayed** check box.
13. Confirm that **Specify when displayed** is shown for **Date range** and **Hour** for the **Report interval**.
14. In **Maximum number of records**, specify `1440`. Click **Next >**. The New Report > Components window is displayed.
15. I/O Response Time is equivilent to the Avg Disk Secs/Xfer field. Select the **Graph** check box for **Avg Disk Secs/Xfer**.
16. In **Display Key**, select (none) for **Field**. Click **Next >**. The New Report > Graph window is displayed.
17. Select **Line** for the **Graph type**, and then confirm that **By column** is selected. Enter `I/O Response Time` for **Y-axis**, and then select **ID** for **Data label 1** and **(none)** for **Data label 2**. Click **Finish**. The settings are saved, and the New Report > Graph window closes.

18. In the Navigation frame of the Main window, click the **Agents** tab and then select the Windows Agent and a subsystem below the Agent.
19. In the Method frame, select **Display Report**. The **I/O Response Time** report is displayed below **User Reports**.

5.12 Example of Creating a Line Graph (Single field, Multiple Instances)

The following example describes how to customize the CPU Status (Multi-Agent) report of the Windows solution set to create a CPU Status (Multi-Agent) report. The report displays a line graph (single field, multiple instances) showing CPU usage.

To customize the CPU Status (Multi-Agent) report to display a line graph (single field, multiple instances):

1. In the Navigation frame of the Main window, select the **Reports** tab. The report hierarchy is displayed. The **System Reports** area displays a hierarchy of the folders and reports for the solution set.
2. In the Navigation frame of the Main window, in **System Reports**, click **Windows**, **Operating System**, **Status Reporting**, Daily Trend and then **CPU Status (Multi-Agent)**. The **CPU Status (Multi-Agent)** report is selected.
3. In the Method frame, choose the **Copy** method. The Copy window is displayed in the Information frame, as is the report hierarchy of the copy destination.
4. Click **OK**. The **CPU Status (Multi-Agent)** report is copied to **User Reports**.
5. In the Method frame, choose the **Edit** method. The Edit > Name and Type window is displayed in the Information frame.
6. In **Report Type**, confirm that **Historical (Multiple Agents)** is selected, and then click **Next**. The Edit > Field window is displayed.
7. In **Record**, confirm that the `System Overview (PI)` record is selected.
8. In **All fields**, select the following fields: CPU %, User CPU %, Privileged CPU %, and System Calls/sec. Click **Next >**. The Edit > Filter window is displayed.
9. Select the field `Agent Host`, and = for **Condition**. Click **Next >**. The Edit > Indication Settings (Historical) window is displayed.
10. Confirm that **Specify when displayed** is shown for **Date range** and **Hour** for the **Report interval**.
11. In **Maximum number of records**, specify `1440`. Click **Next >**. The Edit > Components window is displayed.
12. Select the **Graph** check box for **CPU %**. (Note that at least one Graph check box must be selected to display a graph.
13. Click **Next >**. The Edit > Graph window is displayed.
14. Select **Line** for the **Graph type**, and then confirm that **By column** is selected, CPU % is selected for Y-axis, and that **Agent Instance** is shown for **Data label 1** and **(none)** for **Data label 2**. Click **Finished**. The settings are saved, and the Edit > Graph window closes.
15. In the Navigation frame of the Main window, click the **Agents** tab and then select **Multiselect**, **Windows** below Products, and multiple agents below **Windows**.
16. In the Method frame, select **Display Report**. The **CPU Status (Multi-Agent)** report is displayed below **User Reports**.

Chapter 6 Working with Alerts

The programs of the Tuning Manager series monitor performance data based on thresholds that are predefined in Main Console. When performance data values reach the threshold values, Main Console notifies the user of the system status by email or execution of a command. These notifications are called alerts. A user who receives an alert can prevent operational problems by taking appropriate action to improve performance.

This chapter describes how to set up alerts and provides notes on using alerts.

- Alertable metrics (see section 6.1)
- Setting Alerts (see section 6.2)
- Testing Alerts (see section 6.3)
- Viewing Alerts (see section 6.4)
- Editing an Alert Definition (see section 6.5)
- Notes on Alerts (see section 6.6)

6.1 Alertable metrics

Alerts can be set for some metrics in Main Console, but not others. Table 6.1 and Table 6.2 list the capacity and performance metrics for which alerts can be set.

Table 6.1 Alertable Metrics (Capacity)

Resource	Resource layer	Alertable metrics
Server	Server	Capacity
		Device Files
		Free
		Free %
		Growth Rate
		Imported Filesystems
		Local Filesystems
		Used
	Filesystem	Capacity
		Free
		Free %
		Growth Rate
		Inodes
		Used
Application (Oracle)	Instance	Capacity
		Data Files
		Free
		Free %
		Growth Rate
		Tablespaces
		Used
	Tablespace	Capacity
		Data Files
		Free
		Free %
		Growth Rate
		Rollback Segments
		Sort Segments

Resource	Resource layer	Alertable metrics
Application (Oracle)	Tablespace	Used
	Data file	Size

Table 6.2 Alertable Metrics (Performance)

Resource	Resource layer	Alertable metrics
Server	Server	IOPS
		Read IOPS
		Read Transfer
		Transfer
		Write IOPS
		Write Transfer
Storage	Device file	IOPS
		I/O Response Time
		Read IOPS
		Read Transfer
		Transfer
		Write IOPS
		Write Transfer
	Storage subsystem	Array Groups
		Cache %
		Cache Capacity
		Cache Usage
		Disk IOPS
		Disk Read IOPS
		Disk Read Transfer
		Disk Transfer
		Disk Write IOPS
		Disk Write Transfer
		Logical Disks
		Max Side File Usage
		Max Write Pending Rate
		Port IOPS
		Port Max IOPS
		Port Max Transfer

Resource	Resource layer	Alertable metrics
Storage	Storage subsystem	Port Min IOPS
		Port Min Transfer
		Port Transfer
		Ports
		Side File Usage
		Write Pending Rate
	Storage port	Port IOPS
		Port Max IOPS
		Port Max Transfer
		Port Min IOPS
		Port Min Transfer
		Port Transfer
	Array group	Disk IOPS
		Disk Random IOPS
		Disk Random Transfer
		Disk Read IOPS
		Disk Read Transfer
		Disk Sequential IOPS
		Disk Sequential Transfer
		Disk Transfer
		Disk Write IOPS
		Disk Write Transfer
		I/O Usage
		Max I/O Usage
		Read Hit Ratio
		Write Hit Ratio
	Logical disk	Disk IOPS
		Disk Random IOPS
		Disk Random Transfer
		Disk Read IOPS
		Disk Read Transfer
		Disk Sequential IOPS
		Disk Sequential Transfer
		Disk Transfer

Resource	Resource layer	Alertable metrics
Storage	Logical disk	Disk Write IOPS
		Disk Write Transfer
		I/O Response Time
		Read I/O Response Time
		Write I/O Response Time
	CLPR	Cache Capacity
		Max Side File Usage
		Max Write Pending Rate
		Side File Usage
		Write Pending Rate
Fabric	Switch	Buffer Credit Zero State
		Input Buffer Full
		PortModules
		Ports
		Received Bytes
		Received Frames
		Transferred Bytes
		Transferred Frames
	Switch port	Buffer Credit Zero State
		Input Buffer Full
		Received Bytes
		Received Frames
		Transferred Bytes
		Transferred Frames
Application (Oracle)	Instance	IOPS
		Read IOPS
		Write IOPS
	Tablespace	IOPS
		Read IOPS
		Write IOPS
	Data file	IOPS
		Read IOPS
		Write IOPS

6.2 Setting Alerts

The programs of the Tuning Manager series monitor performance data based on thresholds that are predefined in Main Console. When performance data values reach the threshold values, Main Console notifies the user of the system status by email or execution of a command. These notifications are called alerts. A user who receives an alert can prevent operational problems by taking appropriate action to improve performance.

Set alerts in the following order:

1. define an alert
2. define an alert action
3. bind an alert definition and a resource
4. bind an alert action definition and a resource

Note: This activity requires Manager or Administrator privileges.

To set up an alert, follow these steps:

1. Define:

   Specify the characteristics of the alert including the resource type. See section 6.2.1.

2. Action:

   Specify the action(s) you want Tuning Manager to take in the case of an alert event. See section 6.2.2.

3. Bind:

   Assign the alert definition and the actions you want performed to a resource. This operation is called a *bind*. See section 6.2.3.

Note: Allow at least two polling periods for the alert to become effective.

6.2.1 Creating an Alert Definition

Note: This activity requires Manager or Administrator privileges.

To create a new alert:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **Define** tab.

   The Alerts list appears.
3. To move through the list, click **Next** or **Previous**. When multiple subtables are available for display, you can jump directly to each section of the table. Numbered hyperlinks appear for this purpose.
4. Click **Add Alert Definition**.

   The Alert Setting 1 window is displayed (see Figure 6.1).
5. Fill in the window as described in Table 6.3.
6. Click **Next** to continue (or click **Cancel** to abandon changes).

   The Alert Setting 2 window appears (see Figure 6.2).
7. Fill in the items in the window as explained in the Table 6.4.

   Note: The message fields (**Warning Condition** and **Critical Condition**) will remain grey when you create an new Alert definition. However these fields will display the Alert expressions for Warning and Critical levels once you have completed and saved the alert definition. Example: `Capacity >= 20`.
8. Click **Save** (or click **Cancel** to abandon changes).

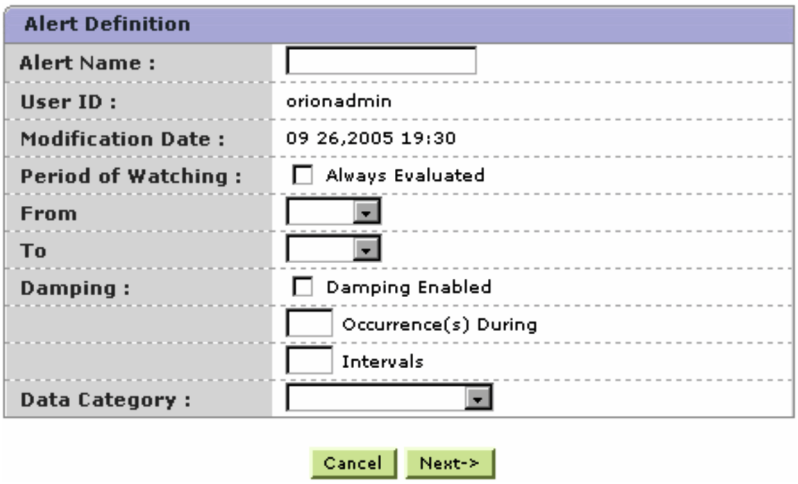


Figure 6.1 The Alert Setting 1 Window

Table 6.3 Alert Definition Fields (First Dialog-Alert Setting 1)

Field		Value
Alert Name		The unique name of the alert.
User ID		The user account responsible for creating the alert (read only).
Modification Date		Last date and time this alert was edited (read only).
Period of Watching	Always Evaluated	When you check this box, this alert condition will be monitored constantly. Note that the values you specified for **From** and **To** are ignored. ***Note:*** To use damping, check **Always Evaluated** and **Damping Enabled**.
	From	Restricts alert monitoring to a finite starting time.
	To	Restricts alert monitoring to a finite ending time.
Damping	Damping Enabled	When checked, an alert is triggered only when multiple instances occur within a finite time frame. ***Note:*** To use damping, check **Always Evaluated** and **Damping Enabled**.
	Occurrence(s) During	The number of times an alert condition occurs before the alert is triggered. (See **Damping Enabled**.)
	Intervals	The number of successive samples to be collected. Example: If 6 is specified in Occurrence(s) and 10 is specified in Intervals, the alert is triggered when the alert condition reaches at least 6 within the successive 10 samples.
Data Category		The resource type to be monitored: ▪ Server ▪ Filesystem ▪ Device File ▪ Storage Subsystem ▪ Storage Port ▪ Logical Disk ▪ Array Group ▪ CLPR ▪ Oracle Instance ▪ Tablespace ▪ Data File ▪ Switch ▪ Switch Port

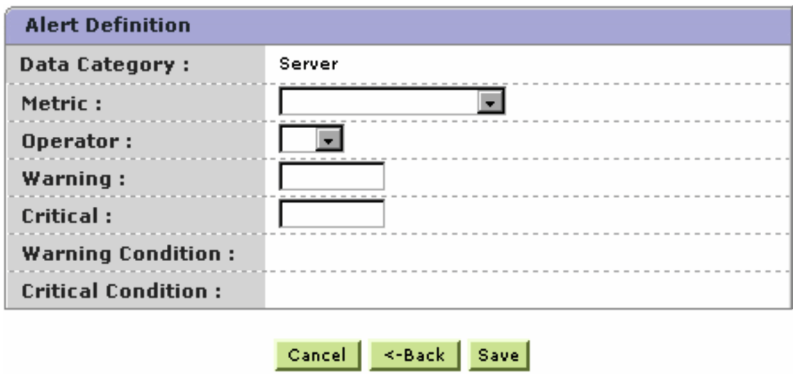


Figure 6.2 The Alert Setting 2 Window

Table 6.4 Alert Definition Fields (Second Dialog-Alert Setting 2)

Field	Value
Data Category	The resource type to be monitored. (read only).
Metric	Specify the metric to be evaluated for the alert.
	Server ▪ Capacity ▪ Used ▪ Free ▪ Free % ▪ Growth Rate ▪ IOPS ▪ Read IOPS ▪ Write IOPS ▪ Transfer ▪ Read Transfer ▪ Write Transfer ▪ Local Filesystems ▪ Imported Filesystems ▪ Device Files
	Filesystem ▪ Capacity ▪ Used ▪ Free ▪ Free % ▪ Growth Rate ▪ Inodes

Field	Value
Metric	Device File ▪ IOPS ▪ Read IOPS ▪ Write IOPS ▪ Transfer ▪ Read Transfer ▪ Write Transfer ▪ I/O Response Time
	Storage Subsystem ▪ Port Max IOPS ▪ Port Min IOPS ▪ Port IOPS ▪ Port Max Transfer ▪ Port Min Transfer ▪ Port Transfer ▪ Cache Capacity ▪ Cache Usage ▪ Disk IOPS ▪ Disk Read IOPS ▪ Disk Write IOPS ▪ Disk Transfer ▪ Disk Read Transfer ▪ Disk Write Transfer ▪ Ports ▪ Logical Disks ▪ Cache % ▪ Array Groups ▪ Max Write Pending Rate ▪ Max Side File Usage ▪ Write Pending Rate ▪ Side File Usage
	Storage Port ▪ Port Max IOPS ▪ Port Min IOPS ▪ Port IOPS ▪ Port Max Transfer ▪ Port Min Transfer ▪ Port Transfer

Field	Value
Metric	Logical Disk ▪ I/O Response Time ▪ Read I/O Response Time ▪ Write I/O Response Time ▪ Disk IOPS ▪ Disk Read IOPS ▪ Disk Write IOPS ▪ Disk Random IOPS ▪ Disk Sequential IOPS ▪ Disk Transfer ▪ Disk Read Transfer ▪ Disk Write Transfer ▪ Disk Random Transfer ▪ Disk Sequential Transfer
	Array Group ▪ I/O Usage ▪ Max I/O Usage ▪ Disk IOPS ▪ Disk Read IOPS ▪ Disk Write IOPS ▪ Disk Random IOPS ▪ Disk Sequential IOPS ▪ Disk Transfer ▪ Disk Read Transfer ▪ Disk Write Transfer ▪ Disk Random Transfer ▪ Disk Sequential Transfer ▪ Read Hit Ratio ▪ Write Hit Ratio
	CLPR ▪ Cache Capacity ▪ Max Write Pending Rate ▪ Max Side File Usage ▪ Write Pending Rate ▪ Side File Usage

Field	Value
Metric	Oracle Instance ▪ Capacity ▪ Used ▪ Free ▪ Free % ▪ Growth Rate ▪ IOPS ▪ Read IOPS ▪ Write IOPS ▪ Tablespaces ▪ Data Files
	Tablespace ▪ Capacity ▪ Used ▪ Free ▪ Free % ▪ Growth Rate ▪ IOPS ▪ Read IOPS ▪ Write IOPS ▪ Data Files ▪ Rollback Segments ▪ Sort Segments
	Data File ▪ IOPS ▪ Read IOPS ▪ Write IOPS ▪ Size
	Switch ▪ Received Bytes ▪ Transferred Bytes ▪ Received Frames ▪ Transferred Frames ▪ Input Buffer Full ▪ Buffer Credit Zero State ▪ Ports ▪ PortModules

Field	Value
Metric	Switch Port ▪ Received Bytes ▪ Transferred Bytes ▪ Received Frames ▪ Transferred Frames ▪ Input Buffer Full ▪ Buffer Credit Zero State
Operator	The comparison operator for evaluating potential alert conditions. ▪ = ▪ >= ▪ <= ▪ > ▪ <
Warning	The threshold value for triggering a warning alert. (<= 2 decimal places). ***Note:*** Displayed values do not always indicate that an alert condition has been reached. For more information, see section 6.6.
Critical	The threshold value for triggering a critical alert. (<= 2 decimal places) ***Note:*** Displayed values do not always indicate that an alert condition has been reached. For more information, see section 6.6.

6.2.2 Defining Alert Actions

In the event of an alert condition, Tuning Manager can respond with any or all of these actions:

- Email message
- SNMP message
- Execute a command
- Log a message in EventLog/Syslog

Notes:

- By default, the alerts are set up to be displayed in Web Client only without invoking any of the above actions.
- If no email is delivered even though email is set as an alert action, you must set a user property file. For details on user property files, see the *HiCommand Tuning Manager Server Administration Guide*.
- If Tuning Manager is installed on a Solaris server, that server must be configured to enable syslog notifications from user applications. For further information, see the *HiCommand Tuning Manager Server Administration Guide*.

6.2.2.1 Creating Alert Action Definitions

To set an alert action definition:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **Action** tab.

   The Alert Actions list appears.
3. If you've created an extensive list, click **Next** or **Previous** to access other segments of the list. When multiple subtables are available for display, you can jump directly to each section of the table. Numbered hyperlinks appear for this purpose.
4. Click **Add Action Definition**.

   The Alert Action Settings window appears.

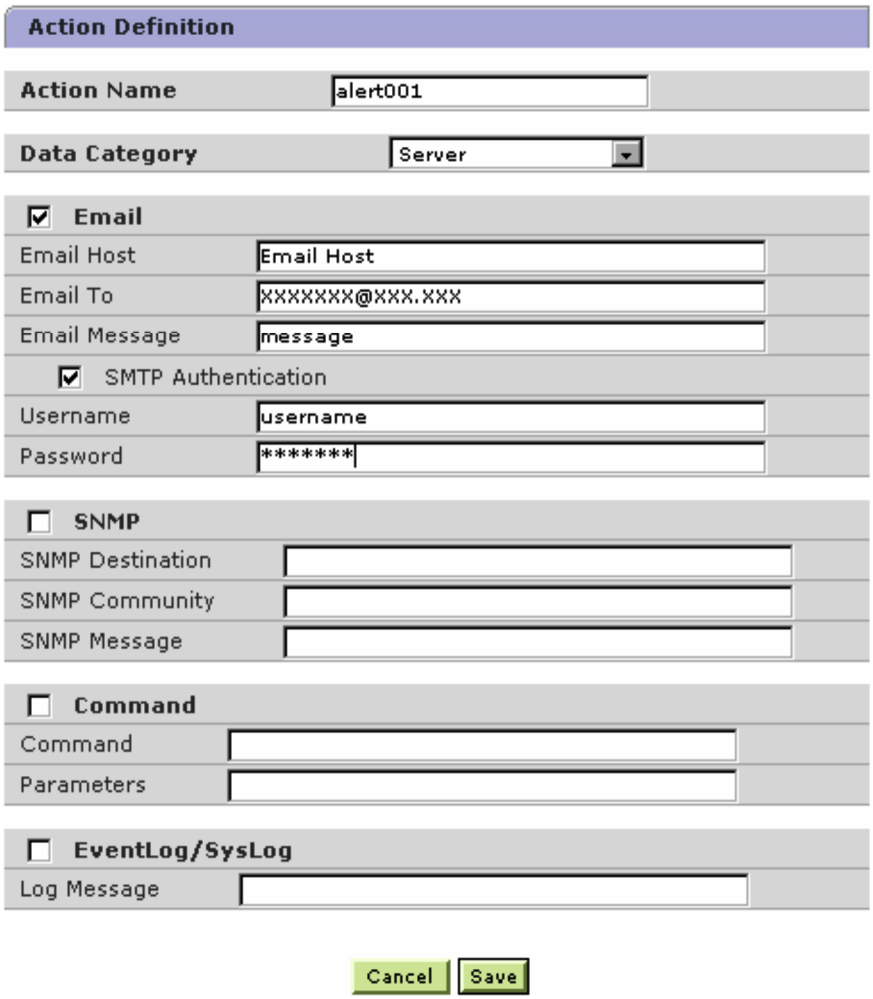


Figure 6.3 The Alert Action Settings Window

5. Determine which of the actions you want executed upon this alert event. You may specify one or more:
   - **Email**-Sends a message to an SMTP server.

     (You can also specify authentication if your SMTP server requires this. Check the **SMTP Authentication** checkbox and fill in User ID and Password.)
   - **SNMP**-Creates an SNMP trap. See the Glossary. For information on usage with SNMP management applications, see section 6.5.8.
   - **Command**-Executes an OS-level script or program.
   - **EventLog/Syslog**-Sends an alert message to the event log or system log.

     (In a Windows environment, the message is sent to the event log. In a Solaris environment, the message is sent to `/var/adm/message` by default.)
6. Fill in the window with appropriate values. See section 6.2.2.2.
7. Click **Save** to add this Action Definition (or click **Cancel** to abandon this window).

6.2.2.2 Alert Action Definition Fields

Table 6.5 Alert Action Settings Fields

Name	Description
Action Name	Unique name for this alert action.
Data Category	From the combo box, select the resource type that triggers the alert action. You can select the following resource types: ▪ Server ▪ Filesystem ▪ Device File ▪ Storage Subsystem ▪ Storage Port ▪ Logical Disk ▪ Array Group ▪ CLPR ▪ Oracle Instance ▪ Tablespace ▪ Data File ▪ Switch ▪ Switch Port

Name		Description
Email	Email Host	SMTP email server host to receive the alert message.
	Email To	This will become the TO field in generated email alerts.
	Email Message	Body of the alert email message. Messages can use Alert Message Variables see section 6.2.2.3.
	SMTP Authentication	If your SMTP server requires authentication for submissions, check the checkbox and fill in the two login fields: ▪ **User ID**: Specify the SMTP user account name. ▪ **Password**: Specify the password.
SNMP	SNMP Destination	Which resource to direct the SNMP notification to.
	SNMP Community	The name of the SNMP grouping.
	SNMP Message	Text message to accompany the alert information in the SNMP trap. Messages can use Alert Message Variables see section 6.2.2.3.
Command	Command	Path to any desired command to be executed upon an alert event.
	Parameters	Argument(s) to the command (if needed).
EventLog/SysLog	EventLog/SysLog	Check this checkbox to activate an operating system log entry.
	Log Message	Enter a string with embedded variables to be inserted in the operating system log. Messages can use Alert Message Variables see section 6.2.2.3.

6.2.2.3 Alert Message Variables

Tuning Manager can display data values as a part of email messages or SNMP messages. To make use of this feature, you embed one or more variables in a message string. At runtime, the alert handler substitutes your embedded variable references with the current values. See Table 6.6 for the full list.

- Each variable must be prefixed by two successive % characters.
- Variables are not case-sensitive.
- Variables must be followed by at least one space character.

Example:

Alert: %%HostName only has %%Free free out of a total capacity of %%Capacity.

Table 6.6 shows the alert message variables, categorized by resource type.

Table 6.6 Alert Message Variables Categorized by Resource Type

Resource	Variables (not case sensitive)	
Server	▪ HostName ▪ IPAddress ▪ OS ▪ Memory ▪ CPU% ▪ Capacity ▪ Free ▪ Free% ▪ IOPS	▪ WriteIOPS ▪ ReadIOPS ▪ Transfer ▪ ReadTransfer ▪ WriteTransfer ▪ GrowthRate ▪ LocalFilesystems ▪ ImportedFilesystems ▪ DeviceFiles
Filesystem	▪ MountPoint ▪ LogicalDevice ▪ DiskGroup ▪ Capacity	▪ Free ▪ Free% ▪ GrowthRate ▪ Inodes
Device File	▪ Name ▪ IOPS ▪ ReadIOPS ▪ WriteIOPS	▪ Transfer ▪ ReadTransfer ▪ WriteTransfer ▪ IOResponseTime

Resource	Variables (not case sensitive)	
Storage Subsystem	▪ SerialNumber ▪ ProductName ▪ VendorID ▪ CacheCapacity ▪ CacheUsage ▪ Cache% ▪ PortMaxIOPS ▪ PortMinIOPS ▪ PortIOPS ▪ PortMaxTransfer ▪ PortMinTransfer ▪ PortTransfer	▪ DiskIOPS ▪ DiskReadIOPS ▪ DiskWriteIOPS ▪ DiskTransfer ▪ DiskReadTransfer ▪ DiskWriteTransfer ▪ WritePendingRate ▪ MaxWritePendingRate ▪ SideFileUsage ▪ MaxSideFileUsage ▪ Ports ▪ ArrayGroups ▪ LogicalDisks
Storage Port	▪ Name ▪ Subsystem.SerialNumber ▪ Subsystem.VendorID ▪ Subsystem.ProductName ▪ PortMaxIOPS ▪ PortMinIOPS ▪ PortIOPS	▪ PortMaxTransfer ▪ PortMinTransfer ▪ PortTransfer
CLPR	▪ CacheCapacity ▪ WritePendingRate ▪ MaxWritePendingRate	▪ SideFileUsage ▪ MaxSideFileUsage ▪ Name
Array Group	▪ Name ▪ RaidLevel ▪ DiskIOPS ▪ DiskReadIOPS ▪ DiskWriteIOPS ▪ DiskRandomIOPS ▪ DiskSequentialIOPS ▪ DiskTransfer	▪ DiskReadTransfer ▪ DiskWriteTransfer ▪ DiskRandomTransfer ▪ DiskSequentialTransfer ▪ ReadHitRatio ▪ WriteHitRatio ▪ IOUsage ▪ MaxIOUsage
Logical Disk	▪ Name ▪ Model ▪ Subsystem ▪ SerialNumber ▪ Subsystem.VendorID ▪ Subsystem.ProductName ▪ DiskIOPS ▪ DiskReadIOPS ▪ DiskWriteIOPS ▪ DiskRandomIOPS	▪ DiskSequentialIOPS ▪ DiskTransfer ▪ DiskReadTransfer ▪ DiskWriteTransfer ▪ DiskRandomTransfer ▪ DiskSequentialTransfer ▪ IOResponseTime ▪ ReadIOResponseTime ▪ WriteIOResponseTime ▪ ArrayGroup.Name

Resource	Variables (not case sensitive)	
Switch	▪ Model ▪ Vendor ▪ Name ▪ TransferredBytes ▪ ReceivedFrames ▪ TransferredFrames ▪ InputBufferFull	▪ SwitchWWN ▪ DomainID ▪ Ports ▪ PortModules ▪ ReceivedBytes ▪ BufferCreditZeroState ▪ FabricName
Switch Port	▪ PortModule ▪ PortNumber ▪ PortType ▪ PortSpeed ▪ PortWWN ▪ BufferCreditZeroState ▪ ReceivedBytes ▪ TransferredBytes	▪ ReceivedFrames ▪ TransferredFrames ▪ InputBufferFull ▪ Switch.Name ▪ Switch.Model ▪ Switch.Vendor ▪ Switch.SwitchWWN ▪ Switch.FabricName
Oracle Instance	▪ Name ▪ Version ▪ Host ▪ Capacity ▪ Free ▪ Usage ▪ Free%	▪ GrowthRate ▪ DataFiles ▪ TableSpaces ▪ IOPS ▪ WriteIOPS ▪ ReadIOPS
Tablespace	▪ Name ▪ Capacity ▪ Free ▪ Usage ▪ Free% ▪ GrowthRate	▪ DataFiles ▪ RollbackSegments ▪ SortSegments ▪ IOPS ▪ WriteIOPS ▪ ReadIOPS
Data File	▪ Name ▪ Size	▪ IOPS ▪ WriteIOPS ▪ ReadIOPS

Table 6.7 shows alert message variables that provide names and values:

Table 6.7 Alert Message Variables Providing Names and Values

Type		Variables (not case sensitive)
Data Category	Filesystem	Server.HostName Server.IPAddress
	Device File	Server.HostName Server.IPAddress
	Tablespace	OracleInstance.Name
	Data File	TableSpace.Name TableSpace.OracleInstance.Name
Alert Types	The metric on which the alert is defined	METRIC
	Date & Time of the alert	DATE
	The level of alert (OK, Warning, Critical)	LEVEL
	Alert event threshold	THRESHOLD
	The comparison operator against which the threshold is measured (=, >, <, >=, <=)	OPERATOR
	Actual value of the metric when the alert occurred	VALUE

6.2.3 Binding Alerts

Binding is the final step in setting up an alert. The two types of binding for an alert are as follows:

- Binding to a single resource
- Using bind propagation (for multiple resources)

6.2.3.1 Binding to a Single Resource

To bind an alert to the resource category and action:

1. Click **Explorer** and then **Alert**.
2. In **Resource Tree** in the Navigation area, select the correct resource category you want to monitor.
3. In the Tab area, click the **Bind** tab.

