



# HiCommand® Tuning Manager Getting Started Guide



© 2006 Hitachi, Ltd., Hitachi Data Systems Corporation, ALL RIGHTS RESERVED

**Notice:** No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or stored in a database or retrieval system for any purpose without the express written permission of Hitachi Data Systems Corporation (hereinafter referred to as “Hitachi Data Systems”).

Hitachi Data Systems reserves the right to make changes to this document at any time without notice and assumes no responsibility for its use. Hitachi Data Systems products and services can only be ordered under the terms and conditions of Hitachi Data Systems’ applicable agreements. All of the features described in this document may not be currently available. Refer to the most recent product announcement or contact your local Hitachi Data Systems sales office for information on feature and product availability.

This document contains the most current information available at the time of publication. When new and/or revised information becomes available, this entire document will be updated and distributed to all registered users.

## Trademarks

Hitachi Data Systems is a registered trademark and service mark of Hitachi, Ltd., and the Hitachi Data Systems design mark is a trademark and service mark of Hitachi, Ltd.

HiCommand is a registered trademark of Hitachi, Ltd.

Performance Management, Hitachi Freedom Storage, TagmaStore, Lightning 9900, Thunder 9500, Thunder 9500V and Thunder 9200 are trademarks of Hitachi Data Systems Corporation.

This product includes software developed by the Apache Software Foundation (<http://www.apache.org/>). This product includes software developed by Ben Laurie for use in the Apache-SSL HTTP server project.

InterBase and InterClient are trademarks or registered trademarks of Borland Software Corporation in the United States and other countries. Hitachi Data Systems Corporation is independent of Borland Software Corporation and has not been authorized, sponsored, or otherwise approved by Borland Software Corporation.

Microsoft Windows, Windows NT and Windows Server are registered trademarks of Microsoft Corporation in the United States and other countries.

This product includes software developed by Ralf S. Engelschall <rse@engelschall.com> for use in the mod\_ssl project (<http://www.modssl.org/>).

This product includes RSA BSAFE Cryptographic software from RSA Security. Inc.

Java, Java Virtual Machine, and Solaris are registered trademarks or trademarks of Sun Microsystems.

Mozilla is a trademark of the Mozilla Organization.

Netscape and Netscape Navigator are registered trademarks of Netscape Communications Corporation.

UNIX is a registered trademark of The Open Group in the United States and other countries.

The following program products contain some parts whose copyrights are reserved by Sun Microsystems, Inc.: P-9D13-YA872, P-9D13-Y6322, P-9D13-Y6332, P-9D13-Y6342, P-9D13-Y6382, and P-9D13-Y6372.

The following program products contain some parts whose copyrights are reserved by UNIX System Laboratories, Inc.: P-9D13-YA872, P-9D13-Y6322, P-9D13-Y6332, P-9D13-Y6342, P-9D13-Y6382, and P-9D13-Y6372.

All other brand or product names are or may be trademarks or service marks of their respective manufacturers and are used to identify products or services of their respective owners.

All other trademarks and product names are the property of their respective owners.

## Notice of Export Controls

Export of technical data contained in this document may require an export license from the United States government and/or the government of Japan. Please contact the Hitachi Data Systems Legal Department for any export compliance questions.

## Document Revision Level

Revision	Date	Description
MK-96HC120-00	July 2006	Initial Release
MK-96HC120-01	August 2006	Revision 1, supersedes and replaces Initial Release
MK-96HC120-02	December 2006	Revision 2, supersedes and replaces Revision 1

# Preface

This document describes how to start using HiCommand® Tuning Manager (which hereinafter is abbreviated to Tuning Manager). This guide assumes that Tuning Manager is already set up and running on your system; however, following is a summary of the tasks that are required to install and use the Main Console and Performance Reporter:

1. Gather required pre-requisite information for the server. For the server machine pre-requisites, see the *HiCommand Tuning Manager Installation Guide*. Specifically, see Chapter 1, Chapter 2, and Appendix A.
2. Gather required pre-requisite information for the agents. For the agent machine pre-requisites, see the *HiCommand Tuning Manager Installation Guide*. Specifically, see Chapter 4 and Appendix A.
3. Install Tuning Manager on the server. For the server machine installation instructions, see the *HiCommand Tuning Manager Installation Guide*. Specifically, see Chapter 3.
4. Install Tuning Manager Agent programs on the agent machines. For the agent machine installation instructions, see the *HiCommand Tuning Manager Installation Guide*. Specifically, see Chapter 5.
5. Configure Settings. For the required server machine and agent machine settings, see the *HiCommand Tuning Manager Installation Guide*. Specifically, for the required server machine settings, see Chapter 1, Chapter 2, Chapter 6, and Appendix A. Specifically, for the required agent machine settings, see Chapter 7.

Post-installation tasks performed in the Main Console and Performance Reporter are contained in the *HiCommand Tuning Manager User's Guide*. This same document also contains helpful reference material, such as a glossary and a list of acronyms and abbreviations.

## Software Version

This document revision applies to HiCommand Tuning Manager version 5.5.

## Convention 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<sup>2</sup> bytes
- 1 GB (gigabyte) = 1,024<sup>3</sup> bytes
- 1 TB (terabyte) = 1,024<sup>4</sup> bytes

## Referenced Documents

- *HiCommand Tuning Manager User's Guide*, MK-92HC022
- *HiCommand Tuning Manager Server Administration Guide*, MK-92HC021
- *HiCommand Tuning Manager Installation Guide*, MK-95HC141
- *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

## 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 manuals. 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.

- E-mail: [doc.comments@hds.com](mailto:doc.comments@hds.com)
- Fax: 858-695-1186
- Mail:  
Technical Writing, M/S 35-10  
Hitachi Data Systems  
10277 Scripps Ranch Blvd.  
San Diego, CA 92131

*Thank you!* (All comments become the property of Hitachi Data Systems Corporation.)

# Contents

<b>Chapter 1</b>	<b>Navigating in the GUI</b> .....	<b>1</b>
1.1	Overview .....	2
1.2	Logging into Tuning Manager .....	2
1.2.1	Logging in as a User .....	3
1.2.2	Logging in as an Administrator .....	3
1.3	Navigating in the Main Console .....	5
1.4	Navigating in Performance Reporter .....	9
<b>Chapter 2</b>	<b>Setting up Users</b> .....	<b>13</b>
2.1	Overview .....	14
2.2	About User Permissions .....	14
2.3	Adding Users .....	15
<b>Chapter 3</b>	<b>Adding and Monitoring Storage</b> .....	<b>17</b>
3.1	Overview .....	18
3.2	Viewing Monitored Logical Disks .....	18
3.3	Adding or Removing a Monitored Logical Disk from a Storage Subsystem .....	19
3.4	Adding or Removing a Monitored Logical Disk from a Server .....	20
3.5	Tip for Performance Monitoring .....	20
<b>Chapter 4</b>	<b>Forecasting</b> .....	<b>21</b>
4.1	Overview .....	22
4.2	Editing a Forecast Report .....	22
<b>Chapter 5</b>	<b>Preventing Performance Bottlenecks</b> .....	<b>25</b>
5.1	Overview .....	26
5.2	Identifying Array Group Bottlenecks .....	27
5.3	Identifying CHA Port Bottlenecks .....	33
<b>Chapter 6</b>	<b>Using the Command Line Interface (CLI)</b> .....	<b>43</b>
6.1	Overview .....	44
6.1.1	Executing Commands .....	44
6.2	Starting and Stopping the Server .....	45
6.2.1	Starting the Server .....	46
6.2.2	Stopping the Server .....	47
6.3	Commands for Administration .....	49
6.3.1	Customizing Collection and Recording Methods of a Store Database .....	49
6.3.2	Customizing the Retention Conditions of Records in a Store Database .....	50
6.4	Commands for Reporting .....	51
6.4.1	Exporting Tuning Manager Data in CSV Format on the Management Server ..	51
6.4.2	Exporting the Store Database of an Agent Remotely from the Management Server .....	51
6.4.3	Exporting a Store Database in CSV Format Locally .....	52
6.5	Confirming the Operating Environment for a RAID Agent .....	54

6.6	Creating and Updating an Instance for an Agent that Allows Multiple Instances .....	54
<b>Chapter 7</b>	<b>Setting up Alerts.....</b>	<b>57</b>
7.1	Overview .....	58
7.2	Setting Alerts .....	59
7.3	Creating an Alert Definition .....	59
7.4	Defining Alert Actions .....	60
7.5	Binding Alerts .....	62
7.6	Testing Alerts .....	62
7.7	Viewing Alerts .....	63
<b>Chapter 8</b>	<b>Troubleshooting Basics .....</b>	<b>65</b>
8.1	Overview .....	66
8.2	Troubleshooting Excessive or Unbalanced Front-end Channel Processor Utilization .....	66
8.3	Troubleshooting Low Cache Hit Rates Leading to Higher Back-end Read/Write Activity .....	67
8.4	Troubleshooting Back-end Disk Path and/or Disk-drive Utilization .....	67
8.5	Troubleshooting I/O Workload Profiles that may be Sub-optimal for a Specific RAID Type .....	67
8.6	Contacting the Hitachi Data Systems Support Centers .....	68
<b>Chapter 9</b>	<b>Frequently Asked Questions.....</b>	<b>69</b>
	<b>Acronyms and Abbreviations .....</b>	<b>71</b>