   A list of bound alerts appears. See Figure 6.4.
4. To move through the list, click **Next** or **Previous**. When multiple subtables are available for display, you can jump directly to each section of the table. Numbered hyperlinks appear for this purpose.

5. Click **Bind Alert**.

   The Alert Activation 1 window appears. See Figure 6.5.

6. Click the radio button for the alert you want to bind.

7. Click **Next**.

   The Alert Activation 2 window appears. See Figure 6.6.

8. (Optional) To view an alert definition, click the hyperlink for the alert name.

9. Notification type: Specify whether this alert condition will be set to notify repeatedly while the condition is met (**Always**) or one time only (**Once Per Condition**). See Figure 6.7

   Note: If you choose **Once per condition** you must manually reset the alert after it has been triggered. If you do not reset the alert, there will be no further notifications. For more information, see section 6.5.7.

10. You can choose which actions happen under each of the possible alert states (OK, Critical and Warning).

11. (Optional) To view the definition for your chosen action, click the hyperlink for the Action Name.

12. To assign a given action to a specific state, click the alert state checkbox(es) for the actions you want performed. See Figure 6.8.

13. Click **Save** to complete activation. (Click **Cancel** to abandon this operation.)

    The Confirmation window appears.

14. Click **Close** to close the Confirmation window.

Storage

Resource Tree > **Storage**

View | Define | Action | **Bind** | Reset

Bound Alerts : Storage

Showing 1 - 10 of 12 | 1 2 | Next->

Alert Name	Resource	Data Category	Warning Condition	Critical Condition	Remarks	Action Links
alert0001	Storage	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%	n/a	Edit , Unbind
alert0001	USP(14050) > SLPR0 > CLPRs > CLPR0	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%	n/a	Edit , Unbind , Test
alert0001	TagmaStore AMS500 (6.0)(4527) > CLPRs > 0	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%	n/a	Edit , Unbind , Test
alert0001	USP(6.0)(55014) > SLPR0 > CLPRs > 2	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%	n/a	Edit , Unbind , Test
alert0001	USP(6.0)(55014) > SLPR0 > CLPRs > CLPR0	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%	n/a	Edit , Unbind , Test
alert0750	Storage	CLPR	Max Side File Usage > 25.0%	Max Side File Usage > 35.0%	n/a	Edit , Unbind
alert0750	USP(14050) > SLPR01 > CLPRs > CLPR1	CLPR	Max Side File Usage > 25.0%	Max Side File Usage > 35.0%	n/a	Edit , Unbind , Test
alert0750	USP(14050) > SLPR0 > CLPRs > CLPR0	CLPR	Max Side File Usage > 25.0%	Max Side File Usage > 35.0%	n/a	Edit , Unbind , Test
alert0750	TagmaStore AMS500 (6.0)(4527) > CLPRs > 0	CLPR	Max Side File Usage > 25.0%	Max Side File Usage > 35.0%	n/a	Edit , Unbind , Test
alert0750	USP(6.0)(55014) > SLPR0 > CLPRs > 2	CLPR	Max Side File Usage > 25.0%	Max Side File Usage > 35.0%	n/a	Edit , Unbind , Test

Bind Alert

Figure 6.4 List of Bound Alerts

Alert Definitions : Storage

Showing 1 - 8 of 8

	Alert Name	Data Category	Warning Condition	Critical Condition
○	alert0001_a_001	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%
○	alert0001_b_001	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%
○	alert0001_b_010	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%
○	alert0010	Logical Disk	Write I/O Response Time = 10.00 ms	Write I/O Response Time = 10.00 ms
○	alert0010_a_0001	Array Group	I/O Usage < 20.0%	I/O Usage < 30.0%
○	alert0020	Storage Port	Port Min Transfer <= 10.00 KB	Port Min Transfer <= 20.00 KB
○	alert0100	Storage Subsystem	Cache % >= 50.0%	Cache % >= 90.0%
○	alert0500	CLPR	Max Write Pending Rate <= 10.0%	Max Write Pending Rate <= 15.0%

Cancel | Next->

Figure 6.5 The Alert Activation 1 Window

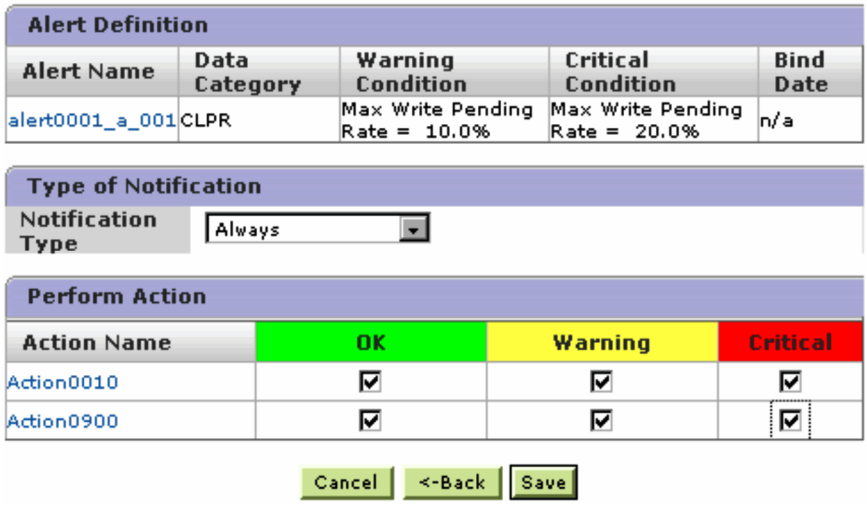


Figure 6.6 The Alert Activation 2 Window

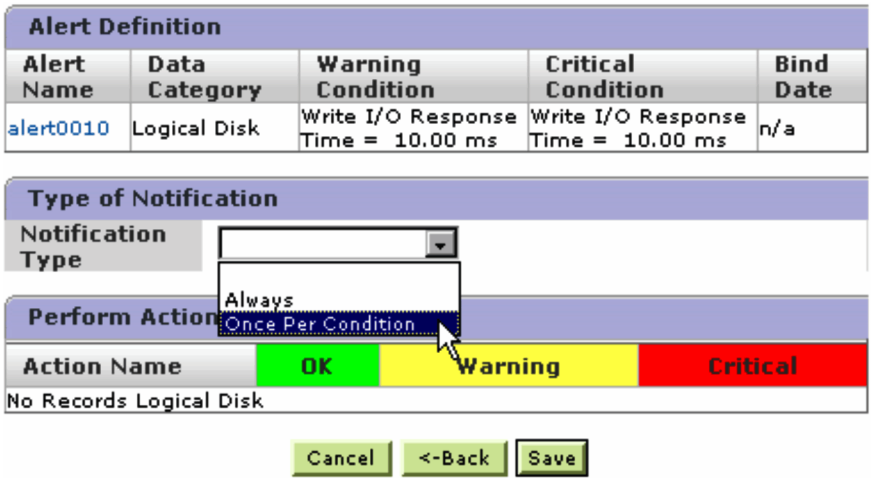


Figure 6.7 Selecting the Notification Type

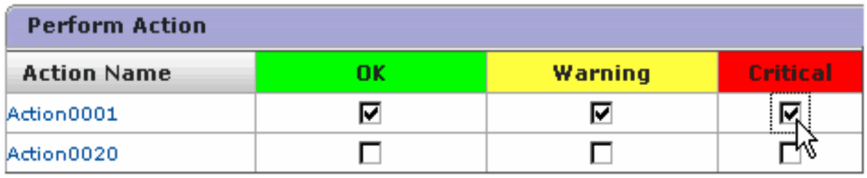


Figure 6.8 Selecting Alert States

6.2.3.2 Using Bind Propagation (for Multiple Resources)

When you want to bind multiple resources sharing the same parent, bind propagation is more productive than selecting one resource at a time.

Example: You want to bind an alert to all filesystems found on all servers on a given subnetwork.

1. Define an alert. See section 6.2.1.

   In this example you would set the Data Category to Filesystem. This will ensure that filesystems are being monitored for the alert condition.

2. Create an alert action. See section 6.2.2.

3. In the tree in the Navigation area, navigate to the subnetwork level. See Figure 6.9.

4. Bind the alert definition and alert action. See section 6.2.3.

   Tuning Manager will propagate this binding to all filesystems within that subnetwork.

Note: If you use bind propagation, you must unbind resources at the same parent level. For more information, see section 6.5.2.2.

Figure 6.9 Navigating to the Subnetwork Level in the Resource Tree

6.3 Testing Alerts

This function gives you a way to test the appropriateness of an alert you have already defined and bound. You supply values that should either trigger the alert or should fall outside of its monitored range. Alerts that are triggered by testing are not displayed in the Alert History.

Note: Manager or Administrator privileges are required to test alerts.

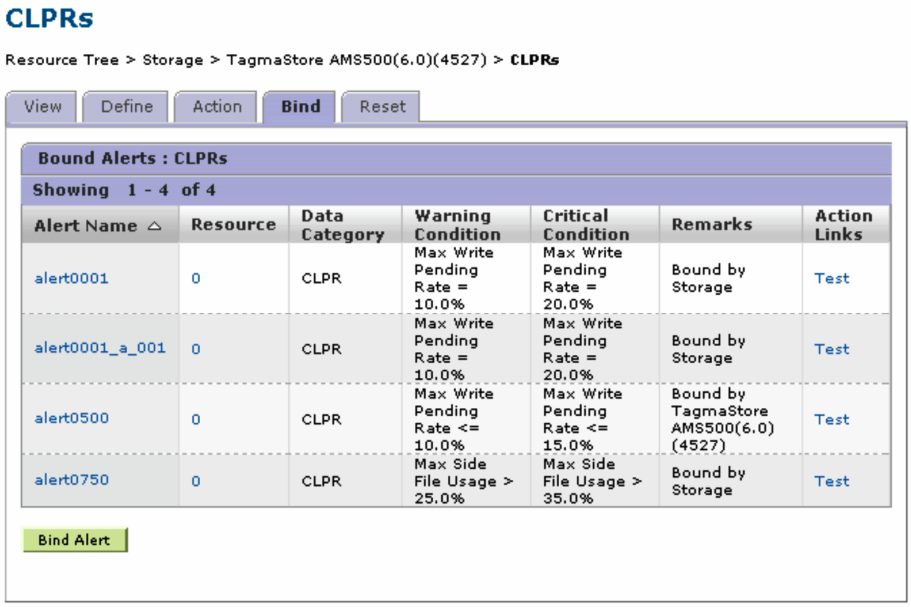
To test an alert you have already bound:

1. Display the **Bind** window for **Alert**.
2. In the Tab area, click the **Bind** tab.

   The bound alerts list is displayed. See Figure 6.10.
3. Click **Test** for the specific alert.

   The Alert Activation Test window is displayed.
4. Specify a value. This value will be compared to each of the conditions in your alert definition.
5. Click **Test**.

   The result of the test is displayed in a popup status window. See Figure 6.11.
6. Click **Close** to remove the popup window.



Alert Name	Resource	Data Category	Warning Condition	Critical Condition	Remarks	Action Links
alert0001	0	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%	Bound by Storage	Test
alert0001_a_001	0	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%	Bound by Storage	Test
alert0500	0	CLPR	Max Write Pending Rate <= 10.0%	Max Write Pending Rate <= 15.0%	Bound by TagmaStore AMS500(6.0)(4527)	Test
alert0750	0	CLPR	Max Side File Usage > 25.0%	Max Side File Usage > 35.0%	Bound by Storage	Test

Figure 6.10 The Bound Alerts List

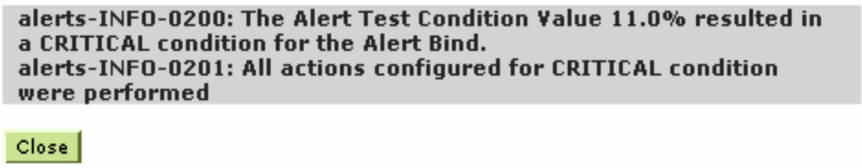


Figure 6.11 The Alert Test Status Window

6.4 Viewing Alerts

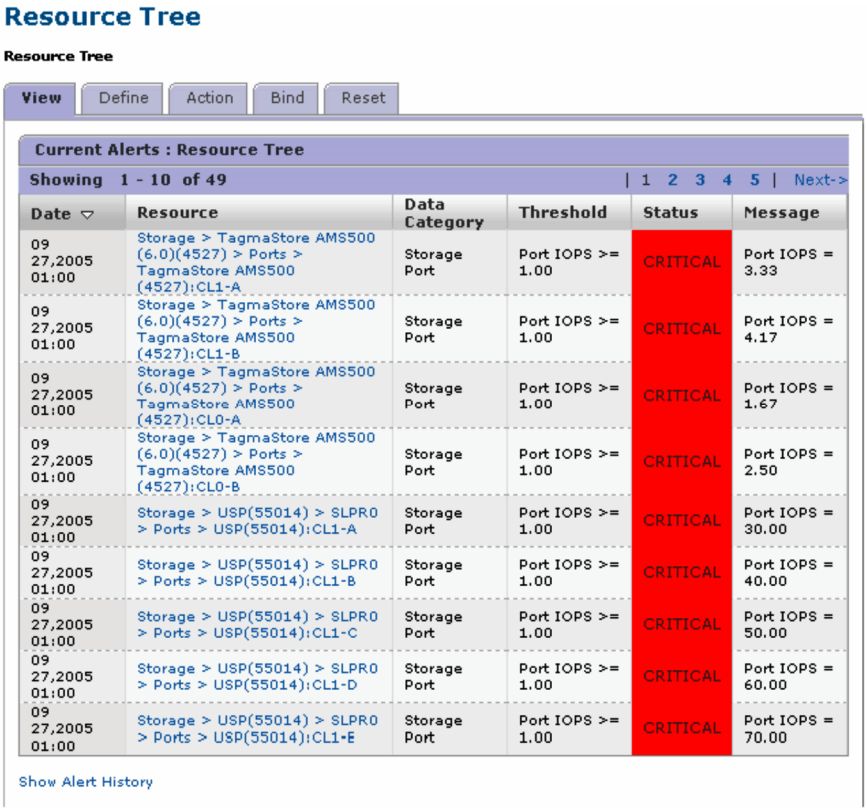
Alerts that have already been reported can be displayed in a table format.

To view an alert:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **View** tab.

   The Alerts list is displayed. See Table 6.8 for a description of displayed information.

   Note: Displayed values do not always indicate that an alert condition has been reached. For more information, see section 6.6.



Resource Tree

Resource Tree

View | Define | Action | Bind | Reset

Current Alerts : Resource Tree

Showing 1 - 10 of 49 | 1 2 3 4 5 | Next->

Date	Resource	Data Category	Threshold	Status	Message
09 27,2005 01:00	Storage > TagmaStore AMS500 (6.0)(4527) > Ports > TagmaStore AMS500 (4527):CL1-A	Storage Port	Port IOPS >= 1.00	CRITICAL	Port IOPS = 3.33
09 27,2005 01:00	Storage > TagmaStore AMS500 (6.0)(4527) > Ports > TagmaStore AMS500 (4527):CL1-B	Storage Port	Port IOPS >= 1.00	CRITICAL	Port IOPS = 4.17
09 27,2005 01:00	Storage > TagmaStore AMS500 (6.0)(4527) > Ports > TagmaStore AMS500 (4527):CL0-A	Storage Port	Port IOPS >= 1.00	CRITICAL	Port IOPS = 1.67
09 27,2005 01:00	Storage > TagmaStore AMS500 (6.0)(4527) > Ports > TagmaStore AMS500 (4527):CL0-B	Storage Port	Port IOPS >= 1.00	CRITICAL	Port IOPS = 2.50
09 27,2005 01:00	Storage > USP(55014) > SLPR0 > Ports > USP(55014):CL1-A	Storage Port	Port IOPS >= 1.00	CRITICAL	Port IOPS = 30.00
09 27,2005 01:00	Storage > USP(55014) > SLPR0 > Ports > USP(55014):CL1-B	Storage Port	Port IOPS >= 1.00	CRITICAL	Port IOPS = 40.00
09 27,2005 01:00	Storage > USP(55014) > SLPR0 > Ports > USP(55014):CL1-C	Storage Port	Port IOPS >= 1.00	CRITICAL	Port IOPS = 50.00
09 27,2005 01:00	Storage > USP(55014) > SLPR0 > Ports > USP(55014):CL1-D	Storage Port	Port IOPS >= 1.00	CRITICAL	Port IOPS = 60.00
09 27,2005 01:00	Storage > USP(55014) > SLPR0 > Ports > USP(55014):CL1-E	Storage Port	Port IOPS >= 1.00	CRITICAL	Port IOPS = 70.00

Show Alert History

Figure 6.12 The Alerts List

The View Alerts list displays the information described in Table 6.8.

Table 6.8 View Alert Data

Column	Description
Record Taken	The date and time for the occurrence of the alert condition.
Resource	The resource associated with the alert.
Data Category	The resource type responsible for generating the alert: ▪ Server ▪ Filesystem ▪ Device File ▪ Storage Subsystem ▪ Storage Port ▪ Array Group ▪ Logical Disk ▪ Oracle Instance ▪ Tablespace ▪ Data File ▪ Switch ▪ Switch Port ▪ CLPR
Threshold	The threshold condition for which the alert was triggered, according to the value in the Status field. ▪ If the status is Critical, the critical threshold statement is shown. ▪ If the status is Warning, the warning threshold statement is shown. ▪ If the status is OK, the lowest threshold statement is shown. By default, the Warning statement is shown. If Warning is not set, the Critical statement is shown.
Status	The status of the resource at the alert time. ▪ Red: critical ▪ Yellow: warning ▪ Green: OK ***Note***: Have you configured an alert as once per condition? If a Warning or Critical status has been reached, you can reset the agent status.
Message	The value of the metric that triggered the alert in the format *metric* = *value*.

6.4.1 Sorting the View Alerts List

To sort the Alerts List, click the column heading for the column you want to sort.

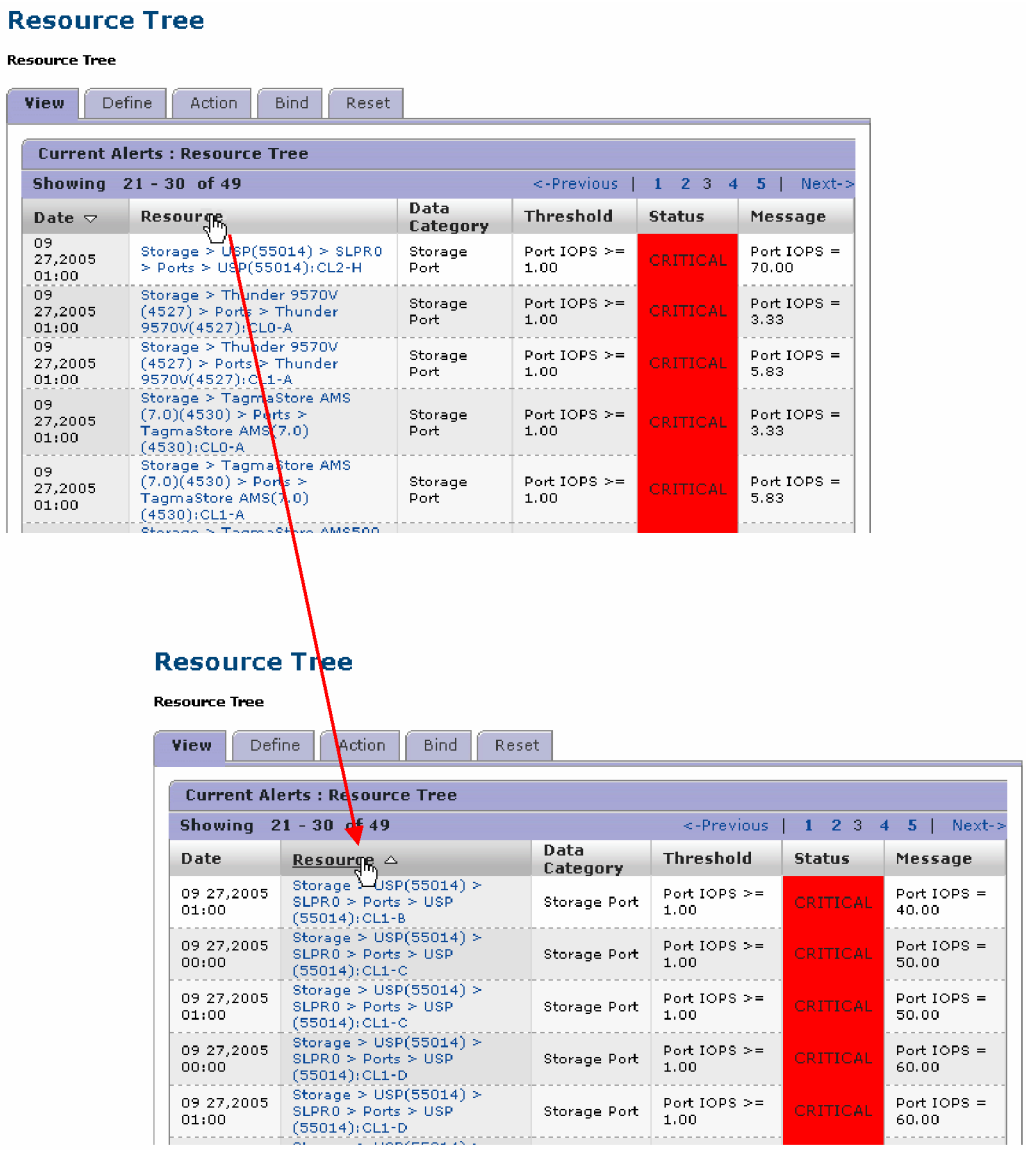


Figure 6.13 Sorting a Column of Alerts

6.4.2 Displaying an Alert History

Note: Displayed values do not always indicate that an alert condition has been reached. For more information, see section 6.6.

Older alert occurrences are deleted in the Tuning Manager database when they fall outside the limits of the **Alert Retention Period** settings of **Data Retention** in **Administration,** accessed from the **Explorer** menu. To find out how long your site's database retains data, ask your system administrator.

To display the list of the past alert notifications:

1. Click **Explorer** and then **Alert**.
2. In the Information area, click the **Show Alert History** link.
3. To move through the list, click **Next** or **Previous**. When multiple subtables are available for display, you can jump directly to each section of the table. Numbered hyperlinks appear for this purpose.
4. Click **Close** to close the window.

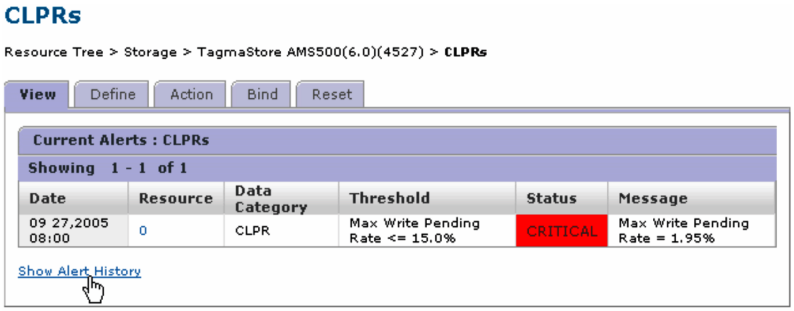


Figure 6.14 The Alert History List

The Alert History window appears.

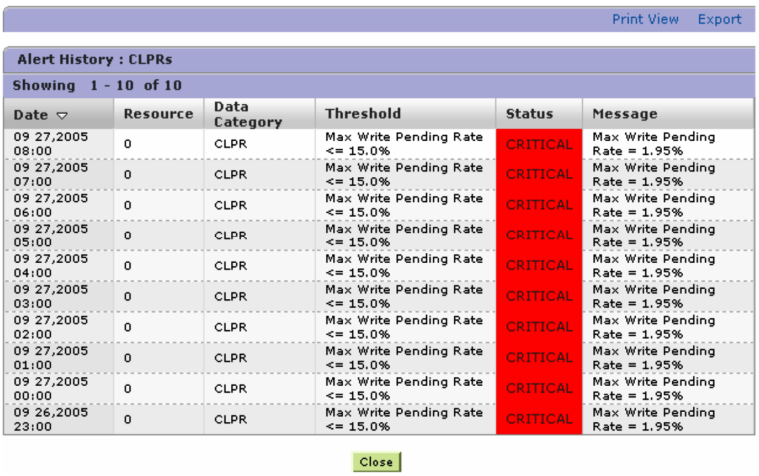


Figure 6.15 The Alert History Window

6.5 Editing an Alert Definition

You edit an alert definition when you want to:

- change the set thresholds for alerts
- modify the actions taken when the value reaches the threshold
- set a new alert by using an existing alert

You can edit or copy the set alerts, if needed.

Note: This activity requires Manager or Administrator privileges.

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **Define** tab.

   The Alerts list appears.
3. To move through the list, click **Next** or **Previous**. When multiple subtables are available for display, you can jump directly to each section of the table. Numbered hyperlinks appear for this purpose.
4. Click the hyperlink for the alert you wish to edit.

   The Alert Setting 1 window appears.

   Note: The data category cannot be changed if this alert is currently bound.
5. Change fields as necessary in this window. Table 6.3 in section 6.2.1.
6. Click **Next**.

   The Alert Setting 2 window appears.

   Note: Displayed values do not always indicate that an alert condition has been reached. For more information, see section 6.6.
7. Change fields as necessary in this window. Table 6.4 in section 6.2.1.
8. Click **Save** (or click **Cancel** to abandon changes).

   Note: Defining an alert is similar to adding one. For detailed information, see section 6.2.1.

6.5.1 Editing Alert Bindings

To edit a bound alert:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **Bind** tab. See Figure 6.16.

   The Alerts list appears.
3. Click **Edit** in **Action Links** for the alert you want to alter. See Figure 6.17.

   The Alert Activation 2 window appears. See Figure 6.18.
4. Make the desired changes, then click **Save** to retain them.

   The Confirmation window appears.
5. Click **Close** to continue.

Note: If an alert was bound through propagation at a higher level, you cannot unbind directly at the lowest levels of **resource tree** impacted by the original binding. You must return to the level where you performed the binding.

You may edit an alert definition at its own resource level (regardless of the level at which you bound the alert).

The Alerts list indicates the origin of the binding. For more information, see section 6.5.2.2.

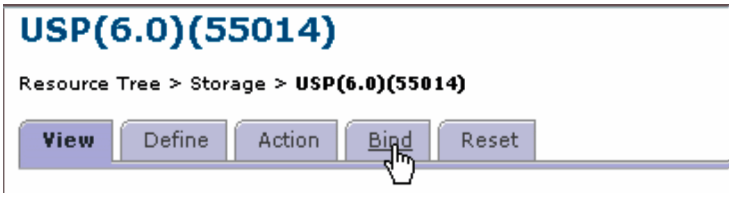


Figure 6.16 The Bind Link for Alerts

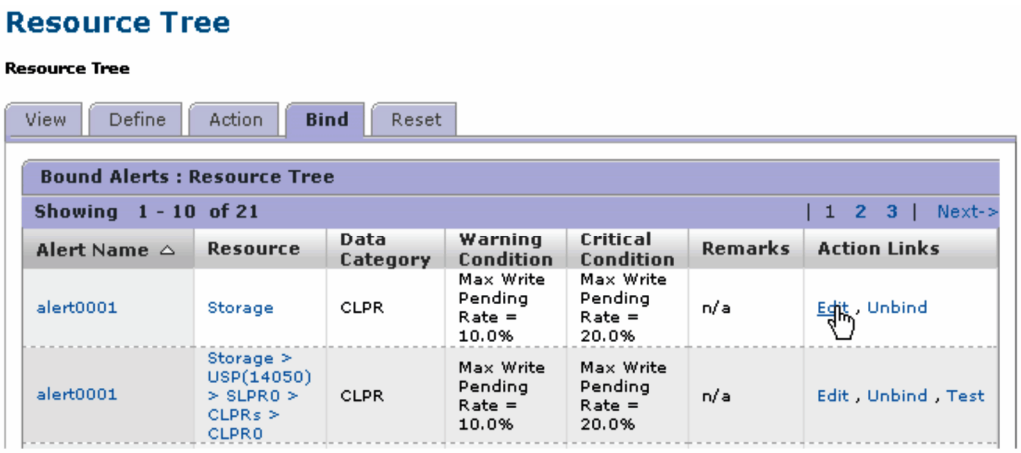


Figure 6.17 The Alerts List

Alert Definition

Alert Name	Data Category	Warning Condition	Critical Condition	Bind Date
alert0500	CLPR	Max Write Pending Rate <= 10.0%	Max Write Pending Rate <= 15.0%	09 26,2005 20:33

Type of Notification

Notification Type

Perform Action

Action Name	OK	Warning	Critical
Action0010	☐	☐	☐
Action0900	☐	☐	☐

Cancel Save

Figure 6.18 The Second Alert Definition Window

6.5.2 Unbinding Alerts

6.5.2.1 Unbinding an Alert that is Bound to a Single Resource

To unbind an alert:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **Bind** tab. See Figure 6.19.

   A list of bound alerts appears.
3. To move through the list, click **Next** or **Previous**. When multiple subtables are available for display, you can jump directly to each section of the table. Numbered hyperlinks appear for this purpose.
4. Click **Unbind** for the Alert Name you have chosen to unbind. See Figure 6.20.

   The Confirmation window appears.
5. Click **Close** to close the Confirmation window.

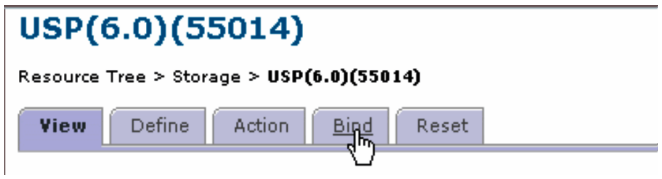


Figure 6.19 The Bind Link for Alerts

Figure 6.20 Unbinding an Alert

6.5.2.2 Unbinding Propagated Alerts

If an alert was bound through propagation at a higher level, you can only unbind that alert by returning to the originating level of **resource tree**. When an alert is the result of propagation, the Alerts list displays the originating level (see the **Remarks** column):

To unbind a propagated alert:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **Bind** tab.
3. Click **Bind**. See Figure 6.21.
4. In **Resource Tree**, navigate to the level where the alert was bound.
5. Click **Unbind** for the alert.

   A Confirmation window is displayed.
6. Click **OK** to proceed with unbinding. (Or click **Cancel** to abandon unbinding.)

   The Confirmation window appears.
7. Click **Close** to close the Confirmation window.

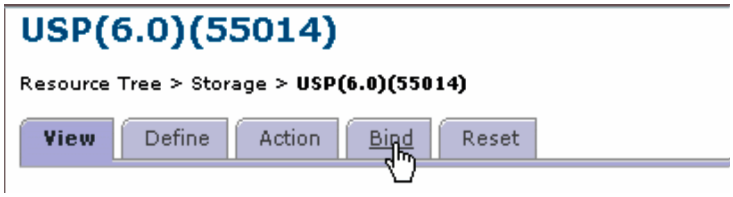


Figure 6.21 The Bind Link for Alerts

6.5.3 Copying Alerts

To copy an alert:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **Bind** tab.

   The Alerts list appears. See Figure 6.22.
3. To move through the list, click **Next** or **Previous**. When multiple subtables are available for display, you can jump directly to each section of the table. Numbered hyperlinks appear for this purpose.
4. Click **Copy** for the alert you wish to copy.

   The Alert Setting 1 window appears with the same settings as the alert you chose.
5. Change any relevant settings in this window.
6. Click **Next** to proceed to the second alert setting window.

   The Alert Setting 2 window appears.
7. Change any relevant settings in this window.

8. Click **Save**.

   The Information area refreshes to include the newly copied alert definition.

Alert Name	Data Category	Warning Condition	Critical Condition	Action Links
alert0001	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%	Delete , Copy
alert0001_a_001	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%	Delete , Copy
alert0001_b_001	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%	Delete , Copy
alert0001_b_010	CLPR	Max Write Pending Rate = 10.0%	Max Write Pending Rate = 20.0%	Delete , Copy
alert0010	Logical Disk	Write I/O Response Time = 10.00 ms	Write I/O Response Time = 10.00 ms	Delete , Copy
alert0010_a_0001	Array Group	I/O Usage < 20.0%	I/O Usage < 30.0%	Delete , Copy
alert0020	Storage Port	Port Min Transfer <= 10.00 KB	Port Min Transfer <= 20.00 KB	Delete , Copy
alert0100	Storage Subsystem	Cache % >= 50.0%	Cache % >= 90.0%	Delete , Copy
alert0500	CLPR	Max Write Pending Rate <= 10.0%	Max Write Pending Rate <= 15.0%	Delete , Copy
alert0750	CLPR	Max Side File Usage > 25.0%	Max Side File Usage > 35.0%	Delete , Copy

Figure 6.22 The Alerts List

6.5.4 Deleting Alerts

To delete alerts:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **Define** tab.

   The Alerts list appears.
3. To move through the list, click **Next** or **Previous**. When multiple subtables are available for display, you can jump directly to each section of the table. Numbered hyperlinks appear for this purpose.
4. Click **Delete** in **Action Links** for the alert you wish to remove. See Figure 6.23.

   A confirmation window is displayed.

   Note: If the alert is already bound, you must first unbind the alert before deleting it.
5. Click **OK** to proceed with deletion. (Or click **Cancel** to abandon deletion.)

   The Confirmation window appears.
6. Click **Close** to close the Confirmation window.

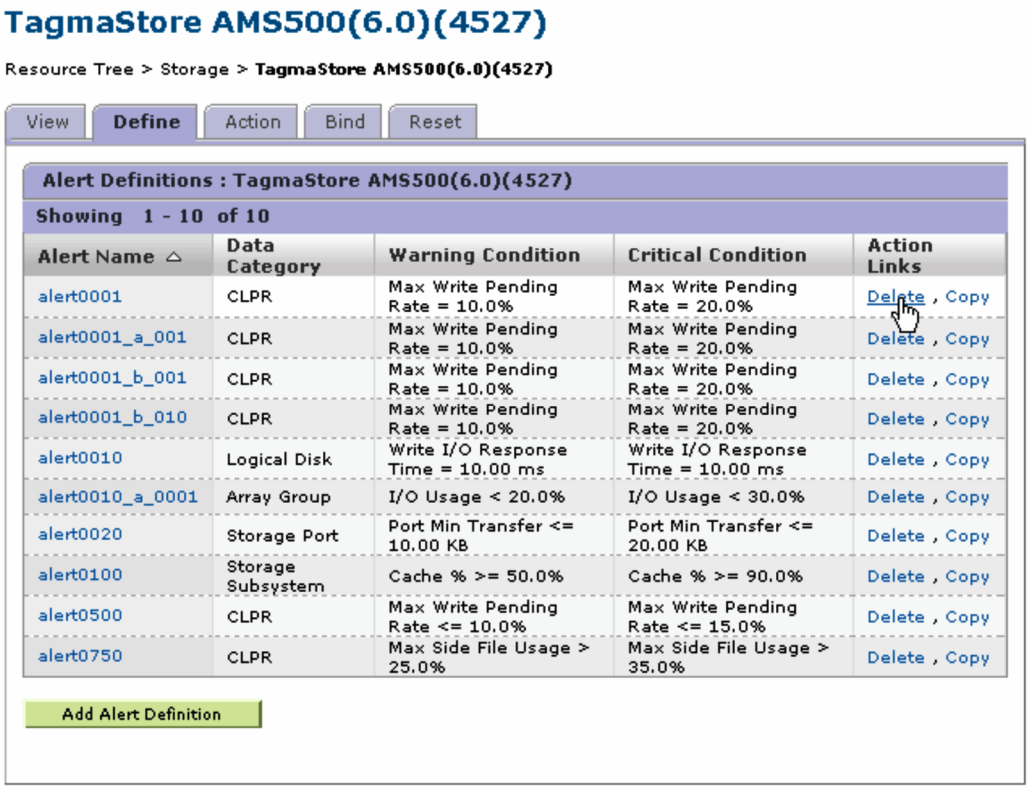


Figure 6.23 Deleting an Alert

6.5.5 Copying Alert Actions

To copy an alert action:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **Action** tab.

   The Alert Actions list appears.
3. To move through the list, click **Next** or **Previous**. When multiple subtables are available for display, you can jump directly to each section of the table. Numbered hyperlinks appear for this purpose.
4. Click **Copy** for the action you want to duplicate.

   The Action Definition window appears for the action. See Figure 6.24.
5. Change any relevant settings in this window. For more information, see section 6.2.2.2.
6. Click **Save**.

   The Application area refreshes to display the newly added alert action.

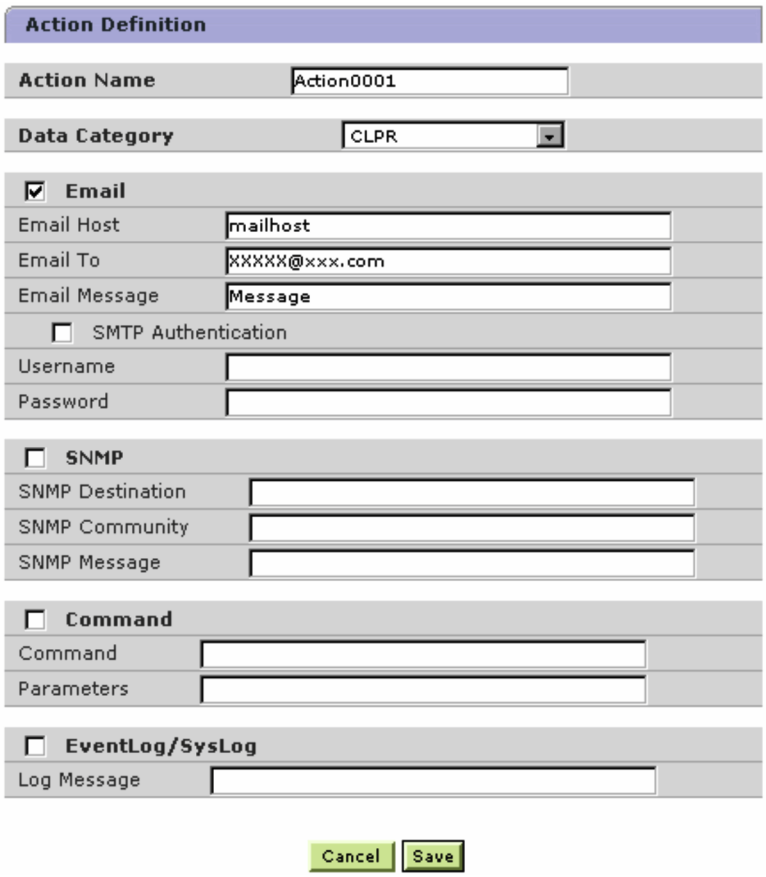


Figure 6.24 The Action Definition Window for Alerts

6.5.6 Deleting Alert Actions

To delete an Alert action:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **Action** tab.

   The Alert Actions list appears.
3. To move through the list, click **Next** or **Previous**. When multiple subtables are available for display, you can jump directly to each section of the table. Numbered hyperlinks appear for this purpose.
4. Click **Delete** for the action you want to remove.

   The Confirmation window appears.
5. Click **Close** to close the Confirmation window.

6.5.7 Resetting Alerts

For alerts with the notification type of **Once per condition**, you will need to reset alerts manually.

To reset an alert:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **Reset** tab.

   The Alert Reset list is displayed. See Figure 6.25.
3. Click the **Reset** hyperlink for the Alert you wish to reset. See Figure 6.26.

   The Confirmation window appears.
4. Click **Close** to continue.

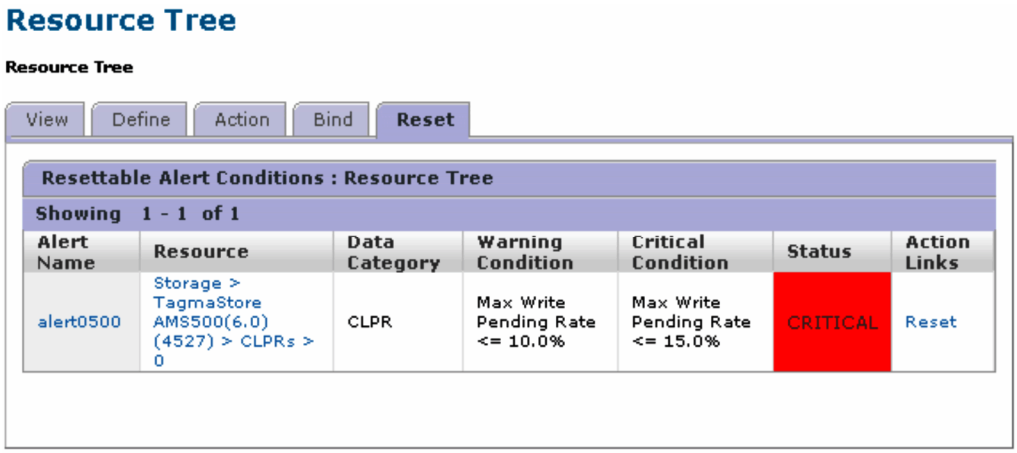


Figure 6.25 The Alert Reset List

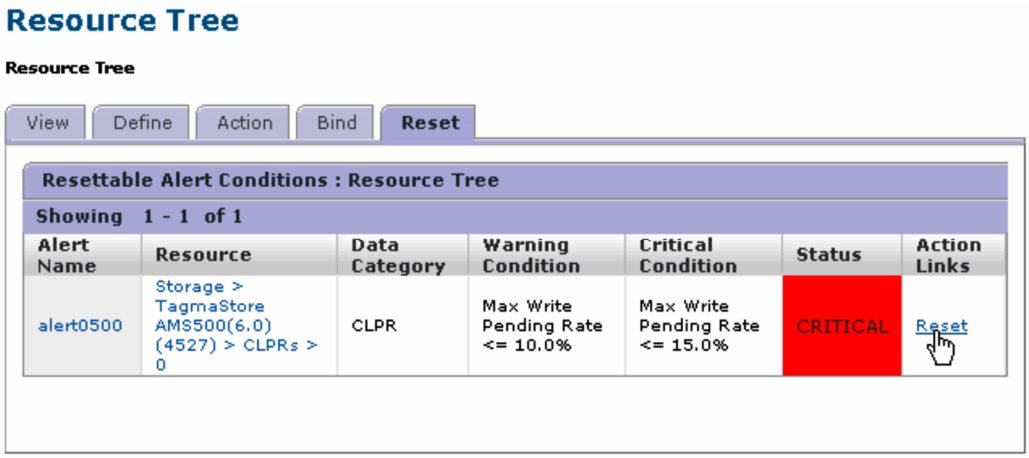


Figure 6.26 Resetting an Alert

6.5.8 Receiving SNMP Alerts

A MIB definition file `HTM-NOTIFICATION-MIB.txt` is included in the filesystem when Tuning Manager is installed. If you are using SNMP management software, you can use the MIB file to properly identify the objects monitored by Tuning Manager.

You can find the MIB file at *Installation directory*`/docs/HTM-NOTIFICATION-MIB.txt`.

The following shows the structure of MIB objects for SNMP traps used by Tuning Manager.

```
iso(1).org(3).dod(6).internet(1).private(4).enterprise(1)

      |

hitachi(116)

      |

systemAP(7)

      |

hiCommand (35)

      |

tuningMgr(1)
```

The contents of the MIB object in Tuning Manager are as follows:

- Object ID

  .1.3.6.1.4.1.116.5.35.1

- Contents

  The user-defined message that was specified during the alert definition.

6.6 Notes on Alerts

Metric Rounding and Alert Condition Evaluation

Throughout Tuning Manager, values are rounded for convenient display. Rounding occurs both for integer and real number values.

Also see the Glossary for **Local Filesystems**, **Filesystem Type**, **Imported Filesystems** and **Filesystems Over Capacity**.

The Tuning Manager database stores collected values at a higher precision and evaluates alert conditions based on those actual values.

As a result, there are circumstances when a displayed value might lead you to believe that you have reached an alert threshold, but Tuning Manager has not actually encountered an alert state.

Example:

- For a given metric, you have specified an alert value of >= 2.5 for Warning Value or Critical Value (see section 6.2.1).
- The value for that metric is collected and then stored in the database as 2.4999.
- The displayed value for the metric is 2.5, (as a result of the standard rounding rule).

Result: No alert is triggered because the actual value (2.4999) has not reached your specified threshold value (>= 2.50).

Chapter 7 Analyzing a Performance Bottleneck

This chapter describes how to analyze performance bottlenecks using Tuning Manager reports, and it provides an example analysis procedure.

- Reviewing Key Points for Analyzing Performance Bottlenecks (see section 7.1)
- Example Analysis Procedure (see section 7.2)

7.1 Reviewing Key Points for Analyzing Performance Bottlenecks

An environment that is integrated by storage consolidation contains many servers and storages, which can present challenges when pinpointing performance bottlenecks. For example, it can be difficult to determine which servers use particular storage and which ports are shared by certain servers. However, by understanding the relationship between the configuration of a monitored system, and the analysis procedure and procedure policies, you can successfully use Tuning Manager to identify and troubleshoot performance degradation.

7.1.1 Understanding the Relationship between the System Configuration and the Analysis Procedure

The analysis of performance information can only be accomplished when you understand the configuration of the system that you are monitoring. To illustrate, Figure 7.1 provides an example system configuration that Tuning Manager is monitoring.

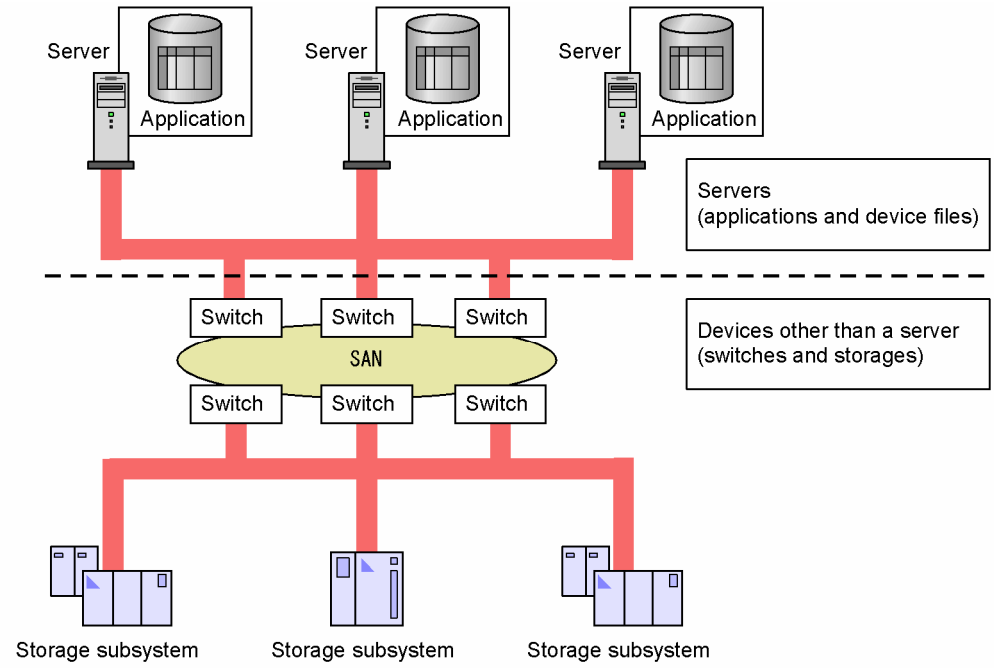


Figure 7.1 Example System Configuration that is Monitored by Tuning Manager

Typically, the locations where performance bottlenecks occur fall into two basic categories:

- Servers (applications and device files)
- Devices other than a server (switches and storages)

If a performance bottleneck occurs in one of your applications, analyze the performance information in the following order:

1. Analyze the performance information for the server running the application.

   If you find the cause of the performance bottleneck, the analysis ends. If you do not find the cause, you can assume that the cause is a device other than a server.

2. Analyze the performance information related to the storages that the application uses.

   Analyze each item of storage-related performance information for the storage port and array group until you are able to determine the cause of the performance bottleneck.

For details on key points for analyzing performance bottlenecks and the analysis procedure, see Table 7.1.

7.1.2 Analysis Procedure Considerations

In performance bottleneck analysis, it is important to determine the order in which resources should be analyzed. Figure 7.2 shows the resources to which performance bottleneck analysis can be applied.

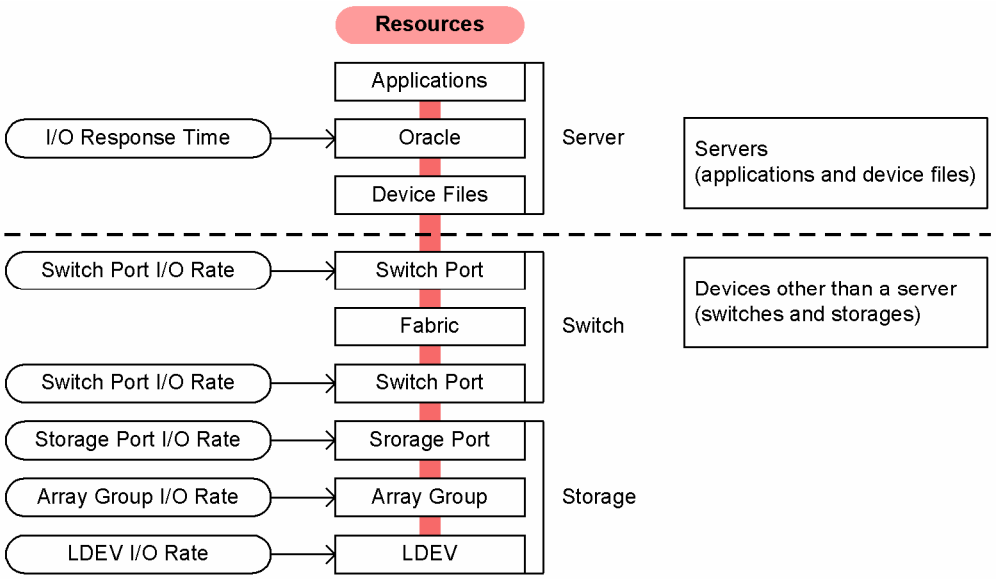


Figure 7.2 Resources to Which Performance Bottleneck Analysis Can Be Applied

Table 7.1 describes performance bottleneck analysis policies and the corresponding analysis procedures.

Table 7.1 Guidelines for Analyzing a Performance Bottleneck

Guideline	Procedure		Location
Check whether the performance bottleneck occurs on a server in the following order: Check the server running the application. Check the resources, other than the server, used by the application. Also use the I/O performance having the most effect on application performance to determine the cause.	1	Display a list of the device files used by the server running the application.	7.2.1.1 Identify the Host Name based on the Oracle Instance 7.2.1.2 Check the I/O Response Time
	2	Check the I/O performance (especially I/O Response Time) for all the device files used by the server. Determine the condition by checking the I/O performance. You can assume that a performance bottleneck occurred on a server in the following cases: ▪ A value has changed rapidly. ▪ When viewed relatively, a value is extremely high.	
I f you do not find any performance bottlenecks on the servers, continue your check by checking locations other than servers. Because storage ports shared by multiple servers are subject to performance bottlenecks, check storage ports. For this check, use the I/O performance of the shared resources to determine the cause.	3	Check the I/O performance of the storage port for a device file.	7.2.1.3 Check Storage Port Performance
	4	If the I/O performance of the server running the application is not a problem, check whether any other servers access the same storage port.	7.2.1.4 Check Connected Server Performance
	5	Check the I/O performance of the other servers.	
	6	Pinpoint any servers placing a heavy load on the storage port.	
	7	If the I/O performance of the storage port is not a problem, check the I/O performance of the array group.	
	8	Check whether any other servers access the same array group.	
	9	Pinpoint any servers that are placing a heavy load on the array group.	

7.2 Example Analysis Procedure

This section provides an example of a performance bottleneck analysis procedure. The example is based on the items described in the previous sections. Figure 7.3 shows the configuration of the system to be monitored in the example.

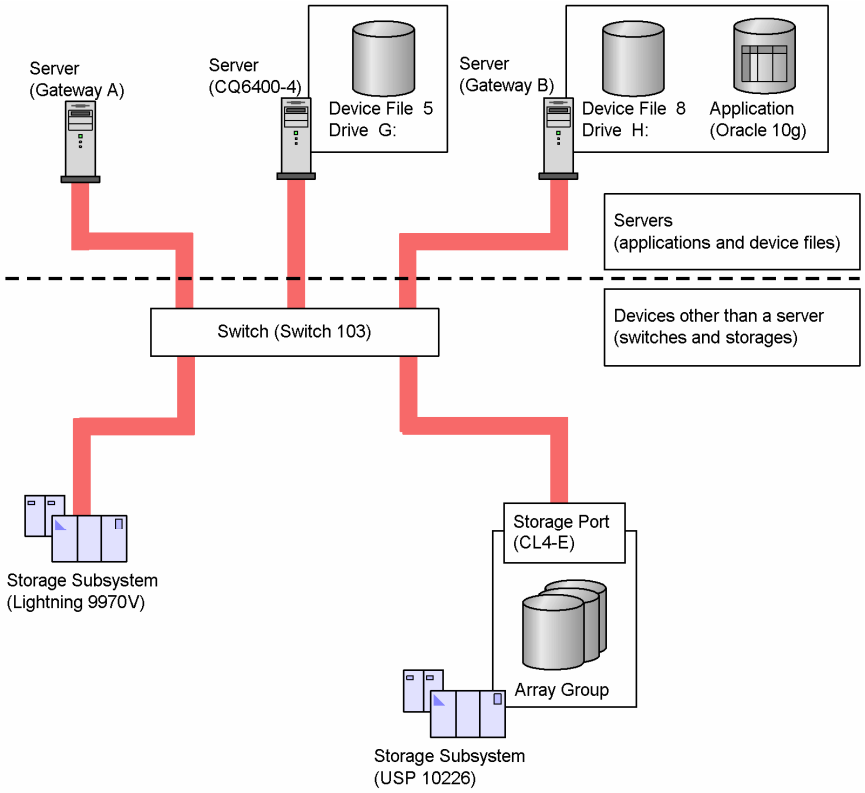


Figure 7.3 Configuration of the System to Be Monitored

Table 7.2 lists the components of the system to be monitored in the example.

Table 7.2 Components of the System to Be Monitored

Component	Name
Server	▪ Gateway A ▪ Gateway B ▪ CQ-6400-4
Switch	Switch 103
Storage	▪ Lightning 9970V ▪ USP 10226

7.2.1 Analyzing the Performance Bottleneck

The following procedures are used to analyze the performance bottleneck.

7.2.1.1 Identify the Host Name based on the Oracle Instance

1. In the Title area of the Application area, choose **Historical Report Window** then specify the time period when the system seemed to run stably.
2. In the Title area in the Application area, choose **Report Window** then specify the time when the problem occurred.
3. In the Explorer area, choose **Resources** and then **Applications**.
4. In the Navigation area, choose **Oracle**.

   A list of Oracle instances appears in the Information area (Sub Resource section). You can see that an instance named *HTM* is running on Gateway B.
5. In the Explorer area, choose **Resources** and then **Hosts**.

7.2.1.2 Check the I/O Response Time

1. In the Navigation area, select **Gateway B**.

   A list of performance information for the host and array on Gateway B appears in the Information area (Sub Resource section).
2. On the **Host/Array Correlation** tab, select **Delta** from the host-side header of the performance information list.

   The rows are sorted in descending order of the delta values (in descending order of the percentage of the Response Time values compared to the Historical Response Time values). You can see that the delta value for device file 8 is the largest.
3. In the Information area (Advanced Information), choose **Device File Performance**.

   The IOPS information for the device file appears in graph form and list form.
4. To start Performance Reporter, choose Global from the Global Tasks Bar area, then **Go**.
5. In the Information frame, choose **User Reports.**

   A list of predefined reports appears.
6. Select **I/O Response Time**.

   The Show Options window appears. For details on how to define the reports to be displayed here, see section 5.11.
7. In the Show Options window, specify the values shown in Table 7.3.

Table 7.3 Settings in the Show Options Window for Checking IDs

Item		Settings
Settings for the report display period	Start Time	To clarify how the performance information changed, specify times before and after the deterioration in Oracle performance seemed to begin.
	End Time	
	Report Interval	`Minute`
Filter	ID	`8` ***Note***: Since you found in step 2 that the I/O Response Time value for device file 8 was the largest of the device files used for Gateway B, specify `8`.
	Disk Bytes/sec	`0` ***Note***: Main Console and Performance Reporter manage different IDs. In this specification, you know that the device file ID in Main Console is `8`, but do not know the ID in Performance Reporter. To display a list of the device file IDs managed by Performance Reporter, specify `0` for Disk Bytes/sec.

I/O Response History appears for all device files on Gateway B.

From the displayed report, check the ID of device file 8.

This example assumes that the ID of device file 8 (checked above) is 8ΔH: (Δ indicates a space).

8. In the Show Options window, specify the values shown in Table 7.4.

Table 7.4 Settings in the Show Options Window for Checking the I/O Response Time

Item		Settings
Settings for the report display period	Start Time	To clarify how the performance information changed, specify times before and after the deterioration in Oracle performance seemed to begin.
	End Time	
	Report Interval	`Minute`
Filter	ID	8ΔH: ***Note***: Since you found in step 8 that the ID of device file 8 used for Gateway B was 8ΔH:, specify 8ΔH:.
	Disk Bytes/sec	`99999999` ***Note***: To display the I/O Response Time value only for device file 8, specify a value that exceeds the maximum possible performance value for the relevant environment. `99999999` is specified here.

I/O Response History appears for device file 8 on Gateway B. You must check if the value increase in I/O Response Time was caused by shared resources (ports and array groups).

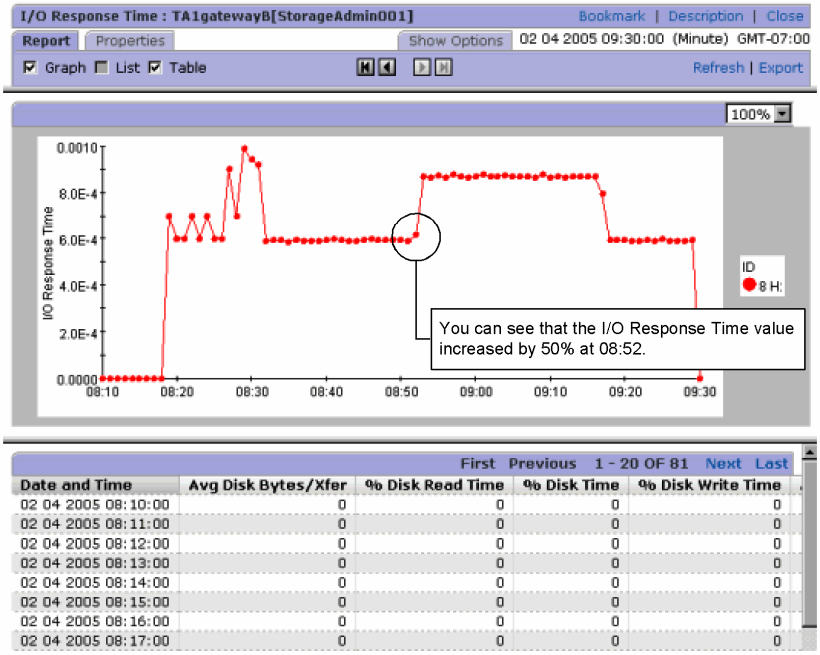


Figure 7.4 I/O Response History for Device File 8 on Gateway B

7.2.1.3 Check Storage Port Performance

To check the performance of the storage port:

1. In Main Console, choose the Explorer area then **Hosts**.
2. Choose **Gateway B**.

   Performance information for the host and array appears in the Information area (Sub Resource section).
3. Choose the **Device File** tab.