# List of Figures

Figure 1.1	Main Console Window displaying Selected Hosts .....	5
Figure 1.2	The Structure of the Report Area.....	7
Figure 1.3	Performance Reporter Main Window with a Report Selected .....	9
Figure 1.4	Report Wizard Window .....	11
Figure 5.1	Example Storage System for the Array Group Bottleneck Example .....	27
Figure 5.2	Performance Reporter Displaying the Reports in the Server Folder .....	28
Figure 5.3	Read IO/sec Trend of Device File #2 in GatewayM .....	28
Figure 5.4	Report Area Displaying the Resources Related to Device File #2.....	29
Figure 5.5	Read IO/sec Trend of LDEV #00:08 .....	29
Figure 5.6	Read IO/sec Trend of Array Group #2-1 .....	30
Figure 5.7	Main Console Showing the Summary of Array Group #2-1 .....	30
Figure 5.8	List of Resources Using Array Group #2-1 .....	31
Figure 5.9	Read IO/sec Trend of LDEV #00:02 used in Server GatewayN.....	31
Figure 5.10	Read IO/sec Trend of Device File #2 (LDEV #00:08) in GatewayM Server .....	32
Figure 5.11	Read IO/sec Trend of Device File #4 (LDEV #00:02) in GatewayN Server .....	32
Figure 5.12	Read IO/sec Trend of Array Group #2-1 .....	32
Figure 5.13	Example Storage System for the CHA Port Bottleneck Example .....	33
Figure 5.14	Performance Data for the GatewayB.....	34
Figure 5.15	GatewayB Performance Data Sorted by I/O Response Time in Descending Order .....	35
Figure 5.16	Performance Reporter Displaying the Reports in the Server Folder .....	35
Figure 5.17	I/O Response Time Characteristics of Device File #8 in GatewayB Server .....	36
Figure 5.18	Disk Xfer/sec Trend of Device File #8 in GatewayB Server .....	36
Figure 5.19	Main Console Displaying the Resources Related to Device File #8.....	37
Figure 5.20	Performance Tab with List of Connected Storage Resources in Advanced Information.....	38
Figure 5.21	Performance Summary of Correlated Storage Resources .....	38
Figure 5.22	Read Xfer/sec Trend of LDEV #01:86.....	39
Figure 5.23	Read Xfer/sec Trend of Array Group #6-1 .....	39
Figure 5.24	Mini. Xfer/sec Trend of Port CL4-E .....	39
Figure 5.25	Main Console Displaying the Port CL4-E .....	40
Figure 5.26	List of Resources Using Port CL4-E .....	40
Figure 5.27	Xfer/sec Trend of Device File #5 (LDEV #01:08) in Server CQ6400-4 .....	41
Figure 5.28	Xfer/sec Trend of Device File #8 in GatewayB Server.....	41
Figure 5.29	Xfer/sec Trend of Device File#5 in CQ6400-4 Server .....	41
Figure 5.30	Avg Xfer/sec Trend of Port CL4-E .....	41
Figure 5.31	CHA Processor Busy Rate.....	42

## List of Tables

Table 1.1	Initial Administrative Login Account Information.....	3
Table 1.2	Components of the Main Window .....	5
Table 1.3	Display Types That Can Be Changed for Each Report .....	7
Table 1.4	Components of the Report Area .....	8
Table 2.1	Tuning Manager User Permissions .....	14
Table 8.1	Subsystem Performance Bottleneck Troubleshooting Examples.....	66
Table 9.1	Frequently Asked Questions .....	69

# Chapter 1 Navigating in the GUI

This chapter addresses the login paths for different user permissions and it introduces the graphical user interface (GUI):

- Overview (see section 1.1)
- Logging into Tuning Manager (see section 1.2)
- Navigating in the Main Console (see section 1.3)
- Navigating in Performance Reporter (see section 1.4)

## 1.1 Overview

You can use Tuning Manager to view the current state of all the storage subsystems, hosts, file systems, databases, SANs, and other storage resources that are being used by an application. You can then contrast that information with an historical view of the “normal” behavior or “baseline” performance of those resources during past periods of acceptable performance that were previously stored in the monitoring software’s database. Tuning Manager helps you to identify all storage resources on the network and their current and past performance, capacity, and utilization. You can define and continuously monitor and store critical performance and capacity thresholds, and send warnings to designated personnel to alert them of potential problems before they occur.

Tuning Manager has two viewers: Main Console and Performance Reporter.

**Main Console** Lets you view data retrieved from the Tuning Manager central data repository (HiRDB). According to a specified time frame and interval, every hour by default, Main Console gathers hourly data from the Store database of each agent and accumulates the data in the central repository with correlations among storage resources. Therefore, Main Console displays historical performance and capacity trends as a report. Main Console also displays links to Performance Reporter.

**Performance Reporter** Lets you view real-time and historical data retrieved from the Store database of each Agent. Performance Reporter not only displays minutely data, but also hourly, weekly, monthly, and yearly data for an agent.

## 1.2 Logging into Tuning Manager

Before you start using the Tuning Manager GUI, you must first determine whether you will be logging in from the perspective of a user or administrator, based on the access privileges that are assigned to you. The login procedures (described below) differ depending on your perspective.

**Note:** 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 Chapter 6. Also, before you start using the Tuning Manager GUI, confirm that your browser options are set up correctly. For details on how to adjust your browser’s settings, see the *HiCommand Tuning Manager User’s Guide*.

## 1.2.1 Logging in as a User

If you are logging in for the first time, please see your system administrator to obtain your User ID, password, and URL. Ask your system administrator to confirm whether your User ID and password are case-sensitive.

To log into the system as a user:

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/). For example:  
<http://host-name:23015/TuningManager/index.jsp>

2. Type your Tuning Manager User ID.
3. Type your Password.
4. Click the **Login** button on the Login window.

## 1.2.2 Logging in as an Administrator

Tuning Manager provides two login modes (Standalone mode and Single sign-on (SSO) mode). The handling of accounts and User IDs differs depending on the mode:

- In **Standalone** mode, Tuning Manager permits only user accounts that Tuning Manager itself manages, your User ID is not case-sensitive, and your password is case-sensitive.
- In **Single sign-on (SSO)** mode, HiCommand series products share the user accounts and whether user IDs and passwords should be case-sensitive can be set (by default, they are not case-sensitive). For details on user accounts in single sign-on (SSO) mode, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

If you are logging into Tuning Manager as the administrator for the first time after initial installation, two user accounts are provided, as outlined in Table 1.1.

Table 1.1 Initial Administrative Login Account Information

User ID	Password	Group
orionadmin	orion	Admin
system	manager	Admin

**Critical:** Once you have successfully logged in for the first time, we strongly recommend that you immediately edit the **orionadmin** account to change the user ID and password. Optionally, you can delete either or both of the default administrative accounts after creating at least one other login account with administrator group permissions.

To log in as an Administrator in Standalone mode:

1. Launch Tuning Manager by typing a URL consisting of the name of the host in which Tuning Manager is installed, and the port number, as shown in the following example:  
<http://host-name:23015/TuningManager/index.jsp>
2. Click the **Login** button.
3. Enter the user ID of an account assigned to the Administrator group. Note that before logging in for the first time, you must activate your license key. Also note that if you have just installed Tuning Manager, use the default login.
4. Enter the password.
5. Click **Login**.
6. To access Administrator View, click **Administration** in the explorer area. A submenu of administration tasks.

Once you have successfully logged in for the first time, you can start adding users. For details about adding users, see section 2.3.

### 1.3 Navigating in the Main Console

As the main window of Tuning Manager, 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 storage subsystems, switches, servers, databases, and file systems. Figure 1.1 shows an example of the Main Console window displaying Performance Information when Hosts is selected.

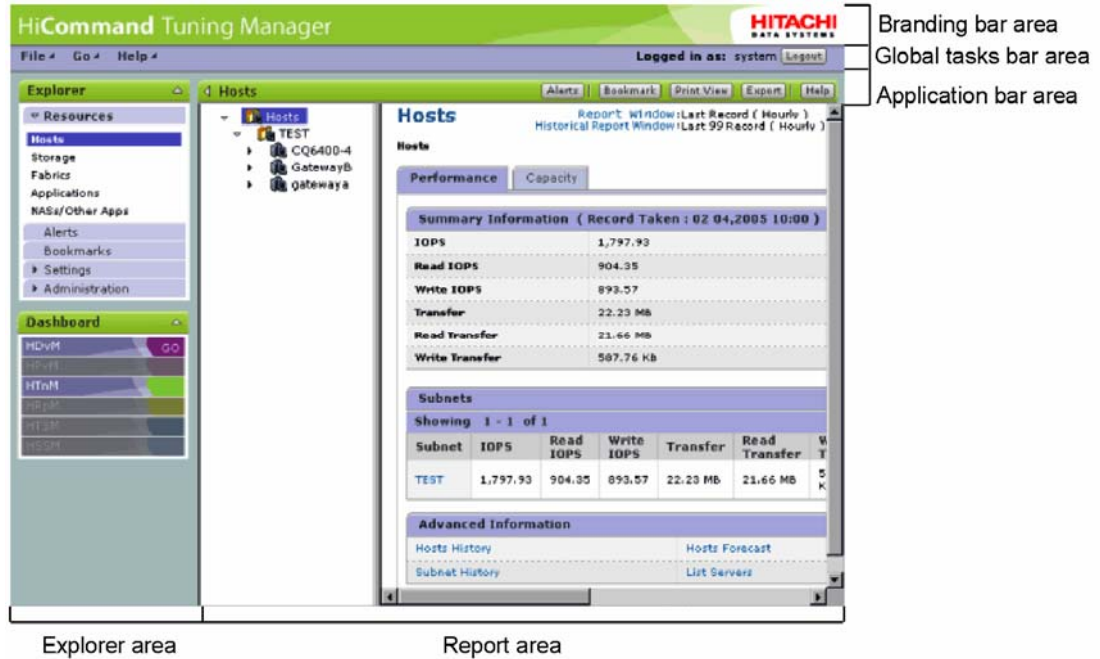


Figure 1.1 Main Console Window displaying Selected Hosts

The following table describes each area of the Main Window.

Table 1.2 Components of the Main Window

Area	Details
Branding bar	Indicates that the product is of the HiCommand® series. For Tuning Manager, <b>HiCommand Tuning Manager</b> is displayed.
Global tasks bar	Provides commands for logging out of Tuning Manager, launching Performance Reporter or Device Manager, launching Online Help, displaying version information, and displaying the user IDs of currently logged-in users and other information.
Explorer	Displays the <b>Explorer</b> menu and <b>Dashboard</b> menu. The <b>Explorer</b> menu items enable you to select the target resources for which reports are displayed, use alerts, use bookmarks, and make settings (such as editing a user profile, specifying a threshold value, and editing license information). If you are logged in with Administrator permissions, functions necessary for administrators to perform day-to-day operations are also available. From the <b>Dashboard</b> menu, you can launch HiCommand Suite applications. Note that you can use the <b>Dashboard</b> menu in Single sign-on mode only. You cannot use the <b>Dashboard</b> menu in Standalone mode.
Application bar	Displays the menu for the item selected in the <b>Explorer</b> menu.