   A list of the device files appears in the Information area (Sub Resource section).
4. Choose **CL4-E**, which is the port for device file 8.

   Information about CL4-E appears in the Report area.
5. In the Information area (Advanced Information), choose **Performance Reporter : RAID (Gateway B)**.

   Performance Reporter starts and the Show Options window appears.
6. In the Show Options window, specify the values shown in Table 7.5.

Table 7.5 Settings in the Show Options Window for Checking the Storage Port Performance

Item		Settings
Settings for the report display period	Start Time	To clarify how the performance information changed, specify times before and after the deterioration in Oracle performance seemed to begin.
	End Time	
	Report Interval	`Minute`
Filter	Port Name	`CL4-E`

Xfer Rate History for CL4-E appears. You need to determine the server that caused the value increase in Transfer Rate for CLL4-E.

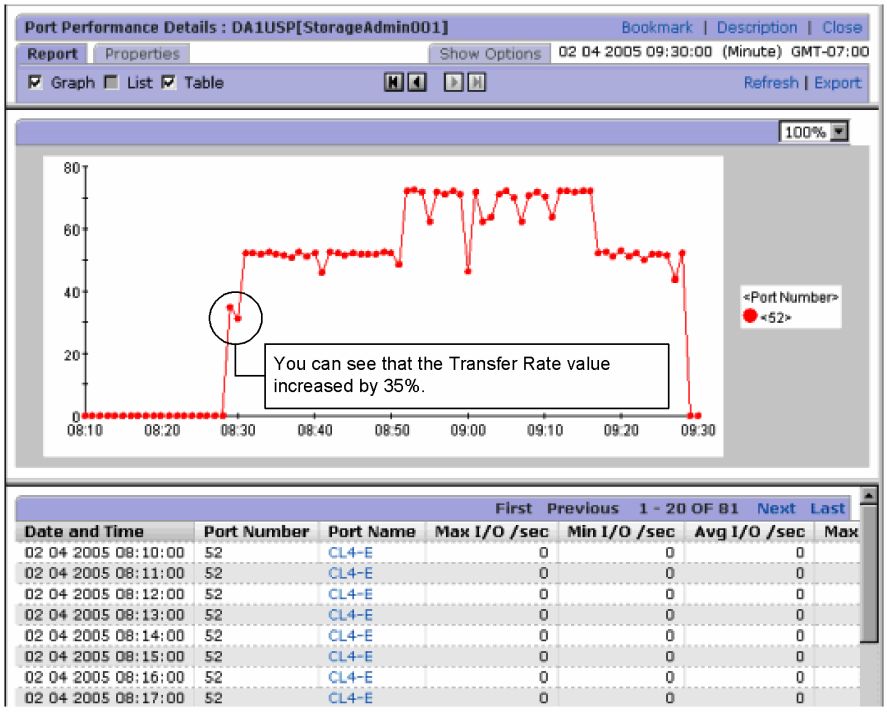


Figure 7.5 Xfer Rate History for CL4-E

7.2.1.4 Check Connected Server Performance

1. Redisplay the Main Console window. In the Information area (Advanced Information), choose **List Connected Server**.

   A list of all servers and device files using CL4-E appears. After sorting data in the **Transfer** column in descending order, you can see that the Transfer value for device file 5 in CQ6400-4 is the largest.

2. In the Navigation frame, choose **Windows**.

3. In the Information frame, choose **User Reports**.

   A list of predefined reports appears.

4. Select **Connected Server Performance**.

   The Show Options window appears. For details on how to define the reports to be displayed here, see section 5.11.

5. In the Show Options window, specify the values shown in Table 7.3.

   Note: Specify 5 for the Filter ID.

   Transfer Rate History appears for all device files on CQ6400-4.

   From the displayed report, check the ID of device file 5.

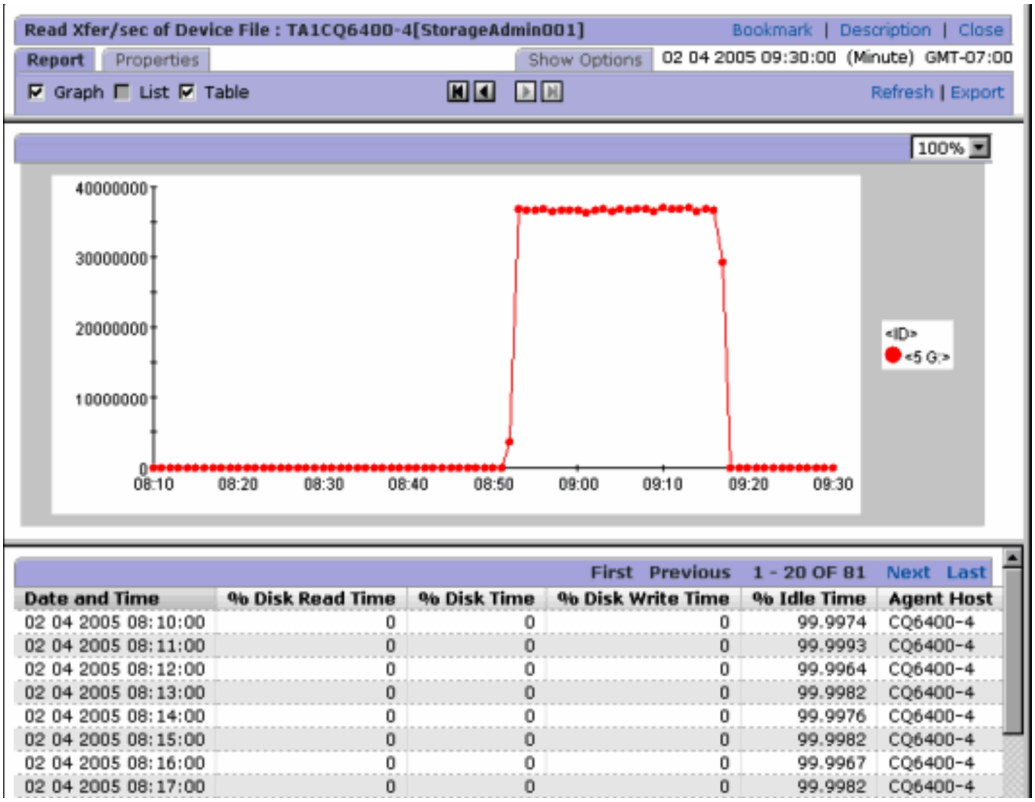
   This example assumes that the ID of device file 5 (checked above) is 5ΔG: (Δ indicates a space).

6. In the Show Options window, specify the values shown in Table 7.6.

Table 7.6 Settings in the Show Options Window for Checking the Transfer Rate History

Item		Settings
Settings for the report display period	Start Time	To clarify how the performance information changed, specify times before and after the deterioration in Oracle performance seemed to begin
	End Time	
	Report Interval	`Minute`
Filter	ID	5ΔG: ***Note***: Since you found in step 6 that the ID of device file 5 used for CQ6400-4 was 5ΔG:, specify 5ΔG:.
	Disk Bytes/sec	`99999999` ***Note***: To display the Transfer Rate History value only for device file 5, specify a value that exceeds the maximum possible performance value for the relevant environment. `99999999` is specified here.

Transfer Rate History for CQ6400-4 appears.



First Previous 1 - 20 OF 81 Next Last

Date and Time	% Disk Read Time	% Disk Time	% Disk Write Time	% Idle Time	Agent Host
02 04 2005 08:10:00	0	0	0	99.9974	CQ6400-4
02 04 2005 08:11:00	0	0	0	99.9993	CQ6400-4
02 04 2005 08:12:00	0	0	0	99.9964	CQ6400-4
02 04 2005 08:13:00	0	0	0	99.9982	CQ6400-4
02 04 2005 08:14:00	0	0	0	99.9976	CQ6400-4
02 04 2005 08:15:00	0	0	0	99.9982	CQ6400-4
02 04 2005 08:16:00	0	0	0	99.9967	CQ6400-4
02 04 2005 08:17:00	0	0	0	99.9982	CQ6400-4

Figure 7.6 Transfer Rate History for CQ6400-4

You can see that the I/O value for CQ6400-4 rose sharply.

This means that the performance deterioration on Gateway B was caused by a rapid increase in I/O by CQ6400-4, which was using the same port as Gateway B.

Appendix A Tuning Manager Metrics and Restrictions

This appendix describes the metrics that Tuning Manager supports and the restrictions on these metrics.

- Lists of Metrics (see section A.1)
- Metrics Displayed by Tuning Manager and the Versions of the Agents from which Information Is Collected (see section A.2)
- Information Displayed on Main Console (see section A.3)
- Agent Restrictions (see section A.4)
- Technical Support (see section A.5)

A.1 Lists of Metrics

Tables A.1 to A.9 show the correspondence between the metrics displayed by Main Console and the field values displayed by Performance Reporter for each agent, and whether alerts can be set using the GUI. Use this information when using Performance Reporter to define a report.

Table A.1 Metrics for Agent for RAID

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
CLPR	Cache Capacity	Cache Memory Capacity	CLPR Summary(PI_CLPS)	Supported
CLPR	Not applicable	Cache Side File Usage	CLPR Summary(PI_CLPS)	Not supported
CLPR	Side File Usage	Cache Side File Usage %	CLPR Summary(PI_CLPS)	Supported
CLPR	Not applicable	Cache Write Pending Usage	CLPR Summary(PI_CLPS)	Not supported
CLPR	Write Pending Rate	Cache Write Pending Usage %	CLPR Summary(PI_CLPS)	Supported
CLPR	Not applicable	CLPR_Number	CLPR Summary(PI_CLPS)	Not supported
CLPR	Not applicable	Interval	CLPR Summary(PI_CLPS)	Not supported
CLPR	Max Side File Usage	Max Cache Side File Usage %	CLPR Summary(PI_CLPS)	Supported
CLPR	Max Write Pending Rate	Max Cache Write Pending Usage %	CLPR Summary(PI_CLPS)	Supported
CLPR	Not applicable	Record Time	CLPR Summary(PI_CLPS)	Not supported
CLPR	Not applicable	Record Type	CLPR Summary(PI_CLPS)	Not supported
LDEV	Not applicable	Interval	Logical Device Summary(PI_LDS)	Not supported
LDEV	Name	LDEV Number	Logical Device Summary(PI_LDS)	Not supported
LDEV	Disk Random IOPS	Random Total I/O /sec	Logical Device Summary(PI_LDS)	Supported
LDEV	Disk Random Transfer	Random Total Xfer /sec	Logical Device Summary(PI_LDS)	Supported
LDEV	Not applicable	Read Hit %	Logical Device Summary(PI_LDS)	Not supported
LDEV	Not applicable	Read Hit I/O Count	Logical Device Summary(PI_LDS)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
LDEV	Disk Read IOPS	Read I/O /sec	Logical Device Summary(PI_LDS)	Supported
LDEV	Not applicable	Read I/O Count	Logical Device Summary(PI_LDS)	Not supported
LDEV	Not applicable	Read Mbytes	Logical Device Summary(PI_LDS)	Not supported
LDEV	Read I/O Response Time	Read Response Rate	Logical Device Summary(PI_LDS)	Supported
LDEV	Not applicable	Read Total Response	Logical Device Summary(PI_LDS)	Not supported
LDEV	Disk Read Transfer	Read Xfer /sec	Logical Device Summary(PI_LDS)	Supported
LDEV	Not applicable	Record Time	Logical Device Summary(PI_LDS)	Not supported
LDEV	Not applicable	Record Type	Logical Device Summary(PI_LDS)	Not supported
LDEV	Disk Sequential IOPS	Sequential Total I/O /sec	Logical Device Summary(PI_LDS)	Not supported
LDEV	Disk Sequential Transfer	Sequential Total Xfer /sec	Logical Device Summary(PI_LDS)	Not supported
LDEV	I/O Response Time	Total Response Rate	Logical Device Summary(PI_LDS)	Supported
LDEV	Not applicable	Write Hit %	Logical Device Summary(PI_LDS)	Not supported
LDEV	Not applicable	Write Hit I/O Count	Logical Device Summary(PI_LDS)	Not supported
LDEV	Disk Write IOPS	Write I/O /sec	Logical Device Summary(PI_LDS)	Supported
LDEV	Not applicable	Write I/O Count	Logical Device Summary(PI_LDS)	Not supported
LDEV	Not applicable	Write Mbytes	Logical Device Summary(PI_LDS)	Not supported
LDEV	Write I/O Response Time	Write Response Rate	Logical Device Summary(PI_LDS)	Supported
LDEV	Not applicable	Write Total Response	Logical Device Summary(PI_LDS)	Not supported
LDEV	Disk Write Transfer	Write Xfer /sec	Logical Device Summary(PI_LDS)	Supported
LDEV	Not applicable	Interval	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	LDEV Number	Logical Device Summary 1(PI_LDS1)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
LDEV	Not applicable	Random Total I/O /sec	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Random Total Xfer /sec	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Read Hit %	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Read Hit I/O Count	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Read I/O /sec	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Read I/O Count	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Read Mbytes	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Read Response Rate	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Read Total Response	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Read Xfer /sec	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Record Time	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Record Type	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Sequential Total I/O /sec	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Sequential Total Xfer /sec	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Total Response Rate	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Write I/O /sec	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Write I/O Count	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Write Mbytes	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Write Response Rate	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Write Total Response	Logical Device Summary 1(PI_LDS1)	Not supported
LDEV	Not applicable	Write Xfer /sec	Logical Device Summary 1(PI_LDS1)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
LDEV	Not applicable	Interval	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	LDEV Number	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Random Total I/O /sec	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Random Total Xfer /sec	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Read Hit %	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Read Hit I/O Count	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Read I/O /sec	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Read I/O Count	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Read Mbytes	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Read Response Rate	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Read Total Response	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Read Xfer /sec	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Record Time	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Record Type	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Sequential Total I/O /sec	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Sequential Total Xfer /sec	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Total Response Rate	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Write I/O /sec	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Write I/O Count	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Write Mbytes	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Write Response Rate	Logical Device Summary 2(PI_LDS2)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
LDEV	Not applicable	Write Total Response	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Write Xfer /sec	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	Interval	Logical Device Summary 2(PI_LDS2)	Not supported
LDEV	Not applicable	LDEV Number	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Random Total I/O /sec	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Random Total Xfer /sec	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Read Hit %	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Read Hit I/O Count	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Read I/O /sec	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Read I/O Count	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Read Mbytes	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Read Response Rate	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Read Total Response	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Read Xfer /sec	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Record Time	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Record Type	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Sequential Total I/O /sec	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Sequential Total Xfer /sec	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Total Response Rate	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Write I/O /sec	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Write I/O Count	Logical Device Summary 3(PI_LDS3)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
LDEV	Not applicable	Write Mbytes	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Write Response Rate	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Write Total Response	Logical Device Summary 3(PI_LDS3)	Not supported
LDEV	Not applicable	Write Xfer /sec	Logical Device Summary 3(PI_LDS3)	Not supported
Port	Port IOPS	Avg I/O /sec	Port Summary(PI_PTS)	Supported
Port	Port Transfer	Avg Xfer /sec	Port Summary(PI_PTS)	Supported
Port	Not applicable	Interval	Port Summary(PI_PTS)	Not supported
Port	Port Max IOPS	Max I/O /sec	Port Summary(PI_PTS)	Supported
Port	Port Max Transfer	Max Xfer /sec	Port Summary(PI_PTS)	Supported
Port	Port Min IOPS	Min I/O /sec	Port Summary(PI_PTS)	Supported
Port	Port Min Transfer	Min Xfer /sec	Port Summary(PI_PTS)	Supported
Port	Not applicable	Port Name	Port Summary(PI_PTS)	Not supported
Port	Port number	Port Number	Port Summary(PI_PTS)	Not supported
Port	Not applicable	Record Time	Port Summary(PI_PTS)	Not supported
Port	Not applicable	Record Type	Port Summary(PI_PTS)	Not supported
Processor(CHP/DKP)	Not applicable	Adaptor ID	Processor Summary(PI_PRCS)	Not supported
Processor(CHP/DKP)	Not applicable	Interval	Processor Summary(PI_PRCS)	Not supported
Processor(CHP/DKP)	Not applicable	Processor Busy %	Processor Summary(PI_PRCS)	Not supported
Processor(CHP/DKP)	Not applicable	Processor ID	Processor Summary(PI_PRCS)	Not supported
Processor(CHP/DKP)	Not applicable	Processor Type	Processor Summary(PI_PRCS)	Not supported
Processor(CHP/DKP)	Not applicable	Max Processor Busy %	Processor Summary(PI_PRCS)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Processor(CHP/DKP)	Not applicable	Record Time	Processor Summary(PI_PRCS)	Not supported
Processor(CHP/DKP)	Not applicable	Record Type	Processor Summary(PI_PRCS)	Not supported
Array Group	Usage	Busy %	RAID Group Summary(PI_RGS)	Not supported
Array Group	Not applicable	Interval	RAID Group Summary(PI_RGS)	Not supported
Array Group	Max Usage	Max Busy %	RAID Group Summary(PI_RGS)	Not supported
Array Group	Not applicable	RAID Group Number	RAID Group Summary(PI_RGS)	Not supported
Array Group	Disk Random IOPS	Random Total I/O /sec	RAID Group Summary(PI_RGS)	Supported
Array Group	Disk Random Transfer	Random Total Xfer /sec	RAID Group Summary(PI_RGS)	Supported
Array Group	Not applicable	Read Hit %	RAID Group Summary(PI_RGS)	Not supported
Array Group	Not applicable	Read Hit I/O Count	RAID Group Summary(PI_RGS)	Not supported
Array Group	Disk Read IOPS	Read I/O /sec	RAID Group Summary(PI_RGS)	Supported
Array Group	Not applicable	Read I/O Count	RAID Group Summary(PI_RGS)	Not supported
Array Group	Not applicable	Read Mbytes	RAID Group Summary(PI_RGS)	Not supported
Array Group	Disk Read Transfer	Read Xfer /sec	RAID Group Summary(PI_RGS)	Supported
Array Group	Not applicable	Record Time	RAID Group Summary(PI_RGS)	Not supported
Array Group	Not applicable	Record Type	RAID Group Summary(PI_RGS)	Not supported
Array Group	Disk Sequential IOPS	Sequential Total I/O /sec	RAID Group Summary(PI_RGS)	Not supported
Array Group	Disk Sequential Transfer	Sequential Total Xfer /sec	RAID Group Summary(PI_RGS)	Not supported
Array Group	Not applicable	Write Hit %	RAID Group Summary(PI_RGS)	Not supported
Array Group	Not applicable	Write Hit I/O Count	RAID Group Summary(PI_RGS)	Not supported
Array Group	Disk Write IOPS	Write I/O /sec	RAID Group Summary(PI_RGS)	Supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Array Group	Not applicable	Write I/O Count	RAID Group Summary(PI_RGS)	Not supported
Array Group	Not applicable	Write Mbytes	RAID Group Summary(PI_RGS)	Not supported
Array Group	Disk Write Transfer	Write Xfer /sec	RAID Group Summary(PI_RGS)	Supported
Subsystem	Not applicable	Cache Memory Capacity	Storage Summary(PI)	Not supported
Subsystem	Cache Usage	Cache Memory Usage	Storage Summary(PI)	Supported
Subsystem	Not applicable	Cache Side File Usage	Storage Summary(PI)	Not supported
Subsystem	Side File Usage	Cache Side File Usage %	Storage Summary(PI)	Supported
Subsystem	Not applicable	Cache Write Pending Usage	Storage Summary(PI)	Not supported
Subsystem	Write Pending Rate	Cache Write Pending Usage %	Storage Summary(PI)	Supported
Subsystem	Not applicable	Interval	Storage Summary(PI)	Not supported
Subsystem	Max Side File Usage	Max Cache Side File Usage %	Storage Summary(PI)	Supported
Subsystem	Max Write Pending Rate	Max Cache Write Pending Usage %	Storage Summary(PI)	Supported
Subsystem	Not applicable	Record Time	Storage Summary(PI)	Not supported
Subsystem	Not applicable	Record Type	Storage Summary(PI)	Not supported

Table A.2 Metrics for Agent for SAN Switch

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Switch port	Not applicable	Address Errors Count	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Area ID	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	CRC Error Count	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Delimiter Errors Count	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Encoding Disparity Count	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Interval	Port Error Summary(PI_PTES)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Switch port	Not applicable	Invalid Ordered Set Count	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Invalid Xmitd Words Count	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Link Failures Count	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Loss of Signal Count	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Loss of Sync Count	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Port Mode	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Port Module Number	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Port Number	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Port Ops Status	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Port Type	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Port WWN	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Prim Seq Proto Error Count	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Rcvd Link Reset	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Rcvd Offline Sequence	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Record Time	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Record Type	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Switch WWN	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Too Long Frames Count	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Too Short Frames Count	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Xmitd Link Reset	Port Error Summary(PI_PTES)	Not supported
Switch port	Not applicable	Xmitd Offline Sequence	Port Error Summary(PI_PTES)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Switch port	Not applicable	Area ID	Port Summary(PI_PTS)	Not supported
Switch port	Buffer Credit Zero State	Buffer Credit Zero State Count	Port Summary(PI_PTS)	Supported
Switch port	Input Buffer Full	Input Buffers Full Count	Port Summary(PI_PTS)	Supported
Switch port	Not applicable	Interval	Port Summary(PI_PTS)	Not supported
Switch port	Not applicable	Port Module Number	Port Summary(PI_PTS)	Not supported
Switch port	Port number	Port Number	Port Summary(PI_PTS)	Not supported
Switch port	Not applicable	Port Type	Port Summary(PI_PTS)	Not supported
Switch port	Not applicable	Port WWN	Port Summary(PI_PTS)	Not supported
Switch port	Received Bytes	Rcvd Bytes / sec	Port Summary(PI_PTS)	Supported
Switch port	Not applicable	Rcvd Frames	Port Summary(PI_PTS)	Not supported
Switch port	Received Frames	Rcvd Frames / sec	Port Summary(PI_PTS)	Supported
Switch port	Not applicable	Rcvd Kbytes	Port Summary(PI_PTS)	Not supported
Switch port	Not applicable	Rcvd Multicast Frames	Port Summary(PI_PTS)	Not supported
Switch port	Not applicable	Record Time	Port Summary(PI_PTS)	Not supported
Switch port	Not applicable	Record Type	Port Summary(PI_PTS)	Not supported
Switch port	Not applicable	Switch WWN	Port Summary(PI_PTS)	Not supported
Switch port	Transferred Bytes	Xmitd Bytes / sec	Port Summary(PI_PTS)	Supported
Switch port	Not applicable	Xmitd Frames	Port Summary(PI_PTS)	Not supported
Switch port	Transferred Frames	Xmitd Frames / sec	Port Summary(PI_PTS)	Supported
Switch port	Not applicable	Xmitd Kbytes	Port Summary(PI_PTS)	Not supported
Switch port	Not applicable	Xmitd Multicast Frames	Port Summary(PI_PTS)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Switch	Not applicable	CRC Error Count	Switch Error Summary(PI_SWES)	Not supported
Switch	Not applicable	Domain ID	Switch Error Summary(PI_SWES)	Not supported
Switch	Not applicable	Encoding Disparity Count	Switch Error Summary(PI_SWES)	Not supported
Switch	Not applicable	Interval	Switch Error Summary(PI_SWES)	Not supported
Switch	Not applicable	Loss of Signal Count	Switch Error Summary(PI_SWES)	Not supported
Switch	Not applicable	Loss of Sync Count	Switch Error Summary(PI_SWES)	Not supported
Switch	Not applicable	Model Name	Switch Error Summary(PI_SWES)	Not supported
Switch	Not applicable	Record Time	Switch Error Summary(PI_SWES)	Not supported
Switch	Not applicable	Record Type	Switch Error Summary(PI_SWES)	Not supported
Switch	Not applicable	Switch Mode	Switch Error Summary(PI_SWES)	Not supported
Switch	Not applicable	Switch Name	Switch Error Summary(PI_SWES)	Not supported
Switch	Not applicable	Switch Ops Status	Switch Error Summary(PI_SWES)	Not supported
Switch	Not applicable	Switch WWN	Switch Error Summary(PI_SWES)	Not supported
Switch	Buffer Credit Zero State	Buffer Credit Zero State Count	Switch Summary(PI_SWS)	Supported
Switch	Not applicable	Domain ID	Switch Summary(PI_SWS)	Not supported
Switch	Input Buffer Full	Input Buffers Full Count	Switch Summary(PI_SWS)	Supported
Switch	Not applicable	Interval	Switch Summary(PI_SWS)	Not supported
Switch	Not applicable	Model Name	Switch Summary(PI_SWS)	Not supported
Switch	Received Bytes	Rcvd Bytes / sec	Switch Summary(PI_SWS)	Supported
Switch	Not applicable	Rcvd Frames	Switch Summary(PI_SWS)	Not supported
Switch	Received Frames	Rcvd Frames / sec	Switch Summary(PI_SWS)	Supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Switch	Not applicable	Rcvd Kbytes	Switch Summary(PI_SWS)	Not supported
Switch	Not applicable	Record Time	Switch Summary(PI_SWS)	Not supported
Switch	Not applicable	Record Type	Switch Summary(PI_SWS)	Not supported
Switch	Not applicable	Switch Name	Switch Summary(PI_SWS)	Not supported
Switch	Not applicable	Switch WWN	Switch Summary(PI_SWS)	Not supported
Switch	Transferred Bytes	Xmitd Bytes / sec	Switch Summary(PI_SWS)	Supported
Switch	Not applicable	Xmitd Frames	Switch Summary(PI_SWS)	Not supported
Switch	Transferred Frames	Xmitd Frames / sec	Switch Summary(PI_SWS)	Supported
Switch	Not applicable	Xmitd Kbytes	Switch Summary(PI_SWS)	Not supported
Fabric	Not applicable	Device Count	System Summary(PI)	Not supported
Fabric	Not applicable	Interval	System Summary(PI)	Not supported
Fabric	Not applicable	Node Count	System Summary(PI)	Not supported
Fabric	Not applicable	Port Count	System Summary(PI)	Not supported
Fabric	Not applicable	Port Module Count	System Summary(PI)	Not supported
Fabric	Not applicable	Record Time	System Summary(PI)	Not supported
Fabric	Not applicable	Record Type	System Summary(PI)	Not supported
Fabric	Switches	Switch Count	System Summary(PI)	Not supported

Table A.3 Metrics for Agent for NAS

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Device Name	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Host Name	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	I/O Mbytes	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Interval	Device Detail(PI_DEVD)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Mbytes Xferd/sec	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Read Mbytes	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Read Ops	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Read Ops %	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Read Ops/sec	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Record Time	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Record Type	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Total I/O Ops	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Total I/O Ops/sec	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Write Mbytes	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Write Ops	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Write Ops %	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Write Ops/sec	Device Detail(PI_DEVD)	Not supported
Not applicable	Not applicable	Devices	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Host Name	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	I/O Mbytes	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Interval	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Mbytes Xferd/sec	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Read Mbytes	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Read Ops	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Read Ops %	Device Summary(PI_DEVS)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Read Ops/sec	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Record Time	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Record Type	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Total I/O Ops	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Total I/O Ops/sec	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Write Mbytes	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Write Ops	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Write Ops %	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	Write Ops/sec	Device Summary(PI_DEVS)	Not supported
Not applicable	Not applicable	1-Minute Run Queue Avg	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	5-Minute Run Queue Avg	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	15-Minute Run Queue Avg	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Active CPUs	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Alloc Mem %	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Alloc Mem Mbytes	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Block I/O Ops	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Block Read Ops	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Block Read Ops/sec	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Block Write Ops	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Block Write Ops/sec	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Boot Time	System Summary Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Context Switches	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Context Switches / sec	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	CPU %	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Free Memory %	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Free Memory Mbytes	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Host Name	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	ICMP Pkts In	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	ICMP Pkts Out	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Idle %	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Interrupts	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Interrupts/sec	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Interval	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	IP Pkts In	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	IP Pkts Out	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Kernel CPU %	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Physical I/O Ops	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Physical Read Ops	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Physical Write Ops	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Processes	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Record Time	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Record Type	System Summary Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Run Queue	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	System Up Time	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	TCP Pkts In	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	TCP Pkts Out	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Total Idle Time	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Total Kernel-mode Time	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Total Physical Memory Mbytes	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Total Pkts	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Total Pkts In	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Total Pkts Out	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Total User-mode Time	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	UDP Pkts In	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	UDP Pkts Out	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	User CPU %	System Summary Overview(PI)	Not supported
Not applicable	Not applicable	Users	System Summary Overview(PI)	Not supported

Table A.4 Metrics for Agent for Platform (Windows)

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Logical Disk	Not applicable	% Disk Read Time	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	% Disk Time	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	% Disk Usage	Logical Disk Overview(PI_LOGD)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Logical Disk	Not applicable	% Disk Write Time	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	% Free Space	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	% Idle Time	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Free	Available Space Mbytes	Logical Disk Overview(PI_LOGD)	Supported
Logical Disk	Not applicable	Avg Disk Bytes/Read	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Avg Disk Bytes/Write	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Avg Disk Bytes/Xfer	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Avg Disk Queue Length	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Avg Disk Read Queue Length	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Avg Disk Secs/Read	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Avg Disk Secs/Write	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Avg Disk Secs/Xfer	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Avg Disk Write Queue Length	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Current Disk Queue Length	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Disk Bytes/sec	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Disk Read Bytes/sec	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Disk Reads/sec	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Disk Write Bytes/sec	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Disk Writes/sec	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Disk Xfers/sec	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Drive Type	Logical Disk Overview(PI_LOGD)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Logical Disk	Not applicable	Free Mbytes	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	ID	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Interval	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Interval2	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Page File Size Mbytes	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Record Time	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Record Type	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Not applicable	Split IO/Sec	Logical Disk Overview(PI_LOGD)	Not supported
Logical Disk	Capacity	Total Size Mbytes	Logical Disk Overview(PI_LOGD)	Supported
Device File	Not applicable	% Disk Read Time	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	% Disk Time	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	% Disk Write Time	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	% Idle Time	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Avg Disk Bytes/Read	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Avg Disk Bytes/Write	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Avg Disk Bytes/Xfer	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Avg Disk Queue Length	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Avg Disk Read Queue Length	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Avg Disk Secs/Read	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Avg Disk Secs/Write	Physical Disk Overview(PI_PHYD)	Not supported
Device File	IO Response Time	Avg Disk Secs/Xfer	Physical Disk Overview(PI_PHYD)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Device File	Not applicable	Avg Disk Write Queue Length	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Current Disk Queue Length	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Transfer	Disk Bytes/sec	Physical Disk Overview(PI_PHYD)	Supported
Device File	Read Transfer	Disk Read Bytes/sec	Physical Disk Overview(PI_PHYD)	Supported
Device File	Read IOPS	Disk Reads/sec	Physical Disk Overview(PI_PHYD)	Supported
Device File	Write Transfer	Disk Write Bytes/sec	Physical Disk Overview(PI_PHYD)	Supported
Device File	Write IOPS	Disk Writes/sec	Physical Disk Overview(PI_PHYD)	Supported
Device File	IOPS	Disk Xfers/sec	Physical Disk Overview(PI_PHYD)	Supported
Device File	Not applicable	ID	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Interval	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Interval2	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Record Time	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Record Type	Physical Disk Overview(PI_PHYD)	Not supported
Device File	Not applicable	Split IO/Sec	Physical Disk Overview(PI_PHYD)	Not supported
Processor	Not applicable	% C1 Time	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	% C2 Time	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	% C3 Time	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	% DPC Time	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	% Idle Time	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	% Interrupt Time	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	APC Bypasses/sec	Processor Overview(PI_PCSR)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Processor	Not applicable	C1 Trans/sec	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	C2 Trans/sec	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	C3 Trans/sec	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	CPU %	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	DPC Bypasses/sec	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	DPC Rate	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	DPCs Queued/sec	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	Instance	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	Interrupts/sec	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	Interval	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	Interval2	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	Privileged CPU %	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	Record Time	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	Record Type	Processor Overview(PI_PCSR)	Not supported
Processor	Not applicable	User CPU %	Processor Overview(PI_PCSR)	Not supported
System	Not applicable	Active Threads	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Available Threads	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Available Work Items	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Borrowed Work Items	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Bytes Rcvd/sec	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Bytes Sent/sec	Server Work Queues Overview(PI_SVRQ)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
System	Not applicable	Bytes Xferd/sec	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Context Blocks Queued/sec	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Current Clients	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Instance	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Interval	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Interval2	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Queue Length	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Read Bytes/sec	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Read Ops/sec	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Record Time	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Record Type	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Total Bytes/sec	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Total Ops/sec	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Work Item Shortages	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Write Bytes/sec	Server Work Queues Overview(PI_SVRQ)	Not supported
System	Not applicable	Write Ops/sec	Server Work Queues Overview(PI_SVRQ)	Not supported
Server (Memory)	Not applicable	% Committed Bytes in Use	System Overview(PI)	Not supported
Server (Memory)	Not applicable	% Physical Mem	System Overview(PI)	Not supported
Server (System)	Not applicable	% Registry Quota in Use	System Overview(PI)	Not supported
Server (Processor)	Not applicable	% Total DPC Time	System Overview(PI)	Not supported
Server (Processor)	Not applicable	% Total Interrupt Time	System Overview(PI)	Not supported
Server (System)	Not applicable	Active CPUs	System Overview(PI)	Not supported
Server (System)	Not applicable	Alignment Fixups/sec	System Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Server (File System)	Not applicable	Async Copy Reads/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Async Data Maps/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Async Fast Reads/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Async MDL Reads/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Async Pin Reads/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Available Mbytes	System Overview(PI)	Not supported
Server (Network)	Not applicable	Blocking Reqs Rejected	System Overview(PI)	Not supported
Server (Network)	Not applicable	Bytes Rcvd/sec	System Overview(PI)	Not supported
Server (Network)	Not applicable	Bytes Total/sec	System Overview(PI)	Not supported
Server (Network)	Not applicable	Bytes Xmitd/sec	System Overview(PI)	Not supported
Server (Processor)	CPU Usage	CPU %	System Overview(PI)	Not supported
Server (File System)	Not applicable	Cache Faults/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Cache Mbytes	System Overview(PI)	Not supported
Server (File System)	Not applicable	Cache Mbytes Peak	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Commit Limit Mbytes	System Overview(PI)	Not supported
Server (Memory)	Memory	Committed Mbytes	System Overview(PI)	Not supported
Server (Network)	Not applicable	Conns Core	System Overview(PI)	Not supported
Server (Network)	Not applicable	Conns LAN Manager 2.0	System Overview(PI)	Not supported
Server (Network)	Not applicable	Conns LAN Manager 2.1	System Overview(PI)	Not supported
Server (Network)	Not applicable	Conns Windows NT	System Overview(PI)	Not supported
Server (System)	Not applicable	Context Blocks Queued/sec	System Overview(PI)	Not supported
Server (System)	Not applicable	Context Switches/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Copy Read Hits %	System Overview(PI)	Not supported
Server (File System)	Not applicable	Copy Reads/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Current Commands	System Overview(PI)	Not supported
Server (Processor)	Not applicable	Current Processes	System Overview(PI)	Not supported
Server (Processor)	Not applicable	Current Threads	System Overview(PI)	Not supported
Server (File System)	Not applicable	Data Flush Pages/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Data Flushes/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Data Map Hits %	System Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Server (File System)	Not applicable	Data Map Pins/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Data Maps/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Demand Zero Faults/sec	System Overview(PI)	Not supported
Server (System)	Not applicable	Errors Access Permissions	System Overview(PI)	Not supported
Server (System)	Not applicable	Errors Granted Access	System Overview(PI)	Not supported
Server (System)	Not applicable	Errors Logon	System Overview(PI)	Not supported
Server (System)	Not applicable	Errors System	System Overview(PI)	Not supported
Server (System)	Not applicable	Events	System Overview(PI)	Not supported
Server (System)	Not applicable	Exception Dispatches/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Fast Read Not Possibles/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Fast Read Resource Misses/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Fast Reads/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	File Control Bytes/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	File Control Ops/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	File Data Ops/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	File Directory Searches	System Overview(PI)	Not supported
Server (File System)	Not applicable	File Read Bytes/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	File Read Ops/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	File Write Bytes/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	File Write Ops/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Files Open	System Overview(PI)	Not supported
Server (File System)	Not applicable	Files Opened Total	System Overview(PI)	Not supported
Server (System)	Not applicable	Floating Emulations/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Free System Page Table Entries	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Interval	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Lazy Write Flushes/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Lazy Write Pages/sec	System Overview(PI)	Not supported
Server (System)	Not applicable	Logon Total	System Overview(PI)	Not supported
Server (System)	Not applicable	Logon/sec	System Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Server (File System)	Not applicable	MDL Read Hits %	System Overview(PI)	Not supported
Server (File System)	Not applicable	MDL Reads/sec	System Overview(PI)	Not supported
Server (System)	Not applicable	Mutexes	System Overview(PI)	Not supported
Server (Network)	Not applicable	Net Errors/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Non Committed Mbytes	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Page Faults/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Page Reads/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Page Writes/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Pages Input/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Pages Output/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Pages/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Pin Read Hits %	System Overview(PI)	Not supported
Server (File System)	Not applicable	Pin Reads/sec	System Overview(PI)	Not supported
Server (Network)	Not applicable	Pkts Rcvd/sec	System Overview(PI)	Not supported
Server (Network)	Not applicable	Pkts Xmitd/sec	System Overview(PI)	Not supported
Server (Network)	Not applicable	Pkts/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Pool Nonpaged Allocs	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Pool Nonpaged Bytes	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Pool Nonpaged Failures	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Pool Nonpaged Peak	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Pool Paged Allocs	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Pool Paged Bytes	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Pool Paged Failures	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Pool Paged Peak	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Pool Paged Resident Bytes	System Overview(PI)	Not supported
Server (Processor)	Not applicable	Privileged CPU %	System Overview(PI)	Not supported
Server (System)	Not applicable	Processes	System Overview(PI)	Not supported
Server (System)	Not applicable	Processor Queue Length	System Overview(PI)	Not supported
Server (File System)	Not applicable	Read Aheads/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Read Bytes Cache/sec	System Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Server (Network)	Not applicable	Read Bytes Net/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Read Bytes Nonpaging/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Read Bytes Paging/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Read Ops Random/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Read Pkts Small/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Read Pkts/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Reads Denied/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Reads Large/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Record Time	System Overview(PI)	Not supported
Server (File System)	Not applicable	Record Type	System Overview(PI)	Not supported
Server (File System)	Not applicable	Redir Bytes Rcvd/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Redir Bytes Total/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Redir Bytes Xmitd/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Redir File Data Ops/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Redir File Read Ops/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Redir File Write Ops/sec	System Overview(PI)	Not supported
Server (System)	Not applicable	Redir Server Sessions	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Sections	System Overview(PI)	Not supported
Server (System)	Not applicable	Semaphores	System Overview(PI)	Not supported
Server (System)	Not applicable	Server Disconnects	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Server Pool Nonpaged Bytes	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Server Pool Paged Bytes	System Overview(PI)	Not supported
Server (System)	Not applicable	Server Reconnects	System Overview(PI)	Not supported
Server (System)	Not applicable	Server Sessions	System Overview(PI)	Not supported
Server (System)	Not applicable	Server Sessions Hung	System Overview(PI)	Not supported
Server (System)	Not applicable	Sessions Errored Out	System Overview(PI)	Not supported
Server (System)	Not applicable	Sessions Forced Off	System Overview(PI)	Not supported
Server (System)	Not applicable	Sessions Logged Off	System Overview(PI)	Not supported
Server (System)	Not applicable	Sessions Timed Out	System Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Server (File System)	Not applicable	Sync Copy Reads/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Sync Data Maps/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Sync Fast Reads/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Sync MDL Reads/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Sync Pin Reads/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	System Cache Resident Bytes	System Overview(PI)	Not supported
Server (System)	Not applicable	System Calls/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	System Code Resident Bytes	System Overview(PI)	Not supported
Server (Memory)	Not applicable	System Code Total Bytes	System Overview(PI)	Not supported
Server (Memory)	Not applicable	System Driver Resident Bytes	System Overview(PI)	Not supported
Server (Memory)	Not applicable	System Driver Total Bytes	System Overview(PI)	Not supported
Server (System)	Not applicable	System Type	System Overview(PI)	Not supported
Server (System)	Not applicable	System Up Time	System Overview(PI)	Not supported
Server (System)	Not applicable	Threads	System Overview(PI)	Not supported
Server (System)	Not applicable	Total APC Bypasses/sec	System Overview(PI)	Not supported
Server (System)	Not applicable	Total DPC Bypasses/sec	System Overview(PI)	Not supported
Server (System)	Not applicable	Total DPC Rate	System Overview(PI)	Not supported
Server (System)	Not applicable	Total DPCs Queued/sec	System Overview(PI)	Not supported
Server (System)	Not applicable	Total Interrupts/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Total Physical Mem Mbytes	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Trans Pages RePurposed/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Transition Faults/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Used Physical Mem Mbytes	System Overview(PI)	Not supported
Server (Processor)	Not applicable	User CPU %	System Overview(PI)	Not supported
Server (System)	Not applicable	Work Item Shortages	System Overview(PI)	Not supported
Server (File System)	Not applicable	Write Bytes Cache/sec	System Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Server (Network)	Not applicable	Write Bytes Net/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Write Bytes Nonpaging/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Write Bytes Paging/sec	System Overview(PI)	Not supported
Server (Memory)	Not applicable	Write Copies/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Write Ops Random/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Write Pkts Small/sec	System Overview(PI)	Not supported
Server (Network)	Not applicable	Write Pkts/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Writes Denied/sec	System Overview(PI)	Not supported
Server (File System)	Not applicable	Writes Large/sec	System Overview(PI)	Not supported

Table A.5 Metrics for Agent for Platform (UNIX)

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Processor	Not applicable	Boot Time	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	CPU %	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Context Switches	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Context Switches/sec	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Idle %	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Idle Time	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Interrupts	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Interrupts/sec	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Interval	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Processor ID	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Record Time	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Record Type	CPU - Per Processor Detail(PI_CPUP)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Processor	Not applicable	Status	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Sys Calls/sec	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	System %	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	System Calls	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	System Time	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Traps	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Traps/sec	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Type	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Up Time	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	User %	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	User Time	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Wait %	CPU - Per Processor Detail(PI_CPUP)	Not supported
Processor	Not applicable	Wait Time	CPU - Per Processor Detail(PI_CPUP)	Not supported
Device File	IO Response Time	Avg Service Time	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Avg Wait Time	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Busy %	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Device Name	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Device Type	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	I/O Mbytes	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Interval	Device Detail(PI_DEVD)	Not supported
Device File	Transfer	Mbytes Xferd/sec	Device Detail(PI_DEVD)	Supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Device File	Not applicable	Queue Length	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Read %	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Read Mbytes	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Read Ops	Device Detail(PI_DEVD)	Not supported
Device File	Read IOPS	Reads/sec	Device Detail(PI_DEVD)	Supported
Device File	Not applicable	Record Time	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Record Type	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Seek Ops	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Total Busy Time	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Total I/O Ops	Device Detail(PI_DEVD)	Not supported
Device File	IOPS	Total I/O Ops/sec	Device Detail(PI_DEVD)	Supported
Device File	Not applicable	Total Service Time	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Total Wait Time	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Wait Length Time	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Write %	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Write Mbytes	Device Detail(PI_DEVD)	Not supported
Device File	Not applicable	Write Ops	Device Detail(PI_DEVD)	Not supported
Device File	Write IOPS	Writes/sec	Device Detail(PI_DEVD)	Supported
Device File	Not applicable	Avg Service Time/device	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Avg Service Time/op	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Busy %	Device Summary(PI_DEVS)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Device File	Not applicable	Devices	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	I/O Mbytes	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Interval	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Mbytes Xferd/sec	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Queue Length	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Read Ops %	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Reads	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Reads/sec	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Record Time	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Record Type	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Seek Ops	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Total Busy Time	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Total I/O Ops	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Total I/O Ops/sec	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Total Service Time	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Total Wait Length Time	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Total Wait Time	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Wait Length Time	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Wait Time	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Write Ops %	Device Summary(PI_DEVS)	Not supported
Device File	Not applicable	Writes	Device Summary(PI_DEVS)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Device File	Not applicable	Writes/sec	Device Summary(PI_DEVS)	Not supported
Server (System)	Not applicable	1-Minute Run Queue Avg	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	15-Minute Run Queue Avg	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	5-Minute Run Queue Avg	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Active CPUs	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Alloc Mem %	System Summary Overview(PI)	Not supported
Server (Memory)	Memory	Alloc Mem Mbytes	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Alloc Swap %	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Alloc Swap Mbytes	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Block Ops	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Block Reads	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Block Reads/sec	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Block Writes	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Block Writes/sec	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Boot Time	System Summary Overview(PI)	Not supported
Server (Processor)	CPU Usage	CPU %	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Cache Read %	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Cache Write %	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Context Switches	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Context Switches/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Faults	System Summary Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Server (Memory)	Not applicable	Free Mem %	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Free Mem Mbytes	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Free Swap %	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Free Swap Mbytes	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	ICMP Pkts In	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	ICMP Pkts Out	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	IP Pkts In	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	IP Pkts Out	System Summary Overview(PI)	Not supported
Server (Processor)	Not applicable	Idle %	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Interrupts	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Interrupts/sec	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Interval	System Summary Overview(PI)	Not supported
Server (Processor)	Not applicable	Kernel CPU %	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Logical I/O Ops	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Logical Read Mbytes	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Logical Reads	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Logical Reads/sec	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Logical Write Mbytes	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Logical Writes	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Logical Writes/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Major Faults	System Summary Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Server (Memory)	Not applicable	Major Faults/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Mem I/O Ops	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Minor Faults	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Minor Faults/sec	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Client Lookup Ops	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Client Ops/sec	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Client Read Ops	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Client Read Ops/sec	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Client Total Bad Ops	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Client Total Ops	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Client Write Ops	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Client Write Ops/sec	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Server Lookup Ops	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Server Ops/sec	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Server Read Ops	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Server Read Ops/sec	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Server Total Bad Ops	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Server Total Ops	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Server Write Ops	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	NFS Server Write Ops/sec	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	Other Pkts In	System Summary Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Server (Network)	Not applicable	Other Pkts Out	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Page Ops/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Page Reclaims/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Page Scans/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Page-In Ops	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Page-In Ops/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Page-Out Ops	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Page-Out Ops/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Pages In	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Pages In/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Pages Out	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Pages Out/sec	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Physical I/O Ops	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Physical Reads	System Summary Overview(PI)	Not supported
Server (I/O)	Not applicable	Physical Writes	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Processes	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Processes Ended	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Processes Started	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Record Time	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Record Type	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Run Queue	System Summary Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Server (System)	Not applicable	Software Lock Faults	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Software Lock Faults/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Swap-In Ops	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Swap-Ins/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Swap-Out Ops	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Swap-Outs/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Swapped-In Pages	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Swapped-In Pages/sec	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Swapped-Out Pages	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Swapped-Out Pages/sec	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	System Calls	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	System Calls/sec	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	System Up Time	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	TCP Pkts In	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	TCP Pkts Out	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Total Faults/sec	System Summary Overview(PI)	Not supported
Server (Processor)	Not applicable	Total Idle Time	System Summary Overview(PI)	Not supported
Server (Processor)	Not applicable	Total Kernel-Mode Time	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Total Page Ops	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Total Page Reclaims	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Total Page Scans	System Summary Overview(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Server (Memory)	Not applicable	Total Physical Mem Mbytes	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	Total Pkts	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	Total Pkts In	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	Total Pkts Out	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Total Swap Mbytes	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Total Swaps	System Summary Overview(PI)	Not supported
Server (Memory)	Not applicable	Total Swaps/sec	System Summary Overview(PI)	Not supported
Server (Processor)	Not applicable	Total User-Mode Time	System Summary Overview(PI)	Not supported
Server (Processor)	Not applicable	Total Wait Time	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Traps	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Traps/sec	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	UDP Pkts In	System Summary Overview(PI)	Not supported
Server (Network)	Not applicable	UDP Pkts Out	System Summary Overview(PI)	Not supported
Server (Processor)	Not applicable	User CPU %	System Summary Overview(PI)	Not supported
Server (System)	Not applicable	Users	System Summary Overview(PI)	Not supported
Server (Processor)	Not applicable	Wait %	System Summary Overview(PI)	Not supported
Workgroup	Not applicable	Argument Lists	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Avg I/O Kbytes	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	CPU %	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	CPU % Each	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Context Switches	Workgroup Summary(PI_WGRP)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Workgroup	Not applicable	Groups	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Interval	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Major Faults	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Process Count	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Programs	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Reads	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Reads/sec	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Real Mem Kbytes	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Record Time	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Record Type	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Swaps	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	System CPU	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Throughput/sec	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Total I/O Kbytes	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Total I/O Ops	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Total I/O Ops/sec	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	User CPU	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Users	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Virtual Mem Kbytes	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Workgroup	Workgroup Summary(PI_WGRP)	Not supported
Workgroup	Not applicable	Writes	Workgroup Summary(PI_WGRP)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Workgroup	Not applicable	Writes/sec	Workgroup Summary(PI_WGRP)	Not supported

Table A.6 Metrics for Agent for Microsoft Exchange Server

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Database Cache % Hit	Database(PI_DB)	Not supported
Not applicable	Not applicable	Database Cache Size	Database(PI_DB)	Not supported
Not applicable	Not applicable	Database Page Fault Stalls/sec	Database(PI_DB)	Not supported
Not applicable	Not applicable	Interval	Database(PI_DB)	Not supported
Not applicable	Not applicable	Log Record Stalls/sec	Database(PI_DB)	Not supported
Not applicable	Not applicable	Log Threads Waiting	Database(PI_DB)	Not supported
Not applicable	Not applicable	Record Time	Database(PI_DB)	Not supported
Not applicable	Not applicable	Record Type	Database(PI_DB)	Not supported
Not applicable	Not applicable	Table Open Cache % Hit	Database(PI_DB)	Not supported
Not applicable	Not applicable	Client Out Queue Length	Epoxy(PI_EPOX)	Not supported
Not applicable	Not applicable	Interval	Epoxy(PI_EPOX)	Not supported
Not applicable	Not applicable	Protocol Name	Epoxy(PI_EPOX)	Not supported
Not applicable	Not applicable	Record Time	Epoxy(PI_EPOX)	Not supported
Not applicable	Not applicable	Record Type	Epoxy(PI_EPOX)	Not supported
Not applicable	Not applicable	Store Out Queue Length	Epoxy(PI_EPOX)	Not supported
Not applicable	Not applicable	Active User Count	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	Connection Count	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	Exchmem Additional Heaps	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	Exchmem Heaps with Memory Errors	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	Exchmem Memory Errors	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	Interval	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	Record Time	MSExchangeIS(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Record Type	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	RPC Averaged Latency	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	RPC Operations/sec	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	RPC Requests	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	User Count	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	VM Largest Block Size	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	VM Total 16 MB Free Blocks	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	VM Total Free Blocks	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	VM Total Large Free Block Bytes	MSExchangeIS(PI)	Not supported
Not applicable	Not applicable	Average Delivery Time	MSExchangeIS Mailbox(PI_ISM)	Not supported
Not applicable	Not applicable	Folder Opens/sec	MSExchangeIS Mailbox(PI_ISM)	Not supported
Not applicable	Not applicable	Interval	MSExchangeIS Mailbox(PI_ISM)	Not supported
Not applicable	Not applicable	Message Opens/sec	MSExchangeIS Mailbox(PI_ISM)	Not supported
Not applicable	Not applicable	Messages Submitted	MSExchangeIS Mailbox(PI_ISM)	Not supported
Not applicable	Not applicable	Messages Submitted/min	MSExchangeIS Mailbox(PI_ISM)	Not supported
Not applicable	Not applicable	Message Recipients Delivered/min	MSExchangeIS Mailbox(PI_ISM)	Not supported
Not applicable	Not applicable	Receive Queue Size	MSExchangeIS Mailbox(PI_ISM)	Not supported
Not applicable	Not applicable	Record Time	MSExchangeIS Mailbox(PI_ISM)	Not supported
Not applicable	Not applicable	Record Type	MSExchangeIS Mailbox(PI_ISM)	Not supported
Not applicable	Not applicable	Send Queue Size	MSExchangeIS Mailbox(PI_ISM)	Not supported
Not applicable	Not applicable	Average Delivery Time	MSExchangeIS Public(PI_ISP)	Not supported
Not applicable	Not applicable	Folder Opens/sec	MSExchangeIS Public(PI_ISP)	Not supported
Not applicable	Not applicable	Interval	MSExchangeIS Public(PI_ISP)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Message Opens/sec	MSExchangeIS Public(PI_ISP)	Not supported
Not applicable	Not applicable	Messages Submitted	MSExchangeIS Public(PI_ISP)	Not supported
Not applicable	Not applicable	Messages Submitted/min	MSExchangeIS Public(PI_ISP)	Not supported
Not applicable	Not applicable	Message Recipients Delivered/min	MSExchangeIS Public(PI_ISP)	Not supported
Not applicable	Not applicable	Receive Queue Size	MSExchangeIS Public(PI_ISP)	Not supported
Not applicable	Not applicable	Record Time	MSExchangeIS Public(PI_ISP)	Not supported
Not applicable	Not applicable	Record Type	MSExchangeIS Public(PI_ISP)	Not supported
Not applicable	Not applicable	Send Queue Size	MSExchangeIS Public(PI_ISP)	Not supported

Table A.7 Metrics for Agent for Oracle

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Data File	Not applicable	Blocks	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Checkpoint Change #	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Enabled	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	File #	Data File Interval(PI_PIDF)	Not supported
Data File	Name	File Name	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Free %	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Free Change	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Free Mbytes	Data File Interval(PI_PIDF)	Not supported
Data File	IOPS	I/O Ops/sec	Data File Interval(PI_PIDF)	Supported
Data File	Size	Mbytes	Data File Interval(PI_PIDF)	Supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Data File	Not applicable	Physical Blocks Read	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Physical Blocks Written	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Physical Reads	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Physical Writes	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Read Time	Data File Interval(PI_PIDF)	Not supported
Data File	Read IOPS	Reads/sec	Data File Interval(PI_PIDF)	Supported
Data File	Not applicable	Record Time	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Record Type	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Start Time	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Status	Data File Interval(PI_PIDF)	Not supported
Data File	Table Space	Tablespace Name	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Used Change	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Used Mbytes	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Write %	Data File Interval(PI_PIDF)	Not supported
Data File	Not applicable	Write Time	Data File Interval(PI_PIDF)	Not supported
Data File	Write IOPS	Writes/sec	Data File Interval(PI_PIDF)	Supported
Database	Not applicable	Archive Change #	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Blocks	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Checkpoint Change #	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Created	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Datafiles	Database Interval(PI_PIDB)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Database	Not applicable	DB Files %	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	DB Name	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Extents	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Free %	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Free Change	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Free Extents	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Free Mbytes	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	High Max Extent	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	I/O Ops/sec	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Links	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Links In Tran	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Links Logged On	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Links Open Cursors	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Log Files %	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Log Mode	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Mbytes	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Next Alloc Fails	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Overextended	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Physical Blocks Read	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Physical Blocks Written	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Physical Reads	Database Interval(PI_PIDB)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Database	Not applicable	Physical Writes	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Reads/sec	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Record Time	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Record Type	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Redo Files	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Rollback Segments	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Rollback Segments Hit %	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Rollback Segments Trans	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Segments	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Sort Segments	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Sorting Users	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Start Time	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Tablespaces	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Used Change	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Used Mbytes	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Write %	Database Interval(PI_PIDB)	Not supported
Database	Not applicable	Writes/sec	Database Interval(PI_PIDB)	Not supported
Tablespace	Not applicable	Datafiles	Tablespace Interval(PI_PITS)	Not supported
Tablespace	IOPS	I/O Ops/sec	Tablespace Interval(PI_PITS)	Supported
Tablespace	Not applicable	Physical Blocks Read	Tablespace Interval(PI_PITS)	Not supported
Tablespace	Not applicable	Physical Blocks Written	Tablespace Interval(PI_PITS)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Tablespace	Not applicable	Physical Reads	Tablespace Interval(PI_PITS)	Not supported
Tablespace	Not applicable	Physical Writes	Tablespace Interval(PI_PITS)	Not supported
Tablespace	Read IOPS	Reads/sec	Tablespace Interval(PI_PITS)	Supported
Tablespace	Not applicable	Record Time	Tablespace Interval(PI_PITS)	Not supported
Tablespace	Not applicable	Record Type	Tablespace Interval(PI_PITS)	Not supported
Tablespace	Rollback Segments	Rollback Segments	Tablespace Interval(PI_PITS)	Supported
Tablespace	Not applicable	Rollback Segments Hit %	Tablespace Interval(PI_PITS)	Not supported
Tablespace	Not applicable	Rollback Segments Trans	Tablespace Interval(PI_PITS)	Not supported
Tablespace	Sort Segments	Sort Segments	Tablespace Interval(PI_PITS)	Supported
Tablespace	Not applicable	Sorting Users	Tablespace Interval(PI_PITS)	Not supported
Tablespace	Not applicable	Start Time	Tablespace Interval(PI_PITS)	Not supported
Tablespace	Not applicable	Tablespace Name	Tablespace Interval(PI_PITS)	Not supported
Tablespace	Not applicable	Write %	Tablespace Interval(PI_PITS)	Not supported
Tablespace	Write IOPS	Writes/sec	Tablespace Interval(PI_PITS)	Supported