Report	Consists of the navigation area and application area. In those areas, information for the item selected in the <b>Explorer</b> menu is displayed. Figure 1.2 shows the structure of the Report area.
--------	--

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. 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 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.

For a comprehensive description of all the available Main Console functions, see the *HiCommand Tuning Manager User's Guide*.

#### To display a report with Main Console:

1. In the Explorer area, choose the **Explorer** menu and then **Resources**. Then select the resource for which you want to display the report. Information about the top level resource appears in the Report area. Figure 1.2 shows the structure of 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. If available in the Tab area, choose the **Performance** or **Capacity** tab. The performance or capacity information appears in the Application area.
4. In Advanced Information, select the report which you want to display. A report type is set for each pre-defined report shown in Advanced Information. Following are the report types:
  - 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 key data about resources as a table.

The display of reports in 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 1.3 shows the display types that can be changed for each report.

Table 1.3 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	<ul style="list-style-type: none"> <li>▪ IOPS</li> <li>▪ Read IOPS</li> <li>▪ Write IOPS</li> </ul>	
	Transfer	<ul style="list-style-type: none"> <li>▪ Transfer</li> <li>▪ Read Transfer</li> <li>▪ Write Transfer</li> </ul>	
Capacity	Capacity	<ul style="list-style-type: none"> <li>▪ Capacity</li> <li>▪ Used</li> <li>▪ Free</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bar-Graph</li> <li>▪ Pie-Graph</li> </ul>

*Note:* The display of some reports cannot be changed.



Figure 1.2 The Structure of the Report Area

The following table describes the sections of the Report area.

**Table 1.4 Components of the Report Area**

Area	Details
Message	Displays warning and error messages for licenses and polling.
Title	Displays texts such as the title of the application area, path to the resource (Crumb Trail), and monitoring date.
Tab	(Not shown in Figure 1.2) is displayed between the Title area and Summary area when <b>Resources &gt; Hosts</b> or <b>Resources &gt; Applications</b> is selected in the Explorer area. The Tab area displays the tabs ( <b>Performance</b> and <b>Capacity</b> ) as shown in Figure 1.1 for switching information to view. If <b>Alert</b> is selected in the Explorer area, this area displays the tabs ( <b>View</b> , <b>Define</b> , <b>Action</b> , <b>Bind</b> , and <b>Reset</b> ) for operating alert functions.
Summary	Displays summary information for the resource selected in the navigation area.
Information	<p>Displays specific information for the resource selected in the navigation area and is divided into the following three sections:</p> <ul style="list-style-type: none"> <li>▪ <b>Sub-resource</b> 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 the Sub-resource section.</li> <li>▪ <b>Favorite Charts</b>: Displayed if you registered a chart for a detailed report displayed from Advanced Information as a Favorite Chart. 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 registering a favorite chart, see the <i>HiCommand Tuning Manager User's Guide</i>.</li> </ul> <p><b>Advanced Information</b>: Displays the list of reports available for the resource selected in the navigation area. 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.</p>

## 1.4 Navigating in Performance Reporter

Performance Reporter reports the performance data collected by each Agent in each Agent's Store database and it lets you display agent-instance level reports and customized reports. Performance Reporter can analyze and report real-time or very recently collected data that is still resident in the agent's data store, or it can report any past time period by querying HiRDB for historical information.

This section describes how you can display and create reports with Performance Reporter. For a comprehensive description of all the Performance Reporter functions, see the *HiCommand Tuning Manager User's Guide*.

Figure 1.3 shows an example of the Performance Reporter main window with a report selected in the report hierarchy.

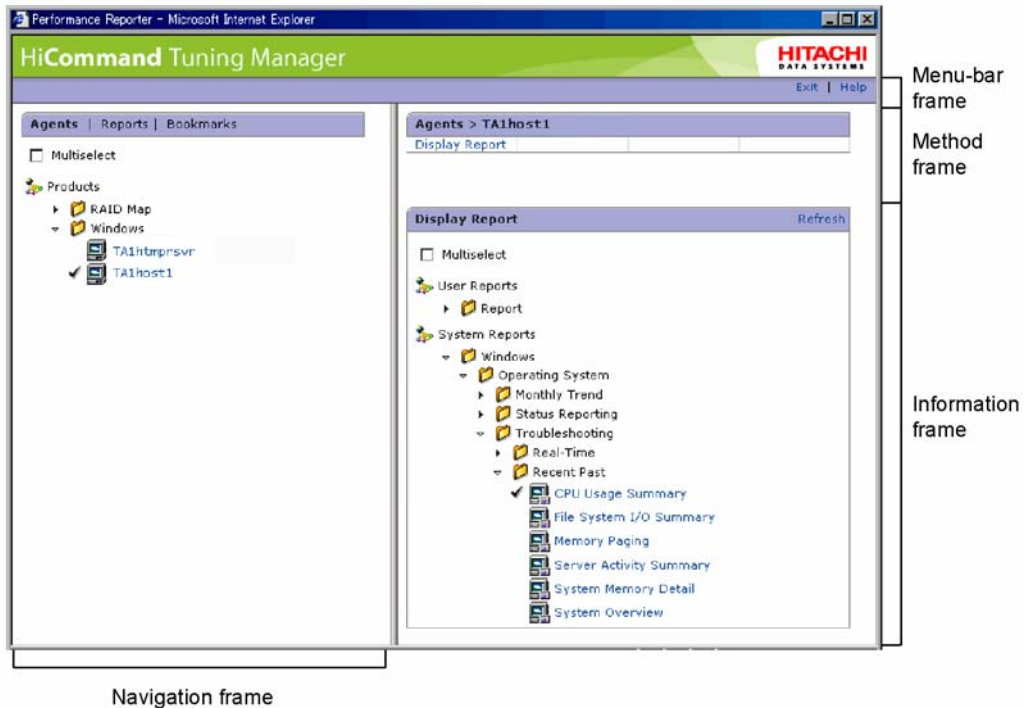


Figure 1.3 Performance Reporter Main Window with a Report Selected

To display a report with Performance Reporter:

**Note:** You can also start Performance Reporter by specifying an Agent in the Main Console. If you do, the Performance Reporter Main window displays the report hierarchy. You can skip steps 1-4.

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, choose the **Agents** tab. The Agent hierarchy is displayed.
3. In the Navigation frame, select the desired Agent from the Agent hierarchy. All the instances of the desired Agent are displayed in the Agent hierarchy.

4. Select the resource for which you want to display the report.
5. In the Method frame, choose **Display Report**.
6. From the report hierarchy, choose the name of the report you wish to display. The appearance of the Main Window changes as follows depending on the tab selected in the Navigation Frame:
  - The **Agents** tab displays the hierarchy of *agents* in the Navigation Frame. When the **Agents** tab is selected, the **Display Report** method appears in the Method Frame and the hierarchy of available reports for the selected agent appears in the Information Frame.
  - The **Reports** tab displays the hierarchy of all the available *reports* categorized into User Reports (user-defined reports) and System Reports (pre-defined reports called solution sets) in the Navigation Frame. When the **Reports** tab is selected, methods for defining and customizing reports appear in the Method Frame.
  - The **Bookmarks** tab displays a hierarchy of bookmark folders, bookmarks, and bookmarked reports.

**To quickly create a user-defined report with Performance Reporter:**

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 Report Wizard window starts and the New Report > Name and Type window is displayed in the Information frame. Use the Report Wizard to enter the necessary items and finish creating the report. Figure 1.4 shows the Report Wizard window. For an example of creating a report from start to finish, see the *HiCommand Tuning Manager User's Guide*. The *HiCommand Tuning Manager User's Guide* also describes how you can create reports by customizing the pre-defined reports (solution sets).

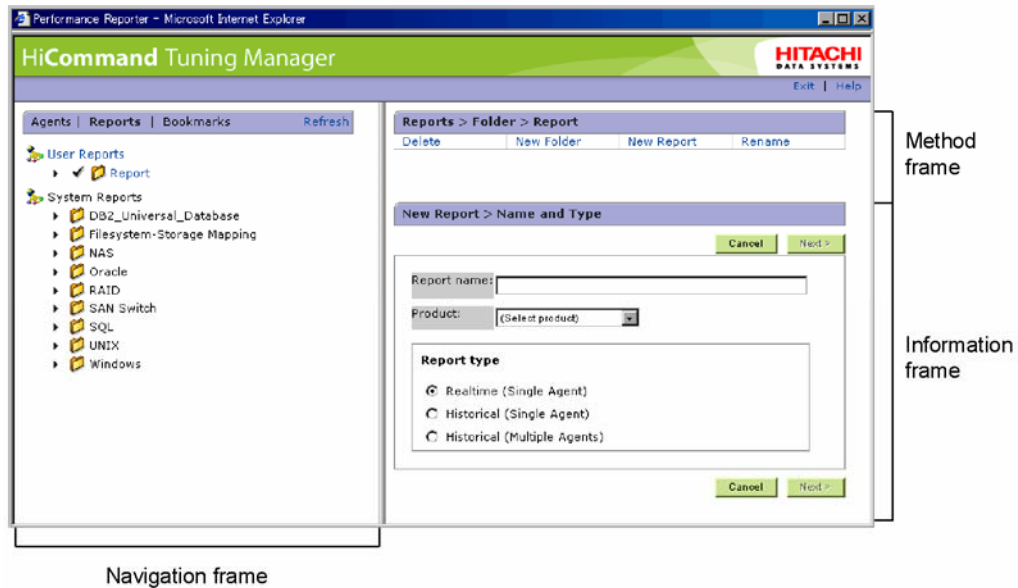


Figure 1.4 Report Wizard Window

The following list describes the items displayed in each frame of the Report Wizard Window.

#### 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 a 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 *HiCommand Tuning Manager User's Guide*.



## Chapter 2 Setting up Users

This chapter describes how to set up users in stand-alone mode. For details on SSO user administration, see the *HiCommand Tuning Manager Server Administration Guide* and the *HiCommand Device Manager Server Installation and Configuration Guide*.

- Overview (see section 2.1)
- About User Permissions (see section 2.2)
- Adding Users (see section 2.3)

## 2.1 Overview

The Tuning Manager administrator may add, delete, and modify Tuning Manager users and designate their group membership. Tuning Manager provides two initial users with administrator privileges. For details, see section 1.2.2. Only members of the Tuning Manager Administrator group can view the management windows. The **Administration** link appears in the explorer area only when the logged-in user belongs to the Administrator group.

As noted in section 1.2.2, Tuning Manager provides two login modes; Standalone mode and Single sign-on (SSO) mode. In Standalone mode (the default mode), Tuning Manager permits only user accounts that Tuning Manager itself manages. In Single sign-on (SSO) mode, HiCommand series products share the user accounts managed by HiCommand Device Manager.

## 2.2 About User Permissions

The Tuning Manager users with Administrator privileges can provide general Tuning Manager users with their user IDs and passwords. The general users are automatically assigned to the User group, but the users with Administrator privileges can assign users to groups at their own discretion. The Tuning Manager users with Manager privileges have privileges to define and bind alerts, in addition to the User privileges. They do not have access to any other management functions.

The Tuning Manager users with User privileges can view information bound to alert definitions, but cannot edit the information. In standalone mode, the tasks displayed in Tuning Manager differ depending on the group to which the user belongs.

Table 2.1 Tuning Manager User Permissions

Permitted Tasks	Group		
	User	Manager	Administrator
<ul style="list-style-type: none"><li>▪ View Performance</li><li>▪ View Capacity</li><li>▪ View Alerts</li><li>▪ View online Help</li><li>▪ Bookmark help topics</li><li>▪ Launch Performance Reporter</li><li>▪ Launch Device Manager</li><li>▪ Edit account password and contact information</li></ul>	Yes	Yes	Yes

<ul style="list-style-type: none"> <li>▪ Define alerts</li> <li>▪ Bind alerts to resources</li> <li>▪ Storage Navigator applications launch in single sign-on mode</li> <li>▪ Assigning a Subnetwork Alias</li> </ul>	No	Yes	Yes
<ul style="list-style-type: none"> <li>▪ Add, delete and edit users</li> <li>▪ Device Manager launch URL configuration</li> <li>▪ Storage Navigator applications launch settings</li> <li>▪ Agent administration</li> <li>▪ Server configuration</li> </ul>	No	No	Yes

## 2.3 Adding Users

As noted in section 1.2.2, Tuning Manager provides two login modes; Standalone mode and Single sign-on (SSO) mode. This section describes how to set up users in stand-alone mode. If you are using SSO mode, see the *HiCommand Device Manager Server Installation and Configuration Guide* for details on SSO user administration.

To set up a user in stand-alone mode:

1. Log in as an administrator.
2. Click **Administration** in the Explorer area.
3. Click **Users and Permissions** in the submenu.
4. Click the **Add User** button. The User Profile form appears.
5. Enter user information in the following fields (all are required).

**User ID**

**Password**

**Confirm Password**

**Group** (select from **admin**, **manager**, or **user**)

**First name**

**Last name**

**Email address**

6. Click the **Save** button to save the information you specified. To reset the information in the window to the initial status, click the **Reset** button.



## Chapter 3 Adding and Monitoring Storage

This chapter describes how to add and monitor storage. Additional details are contained in Chapter 6 of the *HiCommand Tuning Manager Server Administration Guide*.

- Overview (see section 3.1)
- Viewing Monitored Logical Disks (see section 3.2)
- Adding or Removing a Monitored Logical Disk from a Storage Subsystem (see section 3.3)
- Adding or Removing a Monitored Logical Disk from a Server (see section 3.4)
- Tip for Performance Monitoring (see section 3.5)

## 3.1 Overview

Tuning Manager lets you identify all storage resources on the network and their current and past performance, capacity, and utilization. It also automatically identifies and starts monitoring Agent instances; however, even though Tuning Manager automatically identifies logical disks, the administrator must add the monitoring to start the monitoring of the logical disks. This chapter describes how to add monitoring for logical disks.

**Note:** After setting up a resource to be monitored, it may take up to three hours before the Main Console displays information about it. This is due to the following, combined factors: Frequency of polling periods (hourly intervals) and the timeframe for collecting data and transferring it to HiRDB.

## 3.2 Viewing Monitored Logical Disks

Before adding or removing monitoring, display the latest monitoring status.

To view the installed server platform and storage subsystem agents for monitored logical disks:

1. Log in as an administrator.
2. Click **Administration** in the Explorer area.
3. Click **Agents** in the submenu.
4. Click **Monitored Logical Disks** in the navigation area. Tuning Manager displays a list of monitored storage subsystem agents and servers.
5. To refresh the screen display with the latest state of agents, click the **Refresh** button.
6. To view details about a specific subsystem agent, click the agent's **Name** displayed in the **Per Storage Subsystems** section. If the selected HTM Agent for RAID monitors TagmaStore USP, an SLPR row appears in this window.
7. To view details about a specific server, click the agent's **Name** displayed in the **Per Servers** section.
8. To refresh the current view, click the **Reload** button. (The message area above the table of connected logical disks displays the time the data was last refreshed.)
9. Click the **Close** button to close the server details window.

### **Notes:**

- The list of connected devices for each agent is automatically reinitialized when Tuning Manager is started. When you log in to the Tuning Manager server after restarting the services and view the details for a specific agent, the list of connected devices for each agent is initially empty. Click the **Reload** button to display the list of connected devices available for monitoring by the agent.
- If polling is in process, the following message displays when you click the **Reload** button. Retry the operation after polling completes: `web-WARN-2611 Polling in progress. Cannot reload list of logical disk.`

### 3.3 Adding or Removing a Monitored Logical Disk from a Storage Subsystem

To add or remove monitoring for a storage subsystem agent:

1. Display the latest monitoring status, referring to steps 1 to 6 in section 3.2.
2. To add monitoring for a specific logical disk:
  - a. Select the check box next to a connected logical disk whose **Monitored** status is **No**.
  - b. Alternatively, you can select the check box in the header to select all check boxes displayed on the page.
  - c. Click the **Add** button. The **Monitored** status of the selected logical disk now appears as **Yes**.
3. If you want to monitor all logical disks, including those that are not displayed on the page, click the **Add All LDEVs** button.

***WARNING:** The maximum number of monitored logical disks is determined by the size specified for the management database. For example, if Large is specified, the maximum number of monitored logical disks is 16000 for Windows (note that 16000 represents the *total number* of monitored resources, which include hosts, ports, switches, CLPRs, and so on). For details, see the *HiCommand Tuning Manager Installation Guide*.*
4. To remove monitoring for a specific logical disk:
  - a. Select the check box next to a connected logical disk whose **Monitored** status is **Yes**.
  - b. Alternatively, you can select the check box in the header to select all check boxes displayed on the page.
  - c. Click the **Remove** button. The **Monitored** status of the selected logical disk now appears as **No**.
5. If you want to stop monitoring all logical disks, including those that are not displayed on the page, click the **Remove All LDEVs** button.
6. Click the **Close** button to dismiss the agent details window.

### 3.4 Adding or Removing a Monitored Logical Disk from a Server

To add or remove monitoring for a server platform agent:

1. Display the latest monitoring status, referring to steps 1 to 5 and 7 in section 3.2.
2. To add monitoring for a specific logical disk:
  - a. Select the check box next to a connected logical disk whose **Monitored** status is **No**.
  - b. Alternatively, you can select the check box in the header to select all check boxes displayed on the page.
  - c. Click the **Add** button.

The **Monitored** status for the logical disk you added changes to **Yes**.

3. If you want to monitor all logical disks, including those that are not displayed on the page, click the **Add All LDEVs** button.

**WARNING:** The maximum number of monitored logical disks is determined by the size specified for the management database. For example, if Large is specified for the size of the management database, the maximum number of monitored logical disks is 16000 for Windows. For details, see the *HiCommand Tuning Manager Installation Guide*.

4. To remove monitoring for a specific logical disk:
  - a. Select the check box next to a connected logical disk whose **Monitored** status is **Yes**.
  - b. Alternatively, you can select the check box in the header to select all check boxes displayed on the page.
  - c. Click the **Remove** button. The **Monitored** status for the logical disk you removed changes to **No**.
5. If you want to stop monitoring all logical disks, including those that are not displayed on the page, click the **Remove All LDEVs** button.
6. Click the **Close** button to dismiss the agent details window.

### 3.5 Tip for Performance Monitoring

At your site, you may be using Tuning Manager to monitor a storage subsystem, but you do not want frequent polling (every 10-15 minutes) to affect the performance of the storage subsystem. For information about how you can configure the agent to poll infrequently, see the *HiCommand Tuning Manager Server Administration Guide*.

## Chapter 4 Forecasting

This chapter describes how to edit a forecast report.

- Overview (see section 4.1)
- Editing a Forecast Report (see section 4.2)

## 4.1 Overview

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 reports that forecast future performance or capacity trends. Forecasts predict future values by using data for the resources collected in the Last Record and configured time intervals. Note that pre-defined forecast reports are provided in Advance Information, but you will have to edit the provided forecast report (define the forecast horizon) as described below to make the report meaningful.

Forecast reports depict linear and non-linear trends in a time series and enable you to project (forecast) those data into the future. A collection of data points is used to make a forecast. At least 6 data points should be in the history to ensure meaningful forecasts.

The forecast horizon is 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.)

## 4.2 Editing a Forecast Report

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.)

To edit a forecast report:

1. In Advanced Information, click the Forecast report that you want to edit. The report is displayed.
2. Click **Edit**. The dialog box for editing report parameters appears.
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 the forecast).
5. To determine the **Starting from** data point:
  - a. Select **Last Record** defined in the Glossary or **Absolute Start Date/Time**.
  - b. 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.
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 the 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.

For more information about editing a forecast report, see the *HiCommand Tuning Manager User's Guide*.



## Chapter 5 Preventing Performance Bottlenecks

This chapter provides two examples of using Tuning Manager to prevent performance bottlenecks. The example describes how to identify performance problems using the Tuning Manager GUI, Main Console, Performance Reporter, and associated metrics.