Table A.8 Metrics for Agent for Microsoft SQL Server

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Availability	Database Interval(PI_DI)	Not supported
Not applicable	Not applicable	DB Name	Database Interval(PI_DI)	Not supported
Not applicable	Not applicable	DB Owner	Database Interval(PI_DI)	Not supported
Not applicable	Not applicable	DBID	Database Interval(PI_DI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Data Growth %	Database Interval(PI_DI)	Not supported
Not applicable	Not applicable	Index Growth %	Database Interval(PI_DI)	Not supported
Not applicable	Not applicable	Log Growth %	Database Interval(PI_DI)	Not supported
Not applicable	Not applicable	Options	Database Interval(PI_DI)	Not supported
Not applicable	Not applicable	Record Time	Database Interval(PI_DI)	Not supported
Not applicable	Not applicable	Record Type	Database Interval(PI_DI)	Not supported
Not applicable	Not applicable	Start Time	Database Interval(PI_DI)	Not supported
Not applicable	Not applicable	Tran Log Dumps	Database Interval(PI_DI)	Not supported
Not applicable	Not applicable	Cache Avg Scan	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Conns	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	CPU %	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	CPU Time	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	CPU Timeticks	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	I/O %	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	I/O Time	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	I/O Timeticks	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Idle %	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Idle Time	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Idle Timeticks	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Lazy Writes/sec	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Log Writes/sec	Global Server Summary(PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Net Queue	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Net Reads/sec	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Net Writes/sec	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Pkt Errors	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Pkts Rcvd	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Pkts Sent	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Reads Pending	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Record Time	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Record Type	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Start Time	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Timeticks	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Total Errors	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Total Reads	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Total Writes	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Trans/sec	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	Writes Pending	Global Server Summary(PI)	Not supported
Not applicable	Not applicable	DB Name	Replication Published Database Overview(PI_RPDB)	Not supported
Not applicable	Not applicable	Record Time	Replication Published Database Overview(PI_RPDB)	Not supported
Not applicable	Not applicable	Record Type	Replication Published Database Overview(PI_RPDB)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Replicated Trans	Replication Published Database Overview(PI_RPDB)	Not supported
Not applicable	Not applicable	Replicated Trans/sec	Replication Published Database Overview(PI_RPDB)	Not supported
Not applicable	Not applicable	Replication Latency	Replication Published Database Overview(PI_RPDB)	Not supported
Not applicable	Not applicable	Start Time	Replication Published Database Overview(PI_RPDB)	Not supported
Not applicable	Not applicable	Avg Cache Scan	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Cache Buffers Free	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Cache Hit %	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Command Queue Length	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Lazy Writes/sec	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Log Writes/sec	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Max Cache Scan	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Max Tempdb Space Used Mbytes	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Max Users Conn'd	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Net Reads/sec	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Net Writes/sec	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Page Reads/sec	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Page Writes/sec	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	RA Pages Fetched into Cache/sec	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	RA Pages Found in Cache/sec	Server Overview(PI_SERV)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	RA Physical Reads/sec	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	RA Slots Used	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Reads Pending	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Record Time	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Record Type	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Start Time	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Trans/sec	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	User Conns	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Writes Pending	Server Overview(PI_SERV)	Not supported
Not applicable	Not applicable	Data Mbytes	Server Space Interval(PI_SI)	Not supported
Not applicable	Not applicable	DB Size	Server Space Interval(PI_SI)	Not supported
Not applicable	Not applicable	Free %	Server Space Interval(PI_SI)	Not supported
Not applicable	Not applicable	Free Mbytes	Server Space Interval(PI_SI)	Not supported
Not applicable	Not applicable	Index Mbytes	Server Space Interval(PI_SI)	Not supported
Not applicable	Not applicable	Log Mbytes	Server Space Interval(PI_SI)	Not supported
Not applicable	Not applicable	Record Time	Server Space Interval(PI_SI)	Not supported
Not applicable	Not applicable	Record Type	Server Space Interval(PI_SI)	Not supported
Not applicable	Not applicable	Rsvd Mbytes	Server Space Interval(PI_SI)	Not supported
Not applicable	Not applicable	Start Time	Server Space Interval(PI_SI)	Not supported
Not applicable	Not applicable	Unused %	Server Space Interval(PI_SI)	Not supported
Not applicable	Not applicable	Unused Mbytes	Server Space Interval(PI_SI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	DB Name	Transaction Log Overview(PI_TLOG)	Not supported
Not applicable	Not applicable	Log Size Mbytes	Transaction Log Overview(PI_TLOG)	Not supported
Not applicable	Not applicable	Log Space Used %	Transaction Log Overview(PI_TLOG)	Not supported
Not applicable	Not applicable	Max Log Space Used %	Transaction Log Overview(PI_TLOG)	Not supported
Not applicable	Not applicable	Max Log Space Used Mbytes	Transaction Log Overview(PI_TLOG)	Not supported
Not applicable	Not applicable	Record Time	Transaction Log Overview(PI_TLOG)	Not supported
Not applicable	Not applicable	Record Type	Transaction Log Overview(PI_TLOG)	Not supported
Not applicable	Not applicable	Start Time	Transaction Log Overview(PI_TLOG)	Not supported
Not applicable	Not applicable	Record Time	User-Defined Counter Overview(PI_UCTR)	Not supported
Not applicable	Not applicable	Record Type	User-Defined Counter Overview(PI_UCTR)	Not supported
Not applicable	Not applicable	SQL User Counter 1	User-Defined Counter Overview(PI_UCTR)	Not supported
Not applicable	Not applicable	SQL User Counter 2	User-Defined Counter Overview(PI_UCTR)	Not supported
Not applicable	Not applicable	SQL User Counter 3	User-Defined Counter Overview(PI_UCTR)	Not supported
Not applicable	Not applicable	SQL User Counter 4	User-Defined Counter Overview(PI_UCTR)	Not supported
Not applicable	Not applicable	SQL User Counter 5	User-Defined Counter Overview(PI_UCTR)	Not supported
Not applicable	Not applicable	SQL User Counter 6	User-Defined Counter Overview(PI_UCTR)	Not supported
Not applicable	Not applicable	SQL User Counter 7	User-Defined Counter Overview(PI_UCTR)	Not supported
Not applicable	Not applicable	SQL User Counter 8	User-Defined Counter Overview(PI_UCTR)	Not supported
Not applicable	Not applicable	SQL User Counter 9	User-Defined Counter Overview(PI_UCTR)	Not supported
Not applicable	Not applicable	SQL User Counter 10	User-Defined Counter Overview(PI_UCTR)	Not supported
Not applicable	Not applicable	Start Time	User-Defined Counter Overview(PI_UCTR)	Not supported

Table A.9 Metrics for Agent for DB2

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Agents Created Empty Pool	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Agents Created Pool Rate	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Agents From Pool	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Agents Registered	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Agents Registered Top	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Agents Waiting On Token	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Agents Waiting Top	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Comm Private Mem	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Cons In Exec Total	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Cons Total	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	DB2 Status	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Interval	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Local Cons	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Local Cons In Exec	Basic Information on Database Manager Interval(PI_PI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Post Threshold Hash Joins	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Product Name	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Record Time	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Record Type	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Rem Cons In	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Rem Cons In Exec	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Service Level	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Sort Heap Allocated	Basic Information on Database Manager Interval(PI_PI)	Not supported
Not applicable	Not applicable	Interval	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Data Reads	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Data Reads Rate	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Data Writes	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Data Writes Rate	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Index Reads	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Index Reads Rate	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Pool Async Index Writes	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Index Writes Rate	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Read Time	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Read Time Avg	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Total Reads	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Total Writes	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Write Time	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Async Write Time Avg	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Data From Estore	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Data Hit Rate	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Data L Reads	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Data P Reads	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Data To Estore	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Data Writes	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Drty PG Steal Clns	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Pool Drty PG Steal Clns Rate	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Drty PG Thrsh Clns	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Index From Estore	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Index Hit Rate	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Index L Reads	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Index P Reads	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Index To Estore	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Index Writes	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Lsn Gap Clns	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Read Time	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Read Time Avg	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Total Hit Rate	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Total Writes	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Write Time	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Pool Write Time Avg	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported

Resource	Metrics		Record ID	Whether alerts can be set using the GUI
	Main Console	Performance Reporter		
Not applicable	Not applicable	Record Time	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Record Type	Bufferpool Stat on Database Interval(PI_DBPI)	Not supported
Not applicable	Not applicable	Cat Cache Inserts	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Cat Cache Lookups	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Cat Cache Needed Minisize	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Cat Cache Overflows	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Cat Cache Size Top	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Catcache Hit Rate	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Interval	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Pkg Cache Hit Rate	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Pkg Cache Inserts	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Pkg Cache Lookups	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Pkg Cache Needed Minisize	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Pkg Cache Num Overflows	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Pkg Cache Size Top	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Record Time	Cache on Database Interval(PI_DCAI)	Not supported
Not applicable	Not applicable	Record Type	Cache on Database Interval(PI_DCAI)	Not supported

A.2 Metrics Displayed by Tuning Manager and the Versions of Agents from which Information is Collected

This appendix describes the correspondence between the metrics displayed by Tuning Manager and the versions of the Agents from which information is collected.

A.2.1 Storage Resources and the Versions of Agents from which Information is Collected

Tables A.10 through A.12 contain information about storage resources and the versions of the Agents from which the information is collected.

Table A.10 Storage Resources and the Versions of Agents from which Information is Collected (Thunder series)

Resource	Metrics		Agent versions[Note 1]	Thunder 9200	Thunder 9500V series
Storage	Basic Information	Name		Supported	Supported
	Configuration Information	Subsystems		Supported	Supported
	Performance Information	Port Transfer		Not Supported (Always 0)	Supported
		Disk Transfer		Not Supported (Always 0)	Supported
		Port IOPS		Not Supported (Always 0)	Supported
		Disk IOPS		Supported	Supported
Subsystem	Basic Information	Name	All versions of Agent for RAID	Supported	Supported
		Serial Number	All versions of Agent for RAID	Supported	Supported
		Vendor	All versions of Agent for RAID	Supported	Supported
		Product	All versions of Agent for RAID	Supported	Supported
	Configuration Information	Ports		Supported	Supported
		Array Groups		Supported	Supported
		Logical Disks	All versions of Agent for RAID	Supported	Supported

Resource	Metrics		Agent versions[Note 1]	Thunder 9200	Thunder 9500V series
Subsystem	Performance Information	Port IOPS		Not Supported (Always 0)	Supported
		Port Transfer		Not Supported (Always 0)	Supported
		Port Min IOPS		Not Supported (Always 0)	Supported
		Port Min Transfer		Not Supported (Always 0)	Supported
		Port Max IOPS		Not Supported (Always 0)	Supported
		Port Max Transfer		Not Supported (Always 0)	Supported
		Installed Memory Capacity	Agent for RAID v4.0 or later	Supported	Supported
		Cache Capacity	All versions of Agent for RAID	Not Supported (Always 0)	Supported
		Cache Usage	All versions of Agent for RAID	Not Supported (Always 0)	Supported
		Cache %	All versions of Agent for RAID	Not Supported (Always n/a)	Supported
		Write Pending Rate	Agent for RAID v4.0 or later	Not Supported (Always 0)	Supported
		Max Write Pending Rate	Agent for RAID v4.0 or later	Not Supported (Always 0)	Supported
		Side File Usage	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		Max Side File Usage	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		Disk IOPS	All versions of Agent for RAID	Supported	Supported
		Disk Read IOPS	All versions of Agent for RAID	Supported	Supported
		Disk Write IOPS	All versions of Agent for RAID	Supported	Supported
		Disk Transfer	All versions of Agent for RAID	Not Supported (Always 0)	Supported
		Disk Read Transfer	All versions of Agent for RAID	Not Supported (Always 0)	Supported
		Disk Write Transfer	All versions of Agent for RAID	Not Supported (Always 0)	Supported

Resource	Metrics		Agent versions[Note 1]	Thunder 9200	Thunder 9500V series
SLPR	Basic Information	Name	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		SLPR Number	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
	Configuration Information	Array Groups		Not Applicable	Not Applicable
		Ports		Not Applicable	Not Applicable
		Logical Disks		Not Applicable	Not Applicable
		Cache Capacity		Not Applicable	Not Applicable
Port	Basic Information	Name	All versions of Agent for RAID	Supported	Supported
		Port Speed	Agent for RAID v4.0 or later	Supported	Supported
		Port Role	Agent for RAID v5.0 or later	Not Supported (Always n/a)	Not Supported (Always n/a)
		WWN Port	Agent for RAID v3.5 or later	Supported	Supported
		Port number	All versions of Agent for RAID	Supported	Supported
	Configuration Information	Port IOPS	All versions of Agent for RAID	Not Supported (Always 0)	Supported
		Port Max IOPS	All versions of Agent for RAID	Not Supported (Always 0)	Supported
		Port Min IOPS	All versions of Agent for RAID	Not Supported (Always 0)	Supported
		Port Transfer	All versions of Agent for RAID	Not Supported (Always 0)	Supported
		Port Max Transfer	All versions of Agent for RAID	Not Supported (Always 0)	Supported
		Port Min Transfer	All versions of Agent for RAID	Not Supported (Always 0)	Supported
LDEV	Basic Information	Name	Agent for RAID v3.0	Supported	Supported
			Agent for RAID v3.5 or later	Supported	Supported
		Model	Agent for RAID v3.5 or later	Not Supported (Always n/a)	Not Supported (Always n/a)

Resource	Metrics		Agent versions[Note 1]	Thunder 9200	Thunder 9500V series
LDEV	Configuration Information	Array Group	All versions of Agent for RAID	Supported	Supported
		RAID LEVEL	Agent for RAID v3.5 or later	Supported	Supported
			Agent for RAID v3.0	Supported	Supported
		CLPR	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		External Storage	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		External Array Group		Not Applicable	Not Applicable
		External Logical Disk	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
	Performance Information	Read Hit Ratio	All versions of Agent for RAID	Supported	Supported
		Write Hit Ratio	All versions of Agent for RAID	Supported	Supported
		Disk IOPS	All versions of Agent for RAID	Supported	Supported
		Disk Read IOPS	All versions of Agent for RAID	Supported	Supported
		Disk Write IOPS	All versions of Agent for RAID	Supported	Supported
		Disk Random IOPS	Agent for RAID v5.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Disk Sequential IOPS	Agent for RAID v5.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Disk Transfer	All versions of Agent for RAID	Not Supported (Always 0)	Supported
		Disk Read Transfer	All versions of Agent for RAID	Not Supported (Always 0)	Supported
		Disk Write Transfer	All versions of Agent for RAID	Not Supported (Always 0)	Supported
		Disk Random Transfer	Agent for RAID v5.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Disk Sequential Transfer	Agent for RAID v5.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
		I/O Response Time	Agent for RAID v4.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Historical Response Time		Not Supported (Always 0)	Not Supported (Always 0)

Resource	Metrics		Agent versions[Note 1]	Thunder 9200	Thunder 9500V series
LDEV	Performance Information	Delta		Not Supported (Always n/a)	Not Supported (Always n/a)
		Read I/O Response Time	Agent for RAID v4.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Write I/O Response Time	Agent for RAID v4.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
Internal LDEV[Note 3]	Basic Information	Name	Agent for RAID v3.5 or later	Supported	Supported
		RAID LEVEL	Agent for RAID v3.5 or later	Supported	Supported
	Configuration Information	Main LDEV	Agent for RAID v3.5 or later	Supported	Supported
		Array Group	Agent for RAID v3.5 or later	Supported	Supported
		External Storage	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		External Array Group		Not Applicable	Not Applicable
		External Logical Disk	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
Array Group	Basic Information	Name	Agent for RAID v3.5 or later	Supported	Supported
		RAID LEVEL	Agent for RAID v3.5 or later	Supported	Supported
	Configuration Information	CLPR	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
	Performance Information	Usage	Agent for RAID v4.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Max Usage	Agent for RAID v4.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Disk IOPS	Agent for RAID v3.5 or later	Supported	Supported
		Disk Read IOPS	Agent for RAID v3.5 or later	Supported	Supported
		Disk Write IOPS	Agent for RAID v3.5 or later	Supported	Supported
		Disk Random IOPS	Agent for RAID v5.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Disk Sequential IOPS	Agent for RAID v5.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Disk Transfer	Agent for RAID v3.5 or later	Not Supported (Always 0)	Not Supported (Always 0)

Resource	Metrics		Agent versions[Note 1]	Thunder 9200	Thunder 9500V series
Array Group	Performance Information	Disk Read Transfer	Agent for RAID v3.5 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Disk Write Transfer	Agent for RAID v3.5 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Disk Random Transfer	Agent for RAID v5.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Disk Sequential Transfer	Agent for RAID v5.0 or later	Not Supported (Always 0)	Not Supported (Always 0)
		Read Hit Ratio	Agent for RAID v3.5 or later	Supported	Supported
		Write Hit Ratio	Agent for RAID v3.5 or later	Supported	Supported
CLPR	Basic Information	Name	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		CLPR Number	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
	Performance Information	Cache Capacity	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		Write Pending Rate	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		Max Write Pending Rate	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		Side File Usage	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		Max Side File Usage	Agent for RAID v4.0 or later	Not Applicable	Not Applicable

Table A.11 Storage Resources and the Versions of Agents from which Information is Collected (Lightning series)

Resource	Metrics		Agent versions[Note 1]	Lightning 9900 series	Lighting 9900V series
Storage	Basic Information	Name		Supported	Supported
	Configuration Information	Subsystems		Supported	Supported
	Performance Information	Port Transfer		Supported	Supported
		Disk Transfer		Supported	Supported
		Port IOPS		Supported	Supported
		Disk IOPS		Supported	Supported

Resource	Metrics		Agent versions[Note 1]	Lightning 9900 series	Lighting 9900V series
Subsystem	Basic Information	Name	All versions of Agent for RAID	Supported	Supported
		Serial Number	All versions of Agent for RAID	Supported	Supported
		Vendor	All versions of Agent for RAID	Supported	Supported
		Product	All versions of Agent for RAID	Supported	Supported
	Configuration Information	Ports		Supported	Supported
		Array Groups		Not Supported (Always 0)	Supported
		Logical Disks	All versions of Agent for RAID	Supported	Supported
	Performance Information	Port IOPS		Supported	Supported
		Port Transfer		Supported	Supported
		Port Min IOPS		Supported	Supported
		Port Min Transfer		Supported	Supported
		Port Max IOPS		Supported	Supported
		Port Max Transfer		Supported	Supported
		Installed Memory Capacity	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		Cache Capacity	All versions of Agent for RAID	Supported	Supported
		Cache Usage	All versions of Agent for RAID	Supported	Supported
		Cache %	All versions of Agent for RAID	Supported	Supported
		Write Pending Rate	Agent for RAID v4.0 or later	Supported	Supported
		Max Write Pending Rate	Agent for RAID v4.0 or later	Supported	Supported
		Side File Usage	Agent for RAID v4.0 or later	Supported	Supported
		Max Side File Usage	Agent for RAID v4.0 or later	Supported	Supported
		Disk IOPS	All versions of Agent for RAID	Supported	Supported
		Disk Read IOPS	All versions of Agent for RAID	Supported	Supported

Resource	Metrics		Agent versions[Note 1]	Lightning 9900 series	Lighting 9900V series
Subsystem	Performance Information	Disk Write IOPS	All versions of Agent for RAID	Supported	Supported
		Disk Transfer	All versions of Agent for RAID	Supported	Supported
		Disk Read Transfer	All versions of Agent for RAID	Supported	Supported
		Disk Write Transfer	All versions of Agent for RAID	Supported	Supported
SLPR	Basic Information	Name	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		SLPR Number	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
	Configuration Information	Array Groups		Not Applicable	Not Applicable
		Ports		Not Applicable	Not Applicable
		Logical Disks		Not Applicable	Not Applicable
		Cache Capacity		Not Applicable	Not Applicable
Port	Basic Information	Name	All versions of Agent for RAID	Supported	Supported
		Port Speed	Agent for RAID v4.0 or later	Not Supported (Always n/a)	Supported
		Port Role	Agent for RAID v5.0 or later	Supported	Supported
		WWN Port	Agent for RAID v3.5 or later	Supported	Supported
		Port number	All versions of Agent for RAID	Supported	Supported
	Configuration Information	Port IOPS	All versions of Agent for RAID	Supported	Supported
		Port Max IOPS	All versions of Agent for RAID	Supported	Supported
		Port Min IOPS	All versions of Agent for RAID	Supported	Supported
		Port Transfer	All versions of Agent for RAID	Supported	Supported
		Port Max Transfer	All versions of Agent for RAID	Supported	Supported
		Port Min Transfer	All versions of Agent for RAID	Supported	Supported

Resource	Metrics		Agent versions[Note 1]	Lightning 9900 series	Lighting 9900V series
LDEV	Basic Information	Name	Agent for RAID v3.0	Supported	Supported
			Agent for RAID v3.5 or later	Supported	Supported
		Model	Agent for RAID v3.5 or later	Not Supported (Always n/a)	Supported
	Configuration Information	Array Group	All versions of Agent for RAID	Not Supported (Always n/a)	Supported
		RAID LEVEL	Agent for RAID v3.5 or later	Not Supported (Always n/a)	Supported
			Agent for RAID v3.0	Not Supported (Always n/a)	Supported
		CLPR	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		External Storage	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		External Array Group		Not Applicable	Not Applicable
		External Logical Disk	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
	Performance Information	Read Hit Ratio	All versions of Agent for RAID	Supported	Supported
		Write Hit Ratio	All versions of Agent for RAID	Not Supported (Always 0)	Not Supported (Always 0)
		Disk IOPS	All versions of Agent for RAID	Supported	Supported
		Disk Read IOPS	All versions of Agent for RAID	Supported	Supported
		Disk Write IOPS	All versions of Agent for RAID	Supported	Supported
		Disk Random IOPS	Agent for RAID v5.0 or later	Supported	Supported
		Disk Sequential IOPS	Agent for RAID v5.0 or later	Supported	Supported
		Disk Transfer	All versions of Agent for RAID	Supported	Supported
		Disk Read Transfer	All versions of Agent for RAID	Supported	Supported
		Disk Write Transfer	All versions of Agent for RAID	Supported	Supported
		Disk Random Transfer	Agent for RAID v5.0 or later	Supported	Supported

Resource	Metrics		Agent versions[Note 1]	Lightning 9900 series	Lighting 9900V series
LDEV	Performance Information	Disk Sequential Transfer	Agent for RAID v5.0 or later	Supported	Supported
		I/O Response Time	Agent for RAID v4.0 or later	Not Supported (Always 0)	Supported
		Historical Response Time		Not Supported (Always 0)	Supported
		Delta		Not Supported (Always n/a)	Supported
		Read I/O Response Time	Agent for RAID v4.0 or later	Not Supported (Always 0)	Supported
		Write I/O Response Time	Agent for RAID v4.0 or later	Not Supported (Always 0)	Supported
Internal LDEV[Note 3]	Basic Information	Name	Agent for RAID v3.5 or later	Supported	Supported
		RAID LEVEL	Agent for RAID v3.5 or later	Not Supported (Always n/a)	Supported
	Configuration Information	Main LDEV	Agent for RAID v3.5 or later	Supported	Supported
		Array Group	Agent for RAID v3.5 or later	Not Supported (Always n/a)	Supported
		External Storage	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		External Array Group		Not Applicable	Not Applicable
		External Logical Disk	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
Array Group	Basic Information	Name	Agent for RAID v3.5 or later	Not Supported Note 4	Supported
		RAID LEVEL	Agent for RAID v3.5 or later	Not Supported Note 4	Supported
	Configuration Information	CLPR	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
	Performance Information	Usage	Agent for RAID v4.0 or later	Not Supported Note 4	Supported
		Max Usage	Agent for RAID v4.0 or later	Not Supported Note 4	Supported
		Disk IOPS	Agent for RAID v3.5 or later	Not Supported Note 4	Supported
		Disk Read IOPS	Agent for RAID v3.5 or later	Not Supported Note 4	Supported
		Disk Write IOPS	Agent for RAID v3.5 or later	Not Supported Note 4	Supported

Resource	Metrics		Agent versions[Note 1]	Lightning 9900 series	Lighting 9900V series
Array Group	Performance Information	Disk Random IOPS	Agent for RAID v5.0 or later	Not Supported (Always 0)	Supported
		Disk Sequential IOPS	Agent for RAID v5.0 or later	Not Supported (Always 0)	Supported
		Disk Transfer	Agent for RAID v3.5 or later	Not Supported Note 4	Supported
		Disk Read Transfer	Agent for RAID v3.5 or later	Not Supported Note 4	Supported
		Disk Write Transfer	Agent for RAID v3.5 or later	Not Supported Note 4	Supported
		Disk Random Transfer	Agent for RAID v5.0 or later	Not Supported (Always 0)	Supported
		Disk Sequential Transfer	Agent for RAID v5.0 or later	Not Supported (Always 0)	Supported
		Read Hit Ratio	Agent for RAID v3.5 or later	Not Supported Note 4	Supported
		Write Hit Ratio	Agent for RAID v3.5 or later	Not Supported Note 4	Not Supported (Always 0)
CLPR	Basic Information	Name	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		CLPR Number	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
	Performance Information	Cache Capacity	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		Write Pending Rate	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		Max Write Pending Rate	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		Side File Usage	Agent for RAID v4.0 or later	Not Applicable	Not Applicable
		Max Side File Usage	Agent for RAID v4.0 or later	Not Applicable	Not Applicable

Table A.12 Storage Resources and the Versions of Agents from which Information is Collected (TagmaStore)

Resource	Metrics		Agent versions[Note 1]	TagmaStore USP	TagmaStore AMS	Universal Storage Platform V /VM series
Storage	Basic Information	Name		Supported	Supported	Supported
	Configuration Information	Subsystems		Supported	Supported	Supported
	Performance Information	Port Transfer		Supported	Supported	Supported
		Disk Transfer		Supported	Supported	Supported
		Port IOPS		Supported	Supported	Supported
		Disk IOPS		Supported	Supported	Supported
Subsystem	Basic Information	Name	All versions of Agent for RAID	Supported	Supported	Supported
		Serial Number	All versions of Agent for RAID	Supported	Supported	Supported
		Vendor	All versions of Agent for RAID	Supported	Supported	Supported
		Product	All versions of Agent for RAID	Supported	Supported	Supported
	Configuration Information	Ports		Supported	Supported	Supported
		Array Groups		Supported	Supported	Supported
		Logical Disks	All versions of Agent for RAID	Supported	Supported	Supported
	Performance Information	Port IOPS		Supported	Supported	Supported
		Port Transfer		Supported	Supported	Supported
		Port Min IOPS		Supported	Supported	Supported
		Port Min Transfer		Supported	Supported	Supported
		Port Max IOPS		Supported	Supported	Supported
		Port Max Transfer		Supported	Supported	Supported
		Installed Memory Capacity	Agent for RAID v4.0 or later	Not Applicable	Supported	Not Applicable
		Cache Capacity	All versions of Agent for RAID	Supported	Supported	Supported
		Cache Usage	All versions of Agent for RAID	Supported Note 2	Supported	Supported Note 2

Resource	Metrics		Agent versions[Note 1]	TagmaStore USP	TagmaStore AMS	Universal Storage Platform V /VM series
Subsystem	Performance Information	Cache %	All versions of Agent for RAID	Supported Note 2	Supported	Supported Note 2
		Write Pending Rate	Agent for RAID v4.0 or later	Supported	Supported	Supported
		Max Write Pending Rate	Agent for RAID v4.0 or later	Supported	Supported	Supported
		Side File Usage	Agent for RAID v4.0 or later	Supported	Supported	Supported
		Max Side File Usage	Agent for RAID v4.0 or later	Supported	Supported	Supported
		Disk IOPS	All versions of Agent for RAID	Supported	Supported	Supported
		Disk Read IOPS	All versions of Agent for RAID	Supported	Supported	Supported
		Disk Write IOPS	All versions of Agent for RAID	Supported	Supported	Supported
		Disk Transfer	All versions of Agent for RAID	Supported	Supported	Supported
		Disk Read Transfer	All versions of Agent for RAID	Supported	Supported	Supported
		Disk Write Transfer	All versions of Agent for RAID	Supported	Supported	Supported
SLPR	Basic Information	Name	Agent for RAID v4.0 or later	Supported	Not Applicable	Supported
		SLPR Number	Agent for RAID v4.0 or later	Supported	Not Applicable	Supported
	Configuration Information	Array Groups		Supported	Not Applicable	Supported
		Ports		Supported	Not Applicable	Supported
		Logical Disks		Supported	Not Applicable	Supported
		Cache Capacity		Supported	Not Applicable	Supported

Resource	Metrics		Agent versions[Note 1]	TagmaStore USP	TagmaStore AMS	Universal Storage Platform V /VM series
Port	Basic Information	Name	All versions of Agent for RAID	Supported	Supported	Supported
		Port Speed	Agent for RAID v4.0 or later	Supported	Supported	Supported
		Port Role	Agent for RAID v5.0 or later	Supported	Not Supported (Always n/a)	Supported
		WWN Port	Agent for RAID v3.5 or later	Supported	Supported	Supported
		Port number	All versions of Agent for RAID	Supported	Supported	Supported
	Configuration Information	Port IOPS	All versions of Agent for RAID	Supported	Supported	Supported
		Port Max IOPS	All versions of Agent for RAID	Supported	Supported	Supported
		Port Min IOPS	All versions of Agent for RAID	Supported	Supported	Supported
		Port Transfer	All versions of Agent for RAID	Supported	Supported	Supported
		Port Max Transfer	All versions of Agent for RAID	Supported	Supported	Supported
		Port Min Transfer	All versions of Agent for RAID	Supported	Supported	Supported
LDEV	Basic Information	Name	Agent for RAID v3.0	Not Applicable	Not Applicable	Not Applicable
			Agent for RAID v3.5 or later	Supported	Supported	Supported
		Model	Agent for RAID v3.5 or later	Supported	Not Supported (Always n/a)	Supported
	Configuration Information	Array Group	All versions of Agent for RAID	Supported	Supported	Supported
		RAID LEVEL	Agent for RAID v3.5 or later	Supported	Not Applicable	Supported
			Agent for RAID v3.0	Not Applicable	Supported	Not Applicable
		CLPR	Agent for RAID v4.0 or later	Not Supported	Supported	Not Supported
		External Storage	Agent for RAID v4.0 or later	Supported	Not Applicable	Supported
		External Array Group		Supported	Not Applicable	Supported