- Overview (see section 5.1)
- Identifying Array Group Bottlenecks (see section 5.2)
- Identifying CHA Port Bottlenecks (see section 5.3)

## 5.1 Overview

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 SAN switches and storage subsystems. You can query the Tuning Manager historical database for performance and capacity trend analysis on each component of the SAN and 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.

This chapter describes two examples of using Tuning Manager to prevent performance bottlenecks. The examples describe how to identify problems using the Tuning Manager GUI and associated metrics.

- Identifying Array Group Bottlenecks
- Identifying CHA Port Bottlenecks

**Note:** In the examples that are used in this chapter, the values associated with components such as Port Max Transfer, Disk Read IOPS, and so on are attributed to being either low or high—values associated with potential issues. While these values are applicable to these examples, please note that in actual practice, positive and negative thresholds will vary among organizations.

## 5.2 Identifying Array Group Bottlenecks

This section provides an example of using Tuning Manager to identify an array group bottleneck that decreases the I/O per second of an application (Application #1) on the Gateway M server in the following storage system.

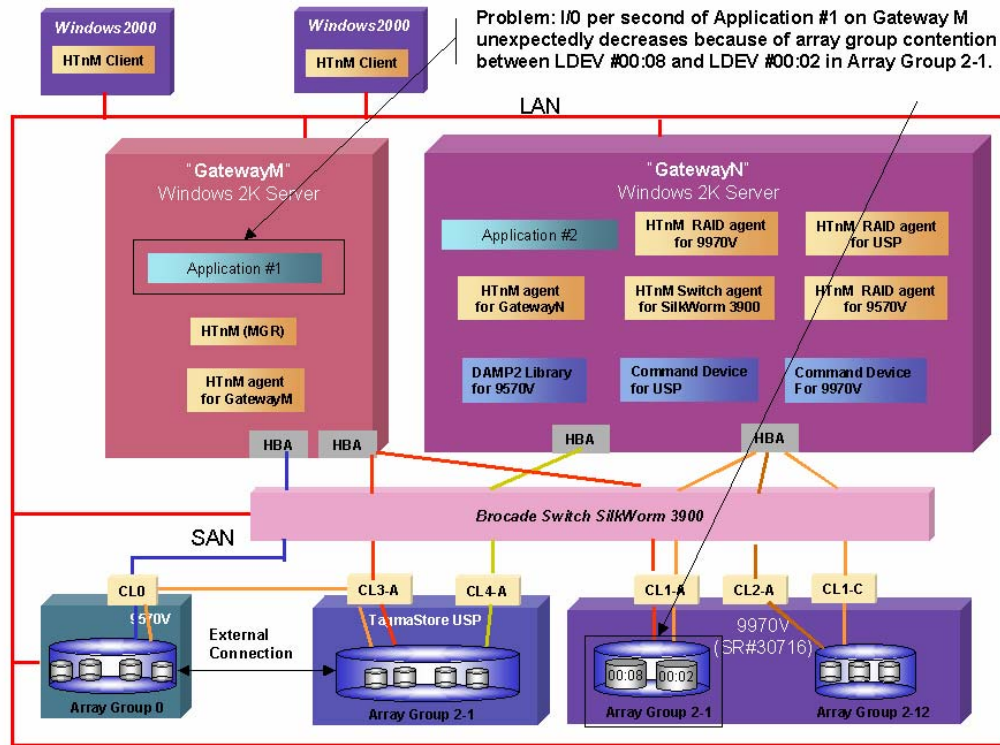


Figure 5.1 Example Storage System for the Array Group Bottleneck Example

Following is an example array group bottleneck scenario, and the steps for troubleshooting it. This example assumes that you have already used Performance Reporter to create reports named Device File Read IO/sec History, LDEV Read IO/sec History, and Array Group Read IO/sec History.

In this example, an application has been running on a server named Gateway M, but after running another application on a server named GatewayN, the number of read I/O operations of the application in GatewayM has decreased.

1. In Performance Reporter, click the **Agents** tab, select the Windows Agent corresponding to the GatewayM server, then click **Display Report, User Reports, Server, and Device File Read IO/sec History**.

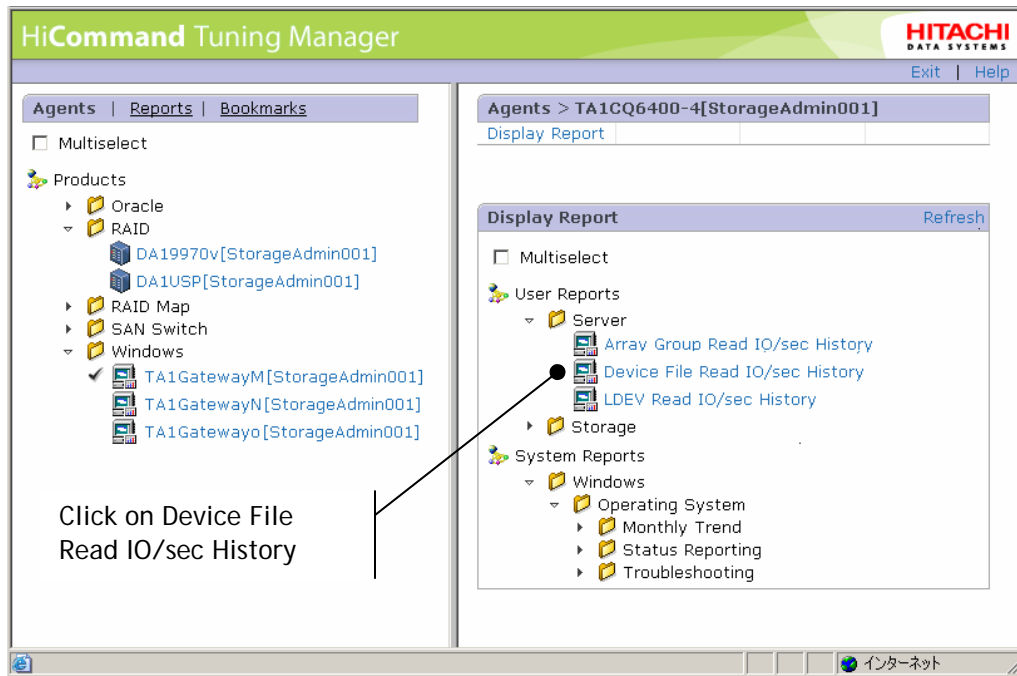


Figure 5.2 Performance Reporter Displaying the Reports in the Server Folder

The Device File Read IO/sec History report shows the Read IO/sec trend of device file #2 in GatewayM.

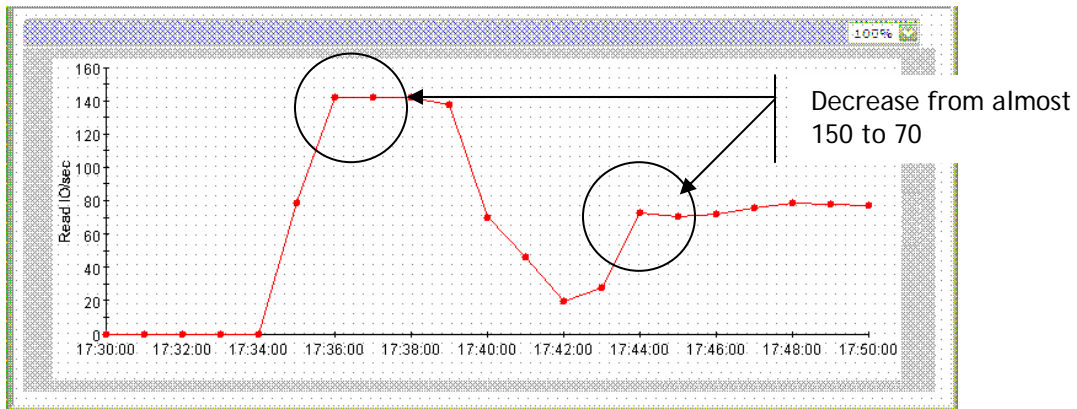


Figure 5.3 Read IO/sec Trend of Device File #2 in GatewayM

The trend shows that the IO/sec has decreased from almost 150 to 70.

- To determine the reason for the decrease, use Main Console to check the performance of the resources related to device file #2. In the Navigation area of Main Console, select device file #2. The resources related to device file #2 are displayed in the Report area.

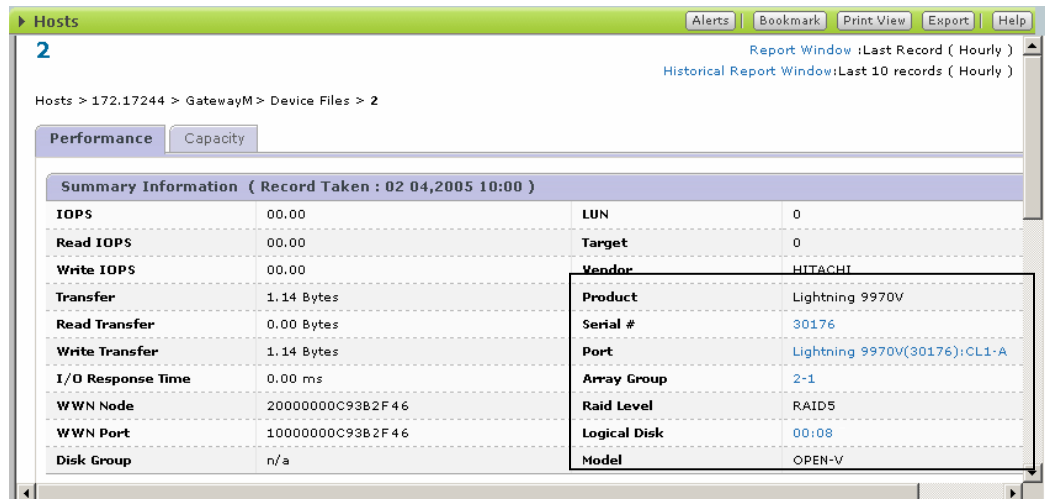


Figure 5.4 Report Area Displaying the Resources Related to Device File #2

According to Main Console, the resources related with device file #2 are as follows:

Storage: Lightning 9970V (SR#30716)

LDEV (Logical Disk): #00:08

Array Group: #2-1

Port: CL1-A

3. Check the performance of the related storage resources. To check the performance of the LDEV, in Performance Reporter, select the RAID Agent corresponding to the LDEV #00:08, and click User Reports, Storage, and then LDEV Read IO/sec History.

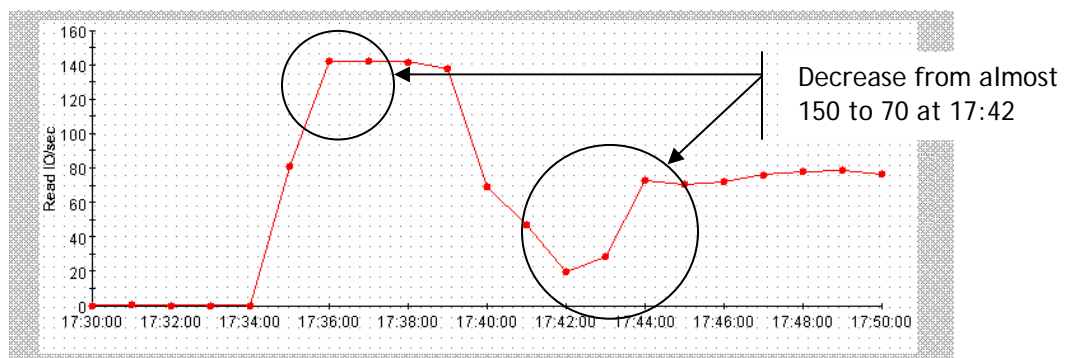


Figure 5.5 Read IO/sec Trend of LDEV #00:08

Note that the performance of LDEV I/O has decreased the same as the server performance.

Now check the performance of the Array Group. In Performance Reporter, select the RAID Agent corresponding to Array Group #2-1, and then click User Reports, Storage, and Array Group Read IO/sec History.

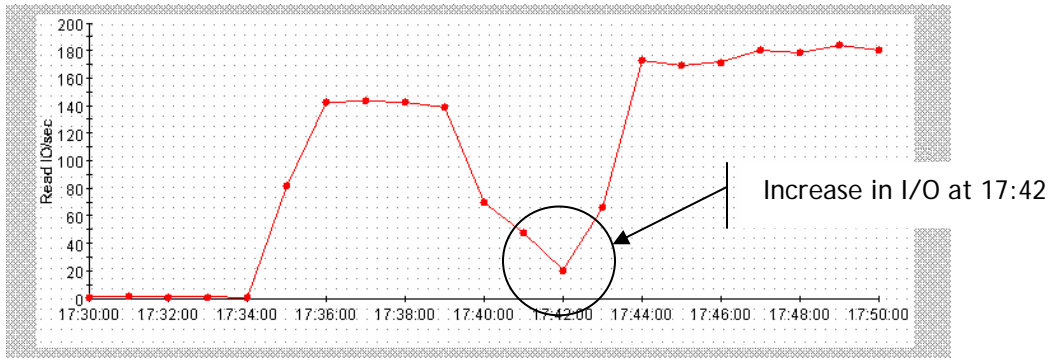


Figure 5.6 Read IO/sec Trend of Array Group #2-1

Even though the LDEV I/O has decreased the same as the server performance, the array group performance has increased. There is activity from another source on Array Group #2-1. At this point, check the resources using the same array group.

4. Use Main Console to check the performance of the resources sharing the array group. In Main Console, show the summary of Array Group #2-1. Figure 5.7 shows the Report area displaying the summary of Array Group #2-1.

**HiCommand Tuning Manager**

Logged in as: system

**2-1**

Storage > Lightning 9970V(30176) > Array Groups > 2-1

Report Window : Last Record ( Hourly )

Metric	Value	Metric	Value
Read Hit Ratio	99.61 %	Write Hit Ratio	0.0 %
Disk IOPS	1,713.26	Disk Transfer	48.72 KB
Disk Read IOPS	1,713.23	Disk Read Transfer	48.72 KB
Disk Write IOPS	0.03	Disk Write Transfer	0.28 Bytes
Disk Random IOPS	n/a	Disk Random Transfer	n/a
Disk Sequential IOPS	n/a	Disk Sequential Transfer	n/a
I/O Usage	0.0 %	Max I/O Usage	0.0 %
Raid Level	RAID5(3D+1P)		

Logical Disk	LUUSE	Record Taken
00:00	n/a	02 04,2005 10:00
00:02	n/a	02 04,2005 10:00
00:03	n/a	02 04,2005 10:00
00:04	n/a	02 04,2005 10:00
00:08	n/a	02 04,2005 10:00

Advanced Information

Array Group History    Array Group Forecast    List Connected Servers

Performance Reporter : RAID (DA19970v [GatewayN])

Click List Connected Servers.

Figure 5.7 Main Console Showing the Summary of Array Group #2-1

It seems that five LDEVs comprise Array Group #2-1. Click the List Connected Servers report. The following report displays.

Server	Device File	IOPS	Read IOPS	Write IOPS	Transfer	Read Transfer	Write Transfer	I/O Response Time	Record Taken
GatewayM	2	0.00	0.00	0.00	1.14 Bytes	0.00 Bytes	1.14 Bytes	0.00 ms	02 04,2005 10:00
GatewayM	3	0.67	0.67	0.00	2.23 KB	2.23 KB	0.00 Bytes	0.00 ms	02 04,2005 10:00
GatewayN	3	1,607.57	1,607.56	0.00	44.51 MB	44.51 MB	11.12 Bytes	0.00 ms	02 04,2005 10:00
GatewayN	4	8.24	8.23	0.01	1.86 MB	1.86 MB	29.51 Bytes	0.00 ms	02 04,2005 10:00
GatewayN	5	0.00	0.00	0.00	18.82 Bytes	0.00 Bytes	18.82 Bytes	0.00 ms	02 04,2005 10:00
GatewayN	8	0.01	0.00	0.01	22.22 Bytes	0.00 Bytes	22.22 Bytes	0.00 ms	02 04,2005 10:00
Gatewayo	2	0.00	0.00	0.00	5.67 Bytes	0.00 Bytes	5.67 Bytes	0.00 ms	02 04,2005 10:00
Gatewayo	3	0.00	0.00	0.00	5.67 Bytes	0.00 Bytes	5.67 Bytes	0.00 ms	02 04,2005 10:00
Gatewayo	4	0.00	0.00	0.00	6.81 Bytes	0.00 Bytes	6.81 Bytes	0.00 ms	02 04,2005 10:00

Figure 5.8 List of Resources Using Array Group #2-1

Server GatewayN is using the same Array Group #2-1.

- Check the performance of the resources sharing the same Array Group. Check the LDEVs used by server GatewayN. In Performance Reporter, select the Windows Agent corresponding to server GatewayN, and then click User Reports, Storage, and LDEV Read IO/sec History.

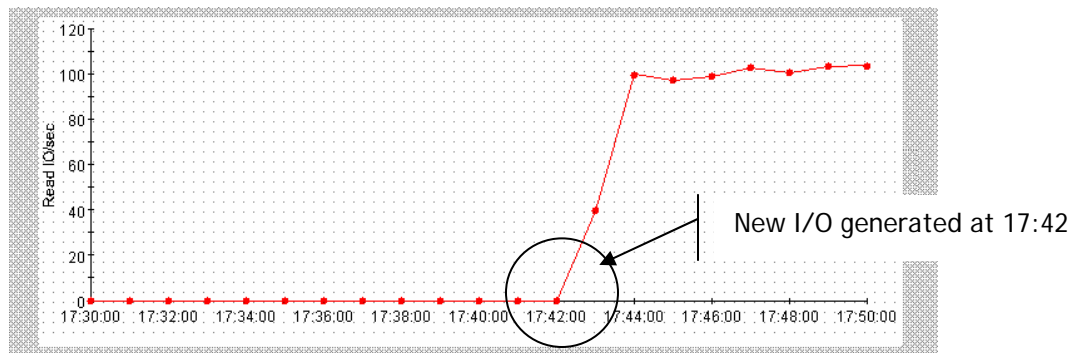
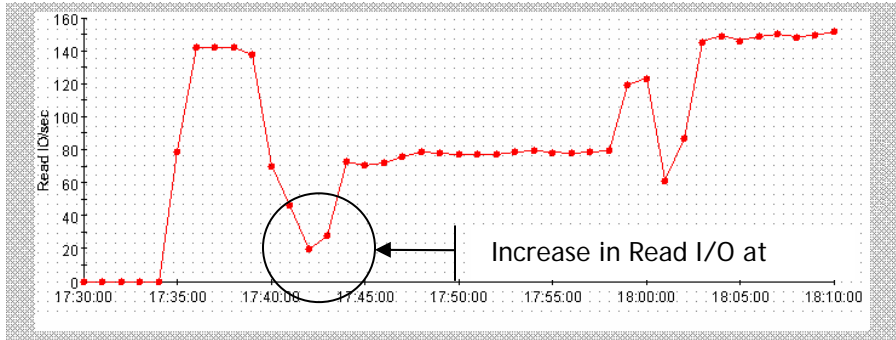


Figure 5.9 Read IO/sec Trend of LDEV #00:02 used in Server GatewayN

New I/O of LDEV #00:02 used in the server GatewayN was generated from 17:42, in contrast to the decrease in I/O of LDEV #00:08 used in server Gateway M. And the total I/O of LDEV #00:02 and LDEV #00:08 is the same as the I/O rate of Array Group #2-1.

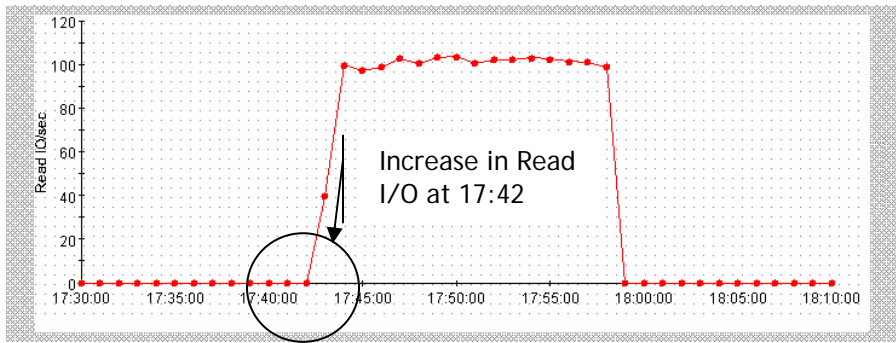
- Confirm the performance bottleneck. To do this, stop the I/O of server GatewayN and then check the I/O trends of the related storage resources.