Resource	Metrics		Agent versions[Note 1]	TagmaStore USP	TagmaStore AMS	Universal Storage Platform V /VM series
LDEV	Configuration Information	External Logical Disk	Agent for RAID v4.0 or later	Supported	Not Applicable	Supported
	Performance Information	Read Hit Ratio	All versions of Agent for RAID	Supported	Supported	Supported
		Write Hit Ratio	All versions of Agent for RAID	Not Supported (Always 0)	Supported	Not Supported (Always 0)
		Disk IOPS	All versions of Agent for RAID	Supported	Supported	Supported
		Disk Read IOPS	All versions of Agent for RAID	Supported	Supported	Supported
		Disk Write IOPS	All versions of Agent for RAID	Supported	Supported	Supported
		Disk Random IOPS	Agent for RAID v5.0 or later	Supported	Not Supported (Always 0)	Supported
		Disk Sequential IOPS	Agent for RAID v5.0 or later	Supported	Not Supported (Always 0)	Supported
		Disk Transfer	All versions of Agent for RAID	Supported	Supported	Supported
		Disk Read Transfer	All versions of Agent for RAID	Supported	Supported	Supported
		Disk Write Transfer	All versions of Agent for RAID	Supported	Supported	Supported
		Disk Random Transfer	Agent for RAID v5.0 or later	Supported	Not Supported (Always 0)	Supported
		Disk Sequential Transfer	Agent for RAID v5.0 or later	Supported	Not Supported (Always 0)	Supported
		I/O Response Time	Agent for RAID v4.0 or later	Supported	Supported	Supported
		Historical Response Time		Supported	Supported	Supported
		Delta		Supported	Supported	Supported
		Read I/O Response Time	Agent for RAID v4.0 or later	Supported	Supported	Supported
		Write I/O Response Time	Agent for RAID v4.0 or later	Supported	Supported	Supported

Resource	Metrics		Agent versions[Note 1]	TagmaStore USP	TagmaStore AMS	Universal Storage Platform V /VM series
Internal LDEV[Note 3]	Basic Information	Name	Agent for RAID v3.5 or later	Supported	Supported	Supported
		RAID LEVEL	Agent for RAID v3.5 or later	Supported	Supported	Supported
	Configuration Information	Main LDEV	Agent for RAID v3.5 or later	Supported	Supported	Supported
		Array Group	Agent for RAID v3.5 or later	Supported	Supported	Supported
		External Storage	Agent for RAID v4.0 or later	Supported	Not Applicable	Supported
		External Array Group		Supported	Not Applicable	Supported
		External Logical Disk	Agent for RAID v4.0 or later	Supported	Not Applicable	Supported
Array Group	Basic Information	Name	Agent for RAID v3.5 or later	Supported	Supported	Supported
		RAID LEVEL	Agent for RAID v3.5 or later	Supported	Supported	Supported
	Configuration Information	CLPR	Agent for RAID v4.0 or later	Supported	Not Applicable	Supported
	Performance Information	Usage	Agent for RAID v4.0 or later	Supported	Not Supported (Always 0)	Supported
		Max Usage	Agent for RAID v4.0 or later	Supported	Not Supported (Always 0)	Supported
		Disk IOPS	Agent for RAID v3.5 or later	Supported	Supported	Supported
		Disk Read IOPS	Agent for RAID v3.5 or later	Supported	Supported	Supported
		Disk Write IOPS	Agent for RAID v3.5 or later	Supported	Supported	Supported
		Disk Random IOPS	Agent for RAID v5.0 or later	Supported	Not Supported (Always 0)	Supported
		Disk Sequential IOPS	Agent for RAID v5.0 or later	Supported	Not Supported (Always 0)	Supported
		Disk Transfer	Agent for RAID v3.5 or later	Supported	Supported	Supported
		Disk Read Transfer	Agent for RAID v3.5 or later	Supported	Supported	Supported

Resource	Metrics		Agent versions[Note 1]	TagmaStore USP	TagmaStore AMS	Universal Storage Platform V /VM series
Array Group	Performance Information	Disk Write Transfer	Agent for RAID v3.5 or later	Supported	Supported	Supported
		Disk Random Transfer	Agent for RAID v5.0 or later	Supported	Not Supported (Always 0)	Supported
		Disk Sequential Transfer	Agent for RAID v5.0 or later	Supported	Not Supported (Always 0)	Supported
		Read Hit Ratio	Agent for RAID v3.5 or later	Supported	Supported	Supported
		Write Hit Ratio	Agent for RAID v3.5 or later	Not Supported (Always 0)	Supported	Not Supported (Always 0)
CLPR	Basic Information	Name	Agent for RAID v4.0 or later	Supported	Supported	Supported
		CLPR Number	Agent for RAID v4.0 or later	Supported	Supported	Supported
	Performance Information	Cache Capacity	Agent for RAID v4.0 or later	Supported	Supported	Supported
		Write Pending Rate	Agent for RAID v4.0 or later	Supported	Supported	Supported
		Max Write Pending Rate	Agent for RAID v4.0 or later	Supported	Supported	Supported
		Side File Usage	Agent for RAID v4.0 or later	Supported	Supported	Supported
		Max Side File Usage	Agent for RAID v4.0 or later	Supported	Supported	Supported

Notes:

1: In blank columns, Tuning Manager displays calculation results or the result of setting fixed values.

2:If CLPRs have been created, Tuning Manager displays zero values for Cache Usage and Cache % because Agent for RAID cannot collect the cache usage metrics for each CLPR.

3:Here *Internal LDEV* means each logical device contained in an LUSE volume. An LUSE configuration is displayed only when Agent for RAID v5.0 or later is used to monitor the storage.

4:When the Lightning 9900 Series is monitored, Tuning Manager does not display metrics for **Array Group** in **Resource Tree.**

A.2.2 Server Resources and the Versions of Agents from which Information is Collected

Tables A.13 through A.15 contain information about server resources and the versions of the Agents from which the information is collected.

Table A.13 Server Resources and the Versions of Agents from which Information is Collected (Windows)

Resource	Metrics		Agent versions[Note]	Windows	Windows IPF
Wholenet	Basic Information	Name		Supported	Supported
	Configuration Information	Servers		Supported	Supported
		Local Filesystems		Supported	Supported
		Device Files		Supported	Supported
	Performance Information	IOPS	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Read IOPS	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Write IOPS	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Transfer	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Read Transfer	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable

Resource	Metrics		Agent versions[Note]	Windows	Windows IPF
Wholenet	Performance Information	Write Transfer	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
	Capacity Information	Capacity	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Used	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Free	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Free%	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Growth Rate	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
Sub Network	Basic Information	Name	All versions of Agent for RAID Map	Supported	Supported
		Subnet Mask	All versions of Agent for RAID Map	Supported	Supported
	Configuration Information	Servers		Supported	Supported
		Local Filesystems		Supported	Supported
		Device Files		Supported	Supported

Resource	Metrics		Agent versions[Note]	Windows	Windows IPF
Sub Network	Performance Information	IOPS	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Read IOPS	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Write IOPS	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Transfer	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Read Transfer	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Write Transfer	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
	Capacity Information	Capacity	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Used	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable

Resource	Metrics		Agent versions[Note]	Windows	Windows IPF
Sub Network	Capacity Information	Free	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Free%	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Growth Rate	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
Server	Basic Information	Name	All versions of Agent for Platform (Windows), All versions of Agent for Platform (Unix)	Supported	Supported
		OS	All versions of Agent for RAID Map	Supported	Supported
		IP Address	All versions of Agent for RAID Map	Supported	Supported
	Configuration Information	Local FileSystems		Supported	Supported
		Imported FileSystems		Not Supported (Always 0)	Not Supported (Always 0)
		Device Files		Supported	Supported
	Performance Information	CPU Usage	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Memory	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable

Resource	Metrics		Agent versions[Note]	Windows	Windows IPF
Server	Performance Information	IOPS	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Read IOPS	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Write IOPS	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Transfer	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Read Transfer	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Write Transfer	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
	Capacity Information	Capacity	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Used	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable

Resource	Metrics		Agent versions[Note]	Windows	Windows IPF
Server	Capacity Information	Free	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Free%	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Growth rate	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Filesystem Over Capacity		Supported	Supported
Local FileSystem	Basic Information	Name	All versions of Agent for RAID Map	Supported	Supported
		Filesystem Type		Supported (Always Win)	Supported (Always Win)
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
	Configuration Information	inodes	All versions of Agent for Platform (Unix)	Not Supported (Always n/a)	Not Supported (Always n/a)
		Volume	All versions of Agent for Platform (Unix)	Not Supported (Always n/a)	Not Supported (Always n/a)
		Disk Group	All versions of Agent for RAID Map	Supported	Supported

Resource	Metrics		Agent versions[Note]	Windows	Windows IPF
Local FileSystem	Capacity Information	Capacity	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Used	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Free	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Free%	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Growth rate	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Over Capacity	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
Remote Filesystem	Basic Information	Name	All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Type	All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
	Capacity Information	Capacity	All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Used	All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable

Resource	Metrics		Agent versions[Note]	Windows	Windows IPF
Remote Filesystem	Capacity Information	Free	All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Free%	All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Growth rate	All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Over Capacity		Not Applicable	Not Applicable
Device File	Basic Information	Name	All versions of Agent for RAID Map	Supported	Supported
		Target	All versions of Agent for RAID Map	Supported	Supported
		LUN	All versions of Agent for RAID Map	Supported	Supported
		WWN Node	All versions of Agent for RAID Map	Supported	Supported
		WWN Port	All versions of Agent for RAID Map	Supported	Supported
	Configuration Information	Filesystem	All versions of Agent for RAID Map	Supported	Supported
		Disk Group	All versions of Agent for RAID Map	Supported	Supported
		Product	All versions of Agent for RAID Map	Supported	Supported
		Vendor	All versions of Agent for RAID Map	Supported	Supported
		Serial Number	All versions of Agent for RAID Map	Supported	Supported
		Model	All versions of Agent for RAID Map	Supported	Supported
		Port	All versions of Agent for RAID Map	Supported	Supported

Resource	Metrics		Agent versions[Note]	Windows	Windows IPF
Device File	Configuration Information	Logical Disk	All versions of Agent for RAID Map	Supported	Supported
		RAID Level	All versions of Agent for RAID Map	Supported	Supported
		Array Group	All versions of Agent for RAID Map	Supported	Supported
	Performance Information	IO Response Time	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Historical Response Time		Supported	Supported
		Delta		Supported	Supported
		IOPS	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Transfer	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Read IOPS	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Read Transfer	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable

Resource	Metrics		Agent versions[Note]	Windows	Windows IPF
Device File	Performance Information	Write IOPS	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable
		Write Transfer	All versions of Agent for Platform (Windows)	Supported	Supported
			All versions of Agent for Platform (Unix)	Not Applicable	Not Applicable

Table A.14 Server Resources and the Versions of Agents from which Information is Collected (HP-UX and Solaris)

Resource	Metrics		Agent versions[Note]	HP-UX	HP-UX IPF	Solaris
Wholenet	Basic Information	Name		Supported	Supported	Supported
	Configuration Information	Servers		Supported	Supported	Supported
		Local Filesystems		Supported	Supported	Supported
		Device Files		Supported	Supported	Supported
	Performance Information	IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported
		Write IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported

Resource	Metrics		Agent versions[Note]	HP-UX	HP-UX IPF	Solaris
Wholenet	Performance Information	Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported
		Write Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported
	Capacity Information	Capacity	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Used	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free%	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Growth Rate	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported

Resource	Metrics		Agent versions[Note]	HP-UX	HP-UX IPF	Solaris
Sub Network	Basic Information	Name	All versions of Agent for RAID Map	Supported	Supported	Supported
		Subnet Mask	All versions of Agent for RAID Map	Supported	Supported	Supported
	Configuration Information	Servers		Supported	Supported	Supported
		Local Filesystems		Supported	Supported	Supported
		Device Files		Supported	Supported	Supported
	Performance Information	IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported
		Write IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported
		Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported
		Write Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported

Resource	Metrics		Agent versions[Note]	HP-UX	HP-UX IPF	Solaris
Sub Network	Capacity Information	Capacity	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Used	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free%	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Growth Rate	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
Server	Basic Information	Name	All versions of Agent for Platform (Windows), All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		OS	All versions of Agent for RAID Map	Supported	Supported	Supported
		IP Address	All versions of Agent for RAID Map	Supported	Supported	Supported
	Configuration Information	Local FileSystems		Supported	Supported	Supported
		Imported FileSystems		Supported	Supported	Supported
		Device Files		Supported	Supported	Supported

Resource	Metrics		Agent versions[Note]	HP-UX	HP-UX IPF	Solaris
Server	Performance Information	CPU Usage	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Memory	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported
		Write IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported
		Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported
		Write Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported

Resource	Metrics		Agent versions[Note]	HP-UX	HP-UX IPF	Solaris
Server	Capacity Information	Capacity	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Used	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free%	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Growth rate	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Filesystem Over Capacity		Supported	Supported	Supported
Local FileSystem	Basic Information	Name	All versions of Agent for RAID Map	Supported	Supported	Supported
		Filesystem Type		Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported

Resource	Metrics		Agent versions[Note]	HP-UX	HP-UX IPF	Solaris
Local FileSystem	Configuration Information	inodes	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Volume	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Disk Group	All versions of Agent for RAID Map	Supported	Supported	Supported
	Capacity Information	Capacity	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Used	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free%	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Growth rate	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Over Capacity	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported

Resource	Metrics		Agent versions[Note]	HP-UX	HP-UX IPF	Solaris
Remote Filesystem	Basic Information	Name	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Type	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
	Capacity Information	Capacity	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Used	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free%	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Growth rate	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Over Capacity		Supported	Supported	Supported
Device File	Basic Information	Name	All versions of Agent for RAID Map	Supported	Supported	Supported
		Target	All versions of Agent for RAID Map	Supported	Supported	Supported
		LUN	All versions of Agent for RAID Map	Supported	Supported	Supported
		WWN Node	All versions of Agent for RAID Map	Supported	Supported	Supported
		WWN Port	All versions of Agent for RAID Map	Supported	Supported	Supported

Resource	Metrics		Agent versions[Note]	HP-UX	HP-UX IPF	Solaris
Device File	Configuration Information	Filesystem	All versions of Agent for RAID Map	Supported	Supported	Supported
		Disk Group	All versions of Agent for RAID Map	Supported	Supported	Supported
		Product	All versions of Agent for RAID Map	Supported	Supported	Supported
		Vendor	All versions of Agent for RAID Map	Supported	Supported	Supported
		Serial Number	All versions of Agent for RAID Map	Supported	Supported	Supported
		Model	All versions of Agent for RAID Map	Supported	Supported	Supported
		Port	All versions of Agent for RAID Map	Supported	Supported	Supported
		Logical Disk	All versions of Agent for RAID Map	Supported	Supported	Supported
		RAID Level	All versions of Agent for RAID Map	Supported	Supported	Supported
		Array Group	All versions of Agent for RAID Map	Supported	Supported	Supported
	Performance Information	IO Response Time	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Historical Response Time		Not Applicable	Not Applicable	Not Applicable
		Delta		Not Applicable	Not Applicable	Not Applicable
		IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported

Resource	Metrics		Agent versions[Note]	HP-UX	HP-UX IPF	Solaris
Device File	Performance Information	Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported
		Read Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported
		Write IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported
		Write Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Not Supported (Always 0)	Supported

Note: In blank columns, Tuning Manager displays calculation results or the result of setting fixed values.

Table A.15 Server Resources and the Versions of Agents from which Information is Collected (AIX and Linux)

Resource	Metrics		Agent versions[Note]	AIX	Linux	Linux IPF
Wholenet	Basic Information	Name		Supported	Supported	Supported
	Configuration Information	Servers		Supported	Supported	Supported
		Local Filesystems		Supported	Supported	Supported
		Device Files		Supported	Supported	Supported

Resource	Metrics		Agent versions[Note]	AIX	Linux	Linux IPF
Wholenet	Performance Information	IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Supported	Supported
		Write IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Supported	Supported
		Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Write Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
	Capacity Information	Capacity	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Used	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported

Resource	Metrics		Agent versions[Note]	AIX	Linux	Linux IPF
Wholenet	Capacity Information	Free	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free%	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Growth Rate	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
Sub Network	Basic Information	Name	All versions of Agent for RAID Map	Supported	Supported	Supported
		Subnet Mask	All versions of Agent for RAID Map	Supported	Supported	Supported
	Configuration Information	Servers		Supported	Supported	Supported
		Local Filesystems		Supported	Supported	Supported
		Device Files		Supported	Supported	Supported
	Performance Information	IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Supported	Supported
		Write IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Supported	Supported

Resource	Metrics		Agent versions[Note]	AIX	Linux	Linux IPF
Sub Network	Performance Information	Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Write Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
	Capacity Information	Capacity	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Used	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free%	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Growth Rate	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported

Resource	Metrics		Agent versions[Note]	AIX	Linux	Linux IPF
Server	Basic Information	Name	All versions of Agent for Platform (Windows), All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		OS	All versions of Agent for RAID Map	Supported	Supported	Supported
		IP Address	All versions of Agent for RAID Map	Supported	Supported	Supported
	Configuration Information	Local FileSystems		Supported	Supported	Supported
		Imported FileSystems		Supported	Supported	Supported
		Device Files		Supported	Supported	Supported
	Performance Information	CPU Usage	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Memory	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Supported	Supported
		Write IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Supported	Supported

Resource	Metrics		Agent versions[Note]	AIX	Linux	Linux IPF
Server	Performance Information	Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Write Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
	Capacity Information	Capacity	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Used	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free%	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Growth rate	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported

Resource	Metrics		Agent versions[Note]	AIX	Linux	Linux IPF
Server	Capacity Information	Filesystem Over Capacity		Supported	Supported	Supported
Local FileSystem	Basic Information	Name	All versions of Agent for RAID Map	Supported	Supported	Supported
		Filesystem Type		Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
	Configuration Information	inodes	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Volume	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Disk Group	All versions of Agent for RAID Map	Supported	Supported	Supported
	Capacity Information	Capacity	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Used	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free%	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported

Resource	Metrics		Agent versions[Note]	AIX	Linux	Linux IPF
Local FileSystem	Capacity Information	Growth rate	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Over Capacity	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
Remote Filesystem	Basic Information	Name	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Type	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
	Capacity Information	Capacity	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Used	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Free%	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Growth rate	All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Over Capacity		Supported	Supported	Supported
Device File	Basic Information	Name	All versions of Agent for RAID Map	Supported	Supported	Supported
		Target	All versions of Agent for RAID Map	Not Supported (Always 0)	Supported	Supported
		LUN	All versions of Agent for RAID Map	Supported	Supported	Supported
		WWN Node	All versions of Agent for RAID Map	Supported	Supported	Supported

Resource	Metrics		Agent versions[Note]	AIX	Linux	Linux IPF
Device File	Basic Information	WWN Port	All versions of Agent for RAID Map	Supported	Supported	Supported
	Configuration Information	Filesystem	All versions of Agent for RAID Map	Supported	Supported	Supported
		Disk Group	All versions of Agent for RAID Map	Supported	Supported	Supported
		Product	All versions of Agent for RAID Map	Supported	Supported	Supported
		Vendor	All versions of Agent for RAID Map	Supported	Supported	Supported
		Serial Number	All versions of Agent for RAID Map	Supported	Supported	Supported
		Model	All versions of Agent for RAID Map	Supported	Supported	Supported
		Port	All versions of Agent for RAID Map	Supported	Supported	Supported
		Logical Disk	All versions of Agent for RAID Map	Supported	Supported	Supported
		RAID Level	All versions of Agent for RAID Map	Supported	Supported	Supported
		Array Group	All versions of Agent for RAID Map	Supported	Supported	Supported
	Performance Information	IO Response Time	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Historical Response Time		Not Applicable	Not Applicable	Not Applicable
		Delta		Not Applicable	Not Applicable	Not Applicable

Resource	Metrics		Agent versions[Note]	AIX	Linux	Linux IPF
Device File	Performance Information	IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Read IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Supported	Supported
		Read Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported
		Write IOPS	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Not Supported (Always 0)	Supported	Supported
		Write Transfer	All versions of Agent for Platform (Windows)	Not Applicable	Not Applicable	Not Applicable
			All versions of Agent for Platform (Unix)	Supported	Supported	Supported

Note: In blank columns, Tuning Manager displays calculation results or the result of setting fixed values.

A.2.3 Fabric Resources and the Versions of Agents from which Information is Collected

Table A.16 describes the information about fabric resources and the versions of the Agents from which the information is collected.

Table A.16 Fabric Resources and the Versions of Agents from which Information is Collected

Resource	Metrics		Agent versions[Note]	Brocade®	McDATA®
Fabric	Basic Information	Name		Supported	Supported
	Configuration Information	Fabrics		Supported	Supported
		Switches		Supported	Supported
	Performance Information	Received Bytes		Supported	Supported
		Transferred Bytes		Supported	Supported
		Received Frames		Supported	Supported
		Transferred Frames		Supported	Supported
Fabric instance	Basic Information	Name	All versions of Agent for Switch	Supported	Supported
	Configuration Information	Switches	All versions of Agent for Switch	Supported	Supported
		Principal Switch	All versions of Agent for Switch	Supported	Supported
		Ports		Supported	Supported
	Performance Information	Received Bytes		Supported	Supported
		Transferred Bytes		Supported	Supported
		Received Frames		Supported	Supported
		Transferred Frames		Supported	Supported
		Input Buffer Full		Supported	Supported
		Buffer Credit Zero State		Supported	Supported

Resource	Metrics		Agent versions[Note]	Brocade®	McDATA®
Switch	Basic Information	Name	All versions of Agent for Switch	Supported	Supported
		Model	All versions of Agent for Switch	Supported	Supported
		Vendor	All versions of Agent for Switch	Supported	Supported
		WWN	All versions of Agent for Switch	Supported	Supported
		Domain ID	All versions of Agent for Switch	Supported	Supported
Switch	Configuration Information	Ports	All versions of Agent for Switch	Supported	Supported
		Port Modules	All versions of Agent for Switch	Supported	Supported
	Performance Information	Received Bytes	All versions of Agent for Switch	Supported	Supported
		Transferred Bytes	All versions of Agent for Switch	Supported	Supported
		Received Frames	All versions of Agent for Switch	Supported	Supported
		Transferred Frames	All versions of Agent for Switch	Supported	Supported
		Input Buffer Full	All versions of Agent for Switch	Supported	Supported
		Buffer Credit Zero State	All versions of Agent for Switch	Supported	Supported
Switch port	Basic Information	Display Name	All versions of Agent for Switch	Supported	Supported
		Port Module	All versions of Agent for Switch	Supported	Supported
		Parent Switch	All versions of Agent for Switch	Supported	Supported
		Port Number	All versions of Agent for Switch	Supported	Supported
		Port Type	All versions of Agent for Switch	Supported	Supported
		Port Speed	All versions of Agent for Switch	Supported	Supported
		Port WWN	All versions of Agent for Switch	Supported	Supported

Resource	Metrics		Agent versions[Note]	Brocade®	McDATA®
Switch port	Performance Information	Received Bytes	All versions of Agent for Switch	Supported	Supported
		Transferred Bytes	All versions of Agent for Switch	Supported	Supported
		Received Frames	All versions of Agent for Switch	Supported	Supported
		Transferred Frames	All versions of Agent for Switch	Supported	Supported
		Input Buffer Full	All versions of Agent for Switch	Supported	Supported
		Buffer Credit Zero State	All versions of Agent for Switch	Supported	Supported

Note: In blank columns, Tuning Manager displays calculation results or the result of setting fixed values.

A.2.4 Oracle Resources and the Versions of Agents from which Information is Collected

Table A.17 describes the information about Oracle resources and the versions of the Agents from which the information is collected.

Table A.17 Oracle Resources and the Versions of Agents from which Information is Collected

Resource	Metrics		Agent versions[Note]
Oracle instance	Basic Information	Name	All versions of Agent for Oracle
		Version	All versions of Agent for Oracle
		Service ID	All versions of Agent for Oracle
	Configuration Information	Host	All versions of Agent for Oracle
		Table Spaces	
		Data Files	
	Performance Information	IOPS	
		Read IOPS	
		Write IOPS	
	Capacity Information	Capacity	
		Used	
		Free	
		Free%	
		Growth rate	

Resource	Metrics		Agent versions[Note]
TableSpace	Basic Information	Name	All versions of Agent for Oracle
	Configuration Information	Data Files	
		Rollback segments	All versions of Agent for Oracle
		Sort segments	All versions of Agent for Oracle
	Performance Information	IOPS	
		Read IOPS	
		Write IOPS	
TableSpace	Capacity Information	Capacity	All versions of Agent for Oracle
		Used	All versions of Agent for Oracle
		Free	All versions of Agent for Oracle
		Free%	
		Growth rate	
Data File	Basic Information	Name	All versions of Agent for Oracle
	Performance Information	IOPS	All versions of Agent for Oracle
		Read IOPS	All versions of Agent for Oracle
		Write IOPS	All versions of Agent for Oracle
	Capacity Information	Size	All versions of Agent for Oracle

Note: In blank columns, Tuning Manager displays calculation results or the result of setting fixed values.

A.3 Information Displayed on Main Console

The metrics displayed on Main Console are a part of data that Agent collects. To view the data that is not displayed in the Main Console, use Performance Reporter. For details about data to be collected by the Agent, see the following manuals:

- *HiCommand Tuning Manager Hardware Reports Reference*
- *HiCommand Tuning Manager Operating System Reports Reference*
- *HiCommand Tuning Manager Application Reports Reference*

A.3.1 For Universal Storage Platform V/VM series logical disks

When displaying metrics about logical disks of Universal Storage Platform V/VM series on Main Console, the following restrictions apply:

- Information about pools and V-VOLs of Dynamic Provisioning cannot be displayed on Main Console.
- Resource information for logical disks whose LDEV number is not in the range from 00:00:00 to 00:3F:FF cannot be displayed in the Main Console. Also, array groups and device files that are associated with these logical disks might not be displayed properly.

  Table A.18 shows information to be displayed when displaying metrics about logical disks of Universal Storage Platform V/VM series in the Main Console.

Table A.18 Universal Storage Platform V/VM series Logical Disks Displayed in Main Console

Information display area / Window	Item selected in the information display area or in the window	Information displayed
Navigation area	The LDEV item	LDEVs whose LDEV number is outside the range from 00:00:00 to 00:3F:FF are not displayed under the Logical Disks item in the Navigation area.
Application area	Logical disks contained in SLPR	The number displayed in the Logical Disks field in the Summary area is the total number of LDEVs whose LDEV number is in the range from 00:00:00 to 00:3F:FF. Note that the displayed number is not the total number of all the LDEVs contained in the SLPR. The LDEVs displayed in the Information area (Sub Resource section) have an LDEV number in the range from 00:00:00 to 00:3F:FF.
Application area	The SLPR item	The number displayed in the Logical Disks field in the Summary area is the total number of LDEVs whose LDEV number is in the range from 00:00:00 to 00:3F:FF. Note that the number is not the total number of all the LDEVs contained in the SLPR. The LDEVs displayed by clicking the **Logical Disks** tab in the Information area (Sub Resource section) have an LDEV number in the range from 00:00:00 to 00:3F:FF.

Information display area / Window	Item selected in the information display area or in the window	Information displayed
List Virtual Logical Disk window	When an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF is specified, or when an LDEV whose externally-connected LDEV number is not in the range from 00:00:00 to 00:3F:FF is specified.	If you specify, for the virtual logical disk, an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF, this LDEV is not displayed in the list. Also, if you use an externally-connected LDEV as the virtual logical disk and the LDEV number is not in the range from 00:00:00 to 00:3F:FF, the **External Logical Disk** area displays the LDEV number without adding a hyperlink. At the same time, the **External Array Group** area displays **n/a**.
Application area	An LDEV that is externally connected to an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF.	The **External Array Group** area of the Summary area displays **n/a**. The **External Logical Disk** area displays the LDEV number of the externally-connected LDEV, without adding a hyperlink.
Application area	A LUSE whose internal LDEVs contain, as an externally-connected LDEV, an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF.	The **External Array Group** area of the Summary area does not display the array groups associated with the LDEVs whose LDEV number is not in the range from 00:00:00 to 00:3F:FF. The **External Logical Disk** area displays the LDEV number of the externally-connected LDEV. If the displayed LDEV number is not in the range from 00:00:00 to 00:3F:FF, no hyperlink is added to the LDEV number. However, if the LDEV number is in the range from 00:00:00 to 00:3F:FF, a hyperlink is added to the LDEV number. If the LDEV whose LDEV number displayed in the Information area (Sub Resource section) is not in the range from 00:00:00 to 00:3F:FF, the **External Array Group** area displays **n/a**. The **External Logical Disk** area displays the LDEV number, without adding a hyperlink.
Application area	Server instances or device files (folder resource) that contain the instance of a device file that connects to an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF.	Of the device file information displayed by clicking the **HOST/Array Correlation** tab from the Information area (Sub Resource section), the following information is displayed on the array side for the device file that is connected to an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF: ▪ The **Logical Disk** area displays the LDEV number to which no hyperlink has been added. ▪ The **Response Time**, **Historical Response Time**, **Delta**, and **IOPS** areas display **n/a**. Of the device file information displayed by clicking the **Device Files** tab from the Information area (Sub Resource section), the following information is displayed for the device file that is connected to the LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF: ▪ The **Logical Disk** field displays the LDEV, without adding a hyperlink. ▪ The **Array Group** field displays **n/a**.