Check the I/O trend of device file #2 of server GatewayM. In Performance Reporter, select the Windows Agent corresponding to server GatewayM, and then click User Reports, Storage, and then Device File Read IO/sec History.



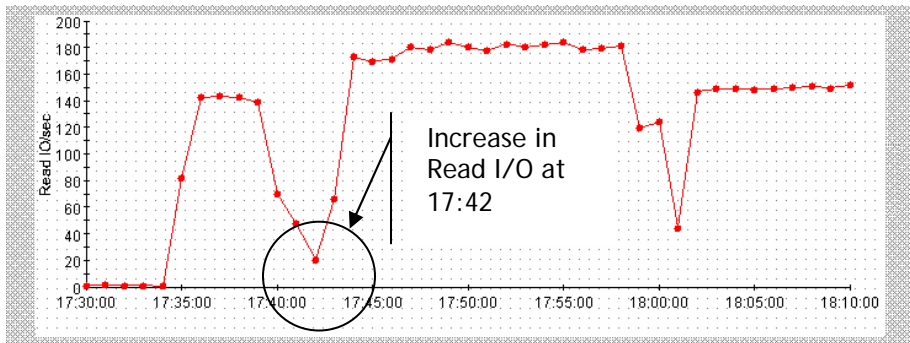
**Figure 5.10** Read IO/sec Trend of Device File #2 (LDEV #00:08) in GatewayM Server

Check the I/O trend of device file #4 of server GatewayN. In Performance Reporter, select the Windows Agent corresponding to server GatewayN, then click **User Reports**, **Storage**, and then **Device File Read IO/sec History**.



**Figure 5.11** Read IO/sec Trend of Device File #4 (LDEV #00:02) in GatewayN Server

Check the I/O trend of Array Group #2-1. In Performance Reporter, select the Agent corresponding to server GatewayN and click the **Array Group Read IO/sec History**.



**Figure 5.12** Read IO/sec Trend of Array Group #2-1

Figure 5.10, Figure 5.11, and Figure 5.12 confirm the performance bottleneck. If you want to maintain the concurrent I/O of LDEV #00:08 and LDEV #00:02 without causing an array group I/O contention bottleneck, you can move LDEV #00:02 to another Array Group using HiCommand Tiered Storage Manager.

### 5.3 Identifying CHA Port Bottlenecks

This section provides an example of using Tuning Manager to identify a CHA port bottleneck that increases the I/O response time of an application (Application #1) on the Gateway B server in the following storage system.

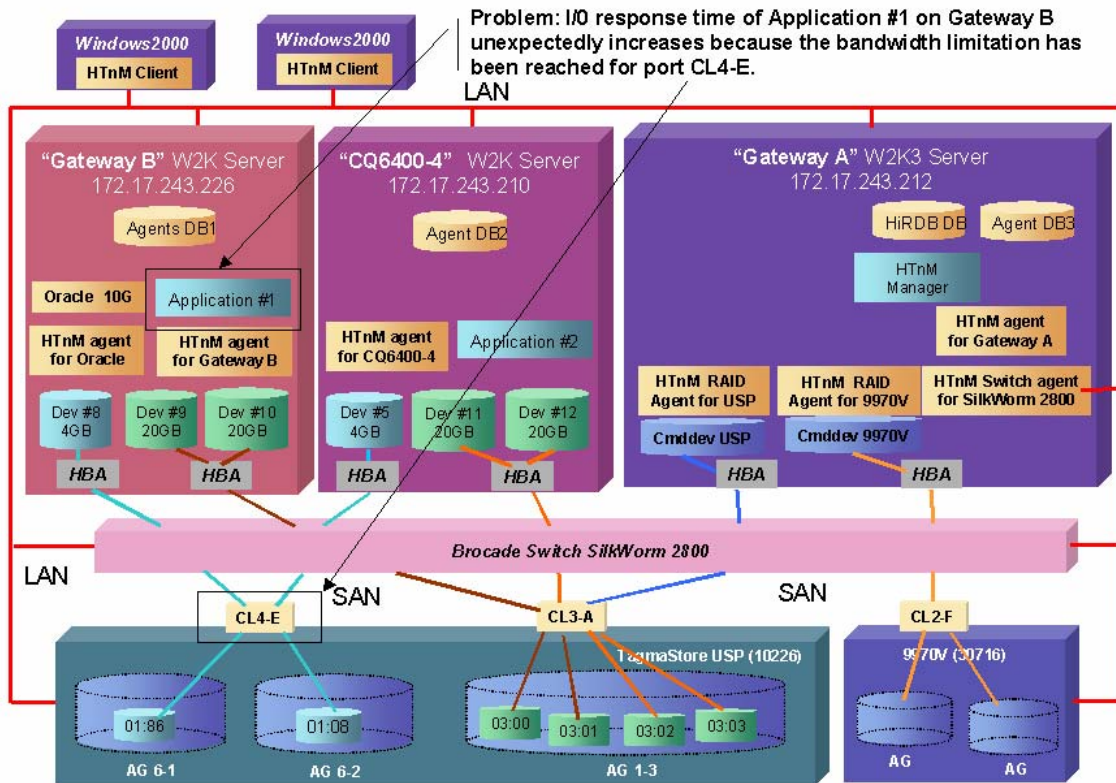


Figure 5.13 Example Storage System for the CHA Port Bottleneck Example

Following is an example of a front-end channel adaptor (CHA port) bottleneck. The example assumes that you have already used Performance Reporter to create reports named Avg Response Rate of Device File, Array Group Read Xfers/sec History, Port Xfers/sec History, LDEV Read Xfer/sec History, and Device File Xfer/sec History.

In this example, an application (Application #1) has been writing data in the GatewayB server on storage system shown in Figure 5.13, but suddenly the I/O response time begins to increase in the GatewayB server. What has happened?

1. In Main Console, select **Hosts** in **Resources** in the **Explorer** area, then click the **GatewayB** server in the object tree, and you will see performance data for the **GatewayB** in the **Application** area.

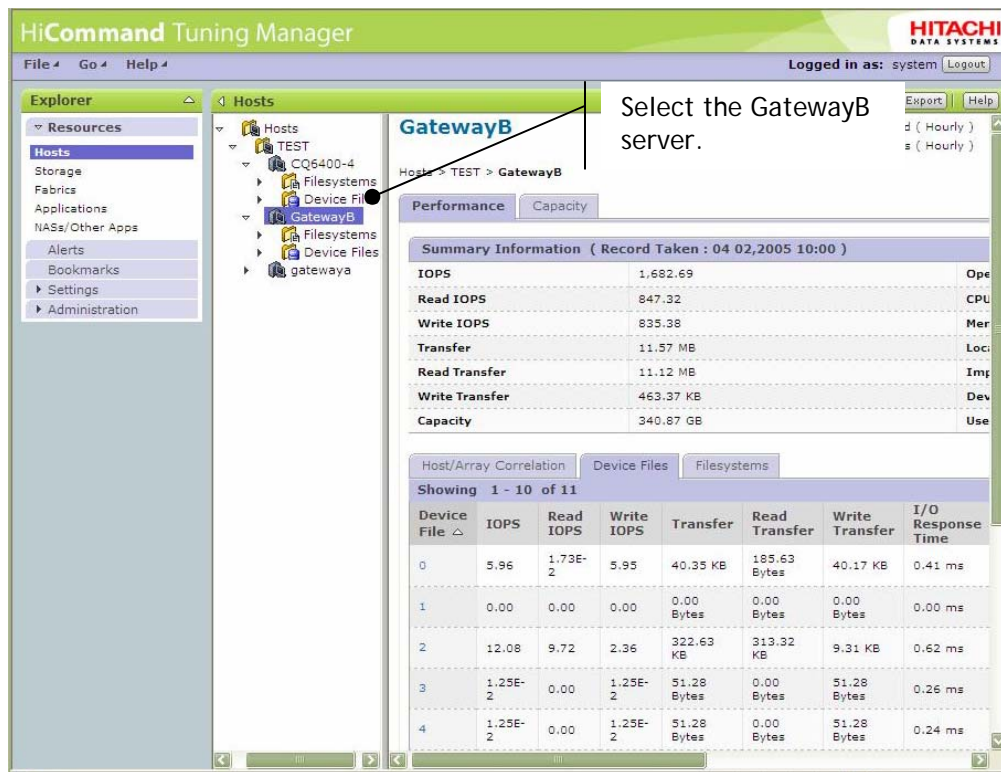
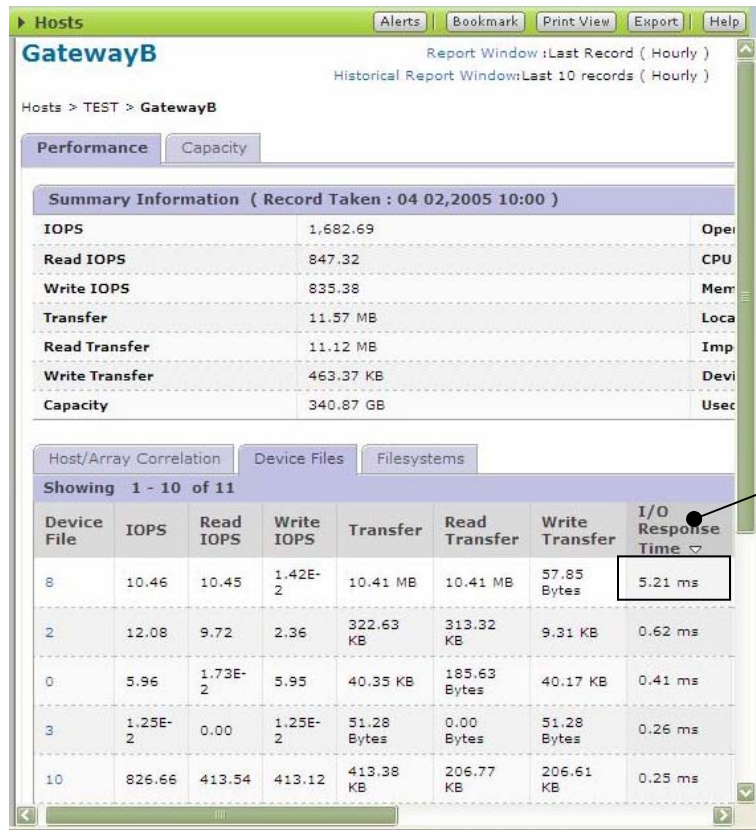


Figure 5.14 Performance Data for the GatewayB

2. To determine the slowest device file on the GatewayB server, click on the column header **I/O Response Time** twice to sort the table in descending order. It is obvious that device file #8 has the slowest response time (5.21ms) of all the device files on the GatewayB server.