Information display area / Window	Item selected in the information display area or in the window	Information displayed
Application area	Resources in the Filesystems folder that contains a device file that connects to an LDEV whose LDEV number is not in the range	Of the device file information displayed by clicking the **HOST/Array Correlation** tab from the Information area (Sub Resource section) of the Application area, the following information is displayed on the array side for the device file that is connected to an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF: ▪ The **Logical Disk** area displays the LDEV number without adding a hyperlink. ▪ The **Response Time**, **Historical Response Time**, **Delta**, and **IOPS** areas display **n/a**.
List Device Files window	Out of the displayed device file information, the device file that is connected to an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF:	Information is displayed as follows: ▪ The **Logical Disk** area displays the LDEV number without adding a hyperlink. ▪ The **Array Group** field displays **n/a**.
List Connected Storage Resources window	A device file that uses an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF:	The **Connected Logical Disks** area does not display information for this LDEV. Also, the **Connected Array Group** area does not display information for the array group used by this LDEV. However, if the LDEV number is in the range from 00:00:00 to 00:3F:FF, and if there is an LDEV that is a monitoring target and uses the same array group, the LDEV and array group information is displayed.
Array Group History window Array Group Forecast window	Array Group History / Forecast window for the file system that contains a device file that uses an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF.	The array group used by this LDEV is not displayed in the list of choices. However, if the LDEV number is in the range from 00:00:00 to 00:3F:FF, and if there is an LDEV that is a monitoring target and uses the same array group, the array group used by the LDEV is displayed in the list of choices. In the Array Group History / Forecast window for the device file that uses an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF, no information is displayed.
Logical Disk History window Logical Disk Forecast window	Logical Disk History / Forecast window for the file system that contains a device file that uses an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF.	This LDEV is not displayed in the list of choices. In the Logical Disk History / Forecast window for the device file that uses an LDEV whose LDEV number is not in the range from 00:00:00 to 00:3F:FF, no information is displayed.

A.4 Agent Restrictions

This section describes the restrictions that apply to Agents when using the Main Console.

A.4.1 Managing Agents

You cannot add, delete, or update Agents during Tuning Manager polling. Perform these operations after the polling has finished.

Consult the system administrator for the polling schedule, interval, and period.

A.4.2 Restrictions Regarding the Combination of Agents

Depending on the combinations and versions of agents to be monitored, Tuning Manager might not be able to display parts of the information. Before operating Tuning Manager, see *Appendix A.2 Metrics Displayed by Tuning Manager and the Versions of the Agents from Which Information Is Collected* to check the restrictions regarding the combination of agents.

A.4.3 When Agent for RAID Map and Agent for Platform Do Not Monitor the Server

The following agents must be installed so that Tuning Manager can display server information:

- Agent for RAID Map
- Agent for Platform

When Agent for RAID Map and Agent for Platform do not monitor the server, the following restrictions are applied to Tuning Manager:

- In the Resource Tree, the network resources (**Whole Network**, **Subnetwork**, **Server**, **Filesystems**, and **Device Files**) are not displayed.
- No information is displayed in **List Connected Server** in the Advanced Information section.
- No information is displayed in the list of servers displayed by selecting **Agent** and **Monitored Logical Disks** in the Administrator view window.

A.4.4 When Agent for RAID (Earlier Than 4.1) Monitors Storage Subsystems

- Restriction when Agent for RAID (earlier than 4.1) monitors storage subsystems:

  If TagmaStore AMS is monitored, Tuning Manager displays SLPR0 only. The ports, logical disks, and array groups that are included in TagmaStore AMS are displayed as child resources of SLPR0. In such a case, Tuning Manager does not display CLPR.

- Restrictions when Agent for RAID (earlier than 4.0) monitors storage subsystems:

  Tuning Manager displays **n/a** for the following information:

  - Port Speed (for storage subsystems)
  - I/O Response Time, Read I/O Response Time, and Write I/O Response Time (for logical disks)
  - I/O Usage and Max I/O Usage (for array groups)
  - Cache Memory Installed Size, Write Pending Rate, Max Write Pending Rate, Side File Usage, and Max Side File Usage (for subsystems)

- Restriction when Agent for RAID (earlier than 3.5) monitors storage subsystems:

  If TagmaStore USP is monitored, Tuning Manager displays SLPR0 only. The ports, logical disks, and array groups that are included in TagmaStore USP are displayed as child resources of SLPR0. In such a case, Tuning Manager does not display CLPR.

- Restrictions when Agent for RAID (earlier than 3.2) monitors storage subsystems:

  - The array group resources are not displayed under **Subsystem** in the Resource Tree.
  - The LUSE configuration information is not displayed.

A.4.5 Monitoring of LDEVs Whose Logical Paths Are Not Set

Main Console can display the information of LDEVs whose logical paths are not set only when (i) the version of Agent for RAID is 5.1 or later, and (ii) the settings for acquiring such information were specified during setup of the instance environment.

For details on how to set up the instance environment of Agent for RAID, see the *HiCommand Tuning Manager Installation Guide*.

A.4.6 Disk Performance Metrics Collected by Agent for Platform

In a Windows 2000 environment where Agent for Platform is operating, the disk performance metrics for the disks whose disk names begin with `Harddisk` on the Windows 2000 Performance Monitor are displayed as `n/a` on the Tuning Manager window.

A.5 Technical Support

If you require support, please contact your administrator, first. Tuning Manager records extensive information in server-based logs. Your administrator may be able to identify further information related to your problem.

If you are unable to obtain answers your questions or require further support, gather the following related information before contacting the Support Center:

- Error code(s) and message(s) displayed in your browser
- When possible capture relevant screens
- Keep a record of actions leading to the error or unexpected event

The Hitachi Data Systems customer support staff is available 24 hours a day, seven days a week. If you need technical support, please call:

- United States: (800) 446-0744
- Outside of the United States: (858) 547-4526

Acronyms and Abbreviations

ASCII	American Standard Code for Information Interchange
CLI	Command Line Interface
CLPR	Cache Logical PaRtition
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
CSV	Comma Separated Values
DDL	Data Definition Language
GUI	Graphical User Interface
HA	High Availability
HDU	Hard Disk Unit
HTM	HiCommand Tuning Manager
HTTP	HyperText Transfer Protocol
I/O	Input/Output
ICMP	Internet Control Message Protocol
ID	identifier, identification
IP	Internet Protocol
IPF	Itanium® Processor Family
LAN	Local Area Network
LDEV	Logical Device Unit
LUN	logical unit number
LUSE	Logical Unit Size Expansion
MB	megabyte
MIB	Management Information Base
NAS	Network Attached Storage
NFS	Network File System
OS	Operating System
RAID	redundant array of inexpensive disks
SAN	Storage Area Network
SLPR	Storage Logical PaRtition
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SQL	structured query language
SSO	Single Sign On
SVP	SerVice Processor
TCP	transmission control protocol

UDP	User Datagram Protocol
WWN	World Wide Name
WWW	World Wide Web
XML	Extensible Markup Language

Glossary

Agent	One of the Tuning Manager product programs. Agents collect and record information about system performance and system configuration. Agents are available to suit the system being monitored (for example, HTM Agent, Agent for RAID, and Agent for Oracle).
Alarm	The definition of system behavior when data reaches the threshold value
Always Evaluated	Alerts using this setting will continuously be monitoring the conditions you specify.
Array Group	RAID array.
Array Groups	RAID arrays.
Average IOPS	The mean value of all IOPS measures for the time period specified in the Report Window Setting window.
Average Transfer	The mean value of all Transfer measures for the time period specified in the Report Window Setting window.
Bookmark	A bookmark that you can use to register reports with specified report definitions, report display conditions, and target agents. You can use a bookmark to display reports in fewer steps and to simultaneously display reports for different agents and reports with different report definitions.
Bookmarks	Named links kept in Tuning Manager which you save for easy access to pages throughout the software.
Buffer Credit Zero State	Indicates that the receiving switch port is busy as a result of consuming all available buffer credits. Tuning Manager increments the count for each occurrence of this condition.
Cache %	The portion of cache capacity used. Presented as a percentage. (Cache Usage / Cache Capacity) * 100
Cache Capacity	The full size of the cache.
Cache Free	The portion of unused cache capacity.
Cache Memory Installed Size	The total amount of cache memory installed in the Thunder 9500V Series.
Cache Usage	The portion of cache capacity used.
Capacity	Total storage space. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
Capacity Forecast	Predicted future storage free space and usage. A Forecast uses historical data as a sample to anticipate future values. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
Capacity History	Total storage space over your specified time span. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
CLPR	CLPR (cache logical partition) functionality enables partitioning (splitting) of a cache. This functionality partitions (that is, splits) the cache by array groups in the storage subsystem, so that other array groups do not affect cache performance.
CLPR Number	A number assigned to the CLPR selected in the Resource Tree.
Cluster system	A cluster system links multiple server systems together and operates them as one system. In this manual, the term cluster system means an HA cluster system.

Collection Interval	Tuning Manager stores metrics values for these intervals: hourly (every hour), daily (every day), monthly (every month) and yearly (every year).
Confidence Level	The confidence level you select for a forecast determines how broad a charted region will be drawn between likely upper and lower bounds. At a 0.95 confidence level, there is a 95% likelihood that the forecasted values will appear between the upper and lower error margins. (If you specify a 0.99 confidence level, the resulting chart presents a broader region between the upper and lower error margins.)
CPU Usage	Percentage of total CPU capacity used. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
Damping	A technique to avoid excessive alerts. Tuning Manager only triggers an alert when a specified number of occurrences (Damping Occurrences) within the specified number of samples (Damping Interval).
Damping Interval	When you enable damping in alert monitoring, this value determines how many samples will be evaluated. If your specified number of Damping Occurrences is reached within the damping interval, an alert will be issued.
Damping Occurrences	If damping is enabled, the number of times an alert condition must be met before an alert is issued. These occurrences must all be contained within your specified Damping Interval.
Data File	A collection of data stored on media as a unit within the filesystem.
Data Files	Collections of data stored on media as a unit within the filesystem. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
Data Point	A value for a specific metric at a specific point in time.
Data model	Collective name for the records and fields of each Agent. The data model is managed by the version.
Date	The Record Time for the data currently displayed.
Delimiter	A character or symbol indicating the delimitation of data.
Delta	Displaying the difference between the values of the previously collected data and currently collected data for the performance data of a field is called delta. The data source of the field is the information which is managed as cumulative values. For example, suppose a field whose data source is a counter for I/O processing, where the counter value obtained during the first collection is 3 and the counter value obtained during the second collection is 7. The output value of this field at the second collection is 7 (the counter value at the second collection) if the delta attribute is not applied to the field, or 4 (the difference between the first value and the second value) if the delta attribute is applied to the field.
Device File	On systems running the UNIX operating system, a file with specifications for a physical device. A device file indicates the location, type and method of access to a physical device.
Device Files	The quantity of device files at this level of the resource tree.
Disk Group	A group of disks representing a single logical storage resource.
Disk IOPS	Input/Output operations per second at the disk level.
Disk Random IOPS	Random operations per second at the disk level.
Disk Random Transfer	Random transfer rate at the disk level.
Disk Read IOPS	Read operations per second at the disk level.
Disk Read Transfer	The speed of data movement for read operations at the disk level.

Disk Sequential IOPS	Sequential operations per second at the disk level.
Disk Sequential Transfer	Sequential transfer rate at the disk level
Disk Transfer	The rate at which data is moved at the disk level.
Disk Write IOPS	Write operations per second at the disk level.
Disk Write Transfer	The rate of writes data movement at the disk level.
Domain ID	A unique integer identifier distinguishing the pool of resources which can be accessed by a given switch. Each switch uses the Domain ID in combination with the WWN addresses of the various attached devices to properly route data across the entire storage area network.
Drilldown report	A report that is associated with another report or a field in a report. You use a drilldown report to display detailed or related information about a report.
Executing node	A logical (or “active”) node that is executing tasks in the server systems making up a cluster system.
External Array Group	An Array Group to which the Logical Disk, allocated to the Universal Storage Platform V/VM series and TagmaStore USP as a Virtual Logical Disk, belongs.
External Logical Disk	A Logical Disk allocated to the Universal Storage Platform V/VM series and TagmaStore USP as a Virtual Logical Disk.
External Storage	The name of a storage subsystem externally connected to the Universal Storage Platform V/VM series and TagmaStore USP. The External Storage contains Logical Disks allocated to the Universal Storage Platform V/VM series and TagmaStore USP as Virtual Logical Disks.
Fabric	A network of interconnected fibre channel switches and cabling ensuring that one or more switches can transmit data between any two ports. The typical fabric includes at least two switches to provide fault tolerance.
Fabrics	Multiple networks of interconnected fibre channel switches and cabling. Each fabric maintains independent routing of data.
Failover	The transfer of processing of the server executing tasks from the executing node to a standby node if a failure occurs in a cluster system.
Field	A performance data item; multiple fields constitute a record.
Filesystem	The name of a filesystem. A filesystem is the scheme defining logical structures and software routines used to control access to the storage on a hard disk system. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree and averaged over the chosen time period. The result is displayed as an integer value.
Filesystem Type	The method used for storing and organizing data within a given operating system. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree and averaged over the chosen time period. The result is displayed as an integer value.
Filesystems	The number of filesystems. A filesystem is the scheme defining logical structures and software routines used to control access to the storage on a hard disk system. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree and averaged over the chosen time period. The result is displayed as an integer value.

Filesystems Over Capacity	Filesystems where usage exceeds a predetermined percentage threshold of used capacity. You set this threshold in the Profile section. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree and averaged over the chosen time period. The result is displayed as an integer value.
Forecast	Forecast reports depict linear and non-linear trends in time series and allow you to project (forecast) those data in to the future. The collection of data points used to make a forecast. At least 6 data points should be in the history to ensure meaningful forecasts.
Forecast Horizon	The number of data points to be forecasted, or the time span to be forecasted e.g.: 3 months, 5 days. The forecast horizon should not span more than 20% to 25% of the forecast history. (e.g.: If you have 12 monthly data points in your history, then your forecast horizon should be set no higher than 3 monthly data points. The data period is always the same for history and horizon. (If the history is made up of daily data points, then the periods used in the forecast are also daily.)
Forecast Interval	See Forecast Period.
Forecast Period	Defines the time between two forecasted data points. (e.g.: monthly, weekly, daily)
Frame	A packet of bytes sent to or received by a SAN switch port. (Typically 2048 bytes.)
Free	The total available capacity. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
Free %	The percentage of free capacity as a percentage of all capacity. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
Growth Rate	The growth rate compares the current and previous capacity usage values within the collection interval currently set in your Report Window Setting window. (If the Time Interval setting in the Report Window Setting window is set to Hourly, the base value will be the Used measured in the previously collected hour. This will be compared to the current usage measure. Assuming that the current Time Interval setting in the Report Window Setting window is set to Hourly, the growth rate reported by Tuning Manager is the result of this formula: Assuming that the current Time Interval setting in the Report Window Setting window is set to Hourly, the growth rate reported by Tuning Manager is the result of this formula: (Current Hour Capacity - Previous Hour Capacity) / Previous Hour Capacity (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
HA cluster system	A cluster system designed to provide high availability. The purpose of this system is to continue operation even if a failure occurs. If a failure occurs in the server executing tasks, a standby server immediately takes over and continues operation processes. This prevents operation interruption in case of a failure and thus ensures high availability. In this manual, the term “cluster system” means an HA cluster system.

Historical report	A report indicating the status of a program being monitored from a time in the recent past to the current time. Performance Reporter can display two types of historical reports: Historical report (single agent), Historical report (multi-agent).
Historical Report Setting window	Used to specify the date and time necessary for making a comparison with the I/O Response Time of the host and array, and a comparison with the average of past I/O Response Times.
Historical Response Time	The average I/O Response Time value.
Hit Ratio	The number of cache hits transactions divided by the number of transactions.
Host	A TCP/IP-accessible computer (or entity) to which one or more storage subsystems are attached. In addition to its TCP/IP address, each host also has a name or alias.
Host and array performance analysis	A method of analyzing (based on the I/O Response Time) whether system performance deterioration is being caused by the host or by the array.
Hosts	Including its subnetworks and storage-related servers, the entire scope of resources available to Tuning Manager.
Hosts Capacity	Including its subnetworks and storage-related servers, the total storage space for all resources available to Tuning Manager.
I/O Response Time	The average response time for an I/O request.
I/O Usage	The percentage of time during which I/O occurred.
Imported Filesystems	The number of external filesystems mounted on a UNIX host or made accessible to a Windows operating systems via sharing. (This feature is not currently available when reporting on Windows hosts.) HiCommand Tuning Manager will display na. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree and averaged over the chosen time period. The result is displayed as an integer value.)
Information Frame	The area in the Tuning Manager web client displaying data about the level you have chosen in Resource Tree.
Inodes	In UNIX filesystems, Inodes contain critical information about a file's user and group ownership and access permissions. To find the inode number for a given UNIX file, use the command: ls -i. To determine the inode information for a given UNIX file, use the command: ls -l. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
Input Buffer Full	Indicates that a buffer for a switch port is full. Tuning Manager increments the count for each occurrence of this condition.
Instance	An allocated memory area known as the SystemGlobalArea and one or more Oracle processes. Every Oracle database must be associated with one Oracle instance.
Instances	See Oracle Instances.
IOPS	Input/Output operations per second. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.) Also see Read IOPS and Write IOPS.
IP Address	Internet Protocol. A multi segment address delimited by dots used to uniquely identify devices and hosts on a network.

Last Record	The date and time for the most recent polling period which is now saved in the application database. The last record time may not be the last polling period because processing is not complete. Polling may still be in progress, aggregation and updates may still be pending.
LDEV	A numbered component using a logical or physical connection to a host. Also see Logical Device.
Local Filesystems	The number of filesystems directly connected to a host computer. This value is aggregated for all sub-resources below the level you have selected in Resource Tree and averaged over the chosen time period. The result is displayed as an integer value.
Logical Device	A numbered component using a logical or physical connection to a host. Each logical device has its own set of resources. (Also referred to as a Logical Disk.)
Logical Devices	Numbered components each using a logical or physical connection to a host. Each logical device has its own set of resources. (Also referred to as Logical Disks.)
Logical Disk	A series of drives (or drive partitions) linked in such a way that the operating system views the entirety as a single storage device. RAID controllers provide one form of managing logical disks while providing benefits in the form of improved reliability, data availability and performance. (Also known as: logical devices, logical drives, volumes, volume sets, logical storage units, logical units, units, and LUNS.)
Logical Disks	The quantity of logical disks in this subsystem.
Logical host	A logical server that provides an execution environment when Performance Reporter is running in a cluster system. If a failure occurs, the system switches over on a per-logical host basis. Logical hosts maintain a dedicated IP address. At failover, the new logical host continues operation by inheriting the same IP address. Therefore, even if the physical server changes due to a failure, clients can still access the new server using the same IP address, as if a single server were always running.
Lower Error Margin	Lower range of possible values within the current forecast Confidence Level.
LUN	Or Logical Unit. See Logical Disk
LUSE	Logical unit size expansion.
Main Console	One of the programs constituting the Tuning Manager products. The Main Console accumulates performance data collected by agents and enables the data to be displayed and analyzed with a Web browser.
Margin	Amount of deviation from the mean predicted value.
Max I/O Usage	The highest value of I/O Usage within the time period specified in the Report Window Setting window. (See ***Note***)
Max Side File Usage	The highest value of Side File Usage within the time period specified in the Report Window Setting window. (See ***Note***)
Max Write Pending Rate	The highest value of Write Pending Rate within the time period specified in the Report Window Setting window. (See ***Note***)
Maximum IOPS	The highest value of all IOPS measures for the time period specified in the Report Window Setting window.
Maximum Transfer	The highest value of all Transfer measures for the time period specified in the Report Window Setting window.
Memory	Random Access Memory.

MIB	Management information base. A management information base is a description of network objects managed using the Simple Network Management Protocol. (Also see SNMP.)
Minimum IOPS	The minimum value of all IOPS measures for the time period specified in the Report Window Setting window.
Minimum Transfer	The minimum value of all Transfer measures for the time period specified in the Report Window Setting window.
Model	Product model number.
Mountpoint	Before a device is accessible (mounted) by UNIX, a directory must be specified as the logical location for that device. The mountpoint is a directory used for that purpose. Tuning Manager reports the number of mountpoints on the monitored whole network and its resources. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
Navigation Frame	The area in the Tuning Manager web client where you control what kinds of data will be displayed. The Navigation Frame includes Resource Tree and choices for editing your Profile and setting Bookmarks.
Network	The entire scope of resources available on Tuning Manager, including its subnetworks and storage-related servers.
Node	Each computer that belongs to a cluster system.
Operating System	The controlling software managing a computer's routing of storage, memory, display and peripheral devices.
Oracle	The relational database management system from Oracle Corporation.
Oracle Capacity	The total storage capacity allocated to Oracle.
Oracle Instance	An Oracle process. Every Oracle database must be associated with one Oracle instance.
Oracle Instances	One or more Oracle processes. Every Oracle database must be associated with one Oracle instance.
Over Capacity	See Filesystems Over Capacity.
Performance	The efficiency of input/output operations.
Period Of Watching	You set the daily time period when the alert conditions are being monitored. For the remainder of the day, that alert remains dormant.
Port	(Storage) A logical connection to a disk array allowing multiple simultaneous read and write transactions. (Fabric) A logical connection to a Switch.
Port IOPS	Input/Output operations per second at the port, for the time period specified in the Report Window Setting window.
Port Max IOPS	The maximum value of all IOPS measures at the port, for the time period specified in the Report Window Setting window. (See ***Note***)
Port Max Transfer	The maximum value of all Transfer measures at the port, for the time period specified in the Report Window Setting window. (See ***Note***)
Port Min IOPS	The minimum value of all IOPS measures at the port, for the time period specified in the Report Window Setting window. (See ***Note***)
Port Min Transfer	The minimum value of all Transfer measures at the port, for the time period specified in the Report Window Setting window. (See ***Note***)
Port Module	Port module on the SAN switch.
Port Modules	Number of SAN switch port modules at the current resource level.
Port Number	Vendor's assigned identifier for the SAN switch port.

Port Role	Specified port type for the disk array device.
Port Speed	SAN switch port speed. (Normally 1 or 2 gigabit.)
Port Transfer	The rate at which data is moved at the port.
Port Type	Code for port type. (Typical values: E, F, G, H)
Port WWN	The unique address of a SAN switch port.
Ports	The number of logical connections to a subsystem.
Principal Switch	Every fabric contains one principal switch.
Product	The storage subsystem hosting the filesystem.
Product Detail record	A type of record that stores performance data indicating the system status at a specific time, such as detailed information about currently active processes. You use PD records to obtain the system status at a specific time, such as operating status of the system or size of the file system currently in use.
Product ID	A byte identifier that indicates a Tuning Manager product; part of the service ID.
Product Interval record	A type of record that stores performance data taken at specific intervals, such as the number of processes per minute. You use PI records to analyze changes to or trends in the system status over time, such as: Change in the number of system calls issued over a specific period of time, Change in the size of the file system being used
Product Log record	A type of record that stores log information about the application or database being executed on an agent's Solaris system.
Profile	Your user identity for Tuning Manager, login, email account.
RAID	Redundant Array of Independent Disks. An assemblage of two or more disk drives to improve fault tolerance and/or performance.
RAID Group	A logical volume consisting of an array of disk drives that uses ports in one or more multiples of 4 channels. Normally this array makes use of striping. This provides good load balancing with a high degree of data availability
RAID Level	Level of functionality for a RAID subsystem: Level 0: provides data striping (placing blocks of each file across multiple drives). This provides performance benefits but no redundancy. Level 1: provides mirroring where duplicate data is written redundantly to more than one drive. Level 3: provides striping plus error correction. One drive is dedicated to storing error correction data. Level 5: provides byte-level data striping and also stripe error correction.
Raw Devices	Devices not allocated to a filesystem.
Read Hit Ratio	The number of transaction hits in the cache within the read transactions, divided by the number of read transactions. (When presented as a percentage, the resulting value is multiplied by 100.)
Read I/O Response Time	The average response time for a read request.
Read IOPS	Read operations per second. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
Read Transfer	The speed of data movement for read operations.
Real-time report	A report indicating the current status of a program being monitored.
Received Bytes	The quantity of bytes successfully passing through the receiving switch port.
Received Frames	The quantity of frames successfully passing through the receiving switch port. (Also see Frame).

Record ID	An ID used to identify each record of the Tuning Manager products. The record ID is used to specify a record in commands that are executed internally by the Tuning Manager.
Record Taken	The date and time for polling period currently display.
Report	Definitions for displaying performance data collected by an agent in a graphical format. A report is based mainly on definitions of the records to be displayed in the report, the performance data items to be displayed, and the performance data display format (such as table or graph).
Report Window Setting window	Window to specify your time frame and interval: Time, Time interval. The settings specified in the Report Window Setting window yield data in Tuning Manager based upon: A point in time, Specify Last Record (default), or a date/time combination of your choice, and a specific reporting time interval. Your choices are hourly (default), daily, weekly, monthly, yearly.
Resource Tree	A hierarchical presentation of the storage-related and application-related resources monitored by Tuning Manager. Resource Tree appears within the Navigation Frame.
Response Time	The I/O Response Time for the time period specified in the Report Window Setting window.
Rollback Segments	The number of rollback segments within the tablespace(s). (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
Serial Number	Identification code for hardware subsystem.
Server	Servers are storage-oriented hosts on a given network or subnetworks. The Servers metric displays the number of storage hosts at the level you have selected in Resource Tree. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree and averaged over the chosen time period. The result is displayed as an integer value.)
Servers	Servers are storage-oriented hosts on a given network or subnetworks. The Servers metric displays the number of storage hosts at the level you have selected in Resource Tree. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree and averaged over the chosen time period. The result is displayed as an integer value.)
Service ID	An ID that uniquely identifies each program of the Tuning Manager products. The service ID is used to specify a server in commands that are executed internally by the Tuning Manager. With Performance Reporter, the ID of an agent is specified in the command argument to display information relevant to that agent. For information about the service ID, see the applicable Agent manual.
Session	The period of interaction with the software beginning after each new login and ending when you logout.
Side File	The area that is temporarily allocated in the cache to store record sets generated during the asynchronous copying process.
Side File Usage	The percentage of data being used as a Side File in the cache.
Single instance	A record that contains only one instance that is to be evaluated.
Size	A measurement of disk capacity or disk space used by the listed resource. (Displayed data indicates the unit of measure employed.)

SLPR	SLPR (storage logical partition) functionality enables partitioning (splitting) of a storage subsystem. The functionality is supported by the Universal Storage Platform V/VM series and TagmaStore USP. This functionality splits the resources (ports, CLPR, and volumes) in the storage subsystem, so that the user can manage each resource independently.
SNMP	Simple Network Management Protocol. A standard protocol with interfaces for managing and monitoring network resources.
SNMP trap	An event notification issued by an SNMP agent.
Solution set	A predefined report format provided for agents. Solution sets simplify the display of performance data collected by agents because they can be used without having to specify complex definitions.
Sort Segments	The number of sort segments within the tablespace(s). (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
Standby node	A node associated with each server system making up a cluster system that stands by to take over tasks if a failure occurs in the executing node.
Storage Subsystem	A physical device containing an array of disk drives acting as a single unit for the purposes of data storage and retrieval.
Store database	A database in which performance data collected by an agent is stored. There is one Store database for each agent.
Subnet	The name and/or IP range for a subnetwork (a subset of a larger network with its own IP range).
Subnet Capacity	Total storage capacity for a subnetwork.
Subnet Capacity History	Total storage capacity for a subnetwork for the time frame you specify.
Subnet Mask	A mask value used to obtain the network address of a subnet from an IP address.
Subnetwork	A subset of a larger network with its own IP range.
Subsystem	The storage subsystem monitored by Tuning Manager.
Subsystems	The number of storage subsystems monitored by Tuning Manager.
Switch	Vendor's identifier for the SAN switch.
Switch WWN	The unique address for a given switch.
Switches	The number of SAN switches at the current resource level.
Tablespace	A logical allocation of Oracle capacity dedicated to storing table data.
Target	The resource for which information is requested or has been gathered.
Trace log	Log information that is collected in case of an error to obtain the details of the error and the duration of the processing event.
Transfer	The rate at which data is moved. Also see Read Transfer and Write Transfer.
Transferred Bytes	The quantity of bytes successfully sent from a switch port.
Transferred Frames	The quantity of frames successfully sent from a switch port. (Also see Frame).
Upper Error Margin	Upper range of possible values within the current forecast Confidence Level.
URL	Uniform Resource Locator: the global address scheme for documents and other resources on the World Wide Web.
Used	The portion of capacity consumed.
Vendor	The manufacturer/source of the subsystem.
Virtual Disk	See Logical Disk

Virtual Logical Disk	A function that connects separate storage subsystems to the Universal Storage Platform V/VM series and TagmaStore USP, in order to logically use their Logical Disks as the Logical Disk of the Universal Storage Platform V/VM series and TagmaStore USP. This function manages Logical Disks in multiple storage subsystems as the Logical Disk that exists logically in a single storage subsystem.
Volume	Storage organized as either a subset of a single disk or spanning multiple disks.
Whole Fabric	Highest resource level in Tuning Manager depicting all fabrics in the SAN. (Equivalent to SAN Fabric.) Also see Fabric.
Write Hit Ratio	The number of transaction hits in the cache within the write transactions, divided by the number of writes transactions. (When presented as a percentage, the resulting value is multiplied by 100.)
Write I/O Response Time	The average response time for a write request.
Write IOPS	Write operations per second. (This value is aggregated for all sub-resources below the level you have selected in Resource Tree.)
Write Pending Rate	The percentage of data in the cache that is waiting to be written.
Write Transfer	The speed of data movement for write operations.
WWN	A 64-bit hexadecimal address (comprising 16 hexadecimal numbers) uniquely identifying devices on a storage area network.
WWN Node	A resource addressable by at least one unique WWN address.
WWN Port	A port on a WWN Node.
Xfer	Transfer rate

Note: When HiCommand Tuning Manager presents maximum/minimum value for metrics of daily, weekly, monthly, quarterly, and yearly periods, the resultant values are the average of the total value (aggregate value) of hourly data.