Double-click I/O Response Time.

Figure 5.15 GatewayB Performance Data Sorted by I/O Response Time in Descending Order

- To see the detailed performance characteristics of the device file #8, use Performance Reporter and select the Windows Agent (TA1gatewayB) corresponding to the GatewayB server, and then click User Reports, Server, and Avg Response Rate of Device File.



Click on Avg Response Rate of Device File.

Figure 5.16 Performance Reporter Displaying the Reports in the Server Folder

The Avg Response Rate of Device File appears as shown below.

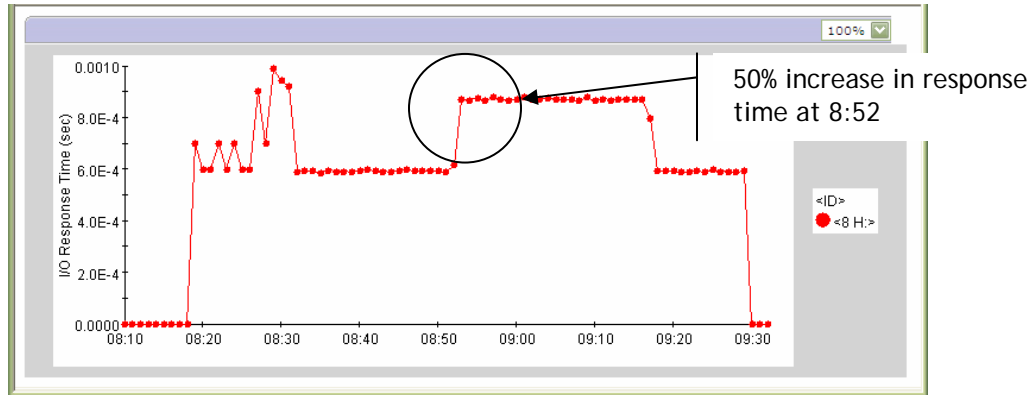


Figure 5.17 I/O Response Time Characteristics of Device File #8 in GatewayB Server

It seems that the response time suddenly increased by around 50% at 8:52. Why did the I/O response time increase suddenly? What is causing this I/O performance degradation?

You can confirm the increase by checking the Device File Xfer/sec History report. While the Windows Agent (TA1gatewayB) is selected, click **User Reports**, **Server**, and then **Device File Xfer/sec History**.

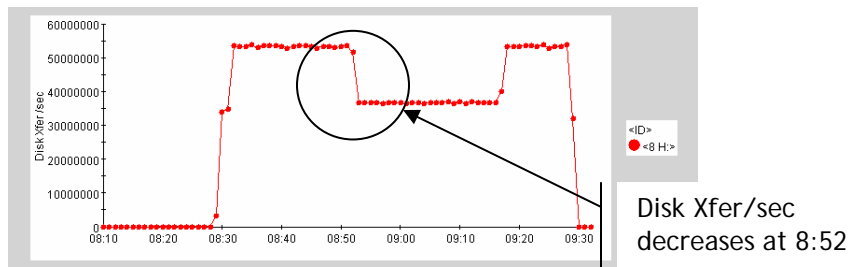


Figure 5.18 Disk Xfer/sec Trend of Device File #8 in GatewayB Server

The Device File Xfer/sec History report confirms that the Xfer/sec decreased by around 50% at 8:52.

4. To determine the cause of this I/O performance degradation, first use Main Console to pinpoint the resources related to device file #8. Under the GatewayB server in the object tree, click **Device Files**, and then device file #8. You will see performance data for device file #8 in the Application area.

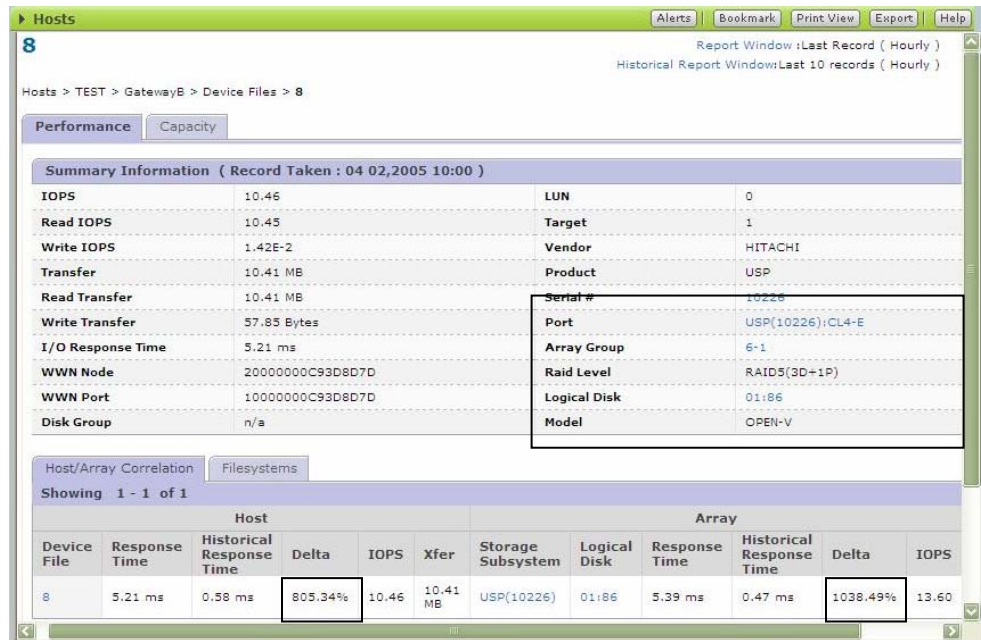


Figure 5.19 Main Console Displaying the Resources Related to Device File #8

According to Main Console, the resources related to device file #8 are as follows:

Storage: TagmaStore USP (SR#10226)

LDEV (Logical Device): #01:86

Array Group: #6-1

Port: CL4-E

In the Host/Array Correlation tab, you may also notice a sudden degradation of I/O response, indicated by both the Delta 805.34% for the device file #8 and the Delta 1038.49% for the logical disk #01:86.

5. Check the performance summary of correlated storage resources, in addition to finding out the related storage resources in step 4. To do this, click **List Connected Storage Resources** in **Advanced Information** while the device file #8 on the GatewayB server is selected as the main resource in Main Console.

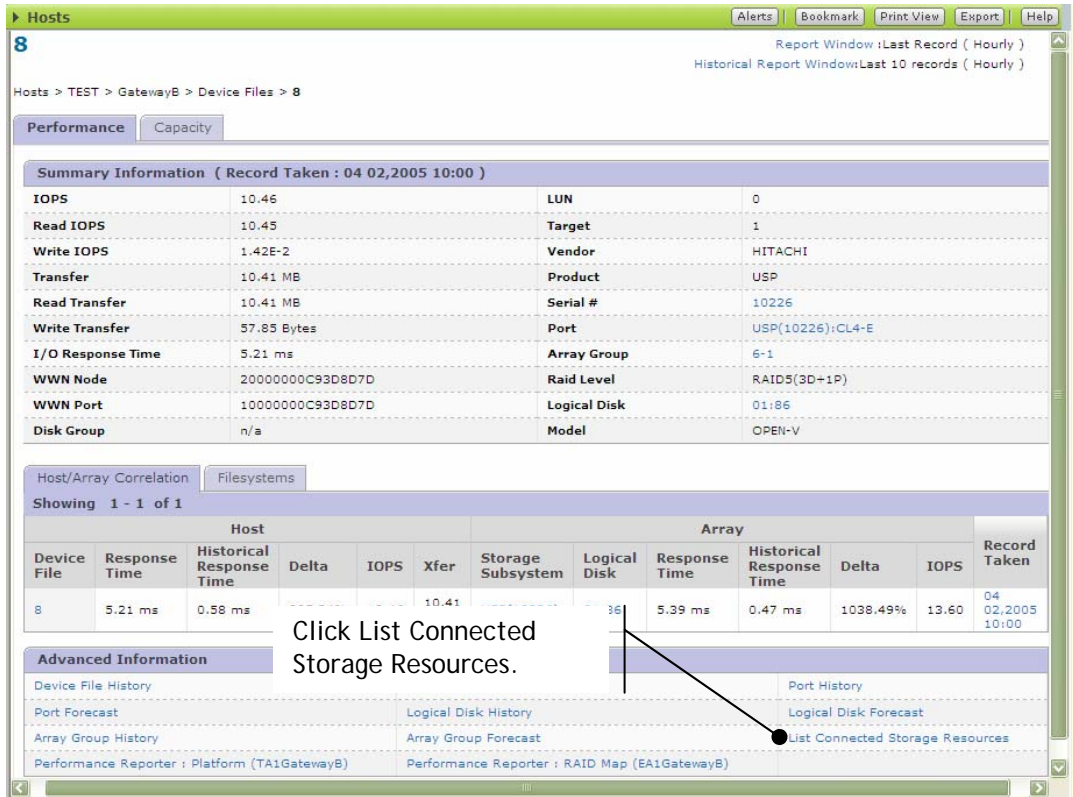


Figure 5.20 Performance Tab with List of Connected Storage Resources in Advanced Information  
The following report displays.

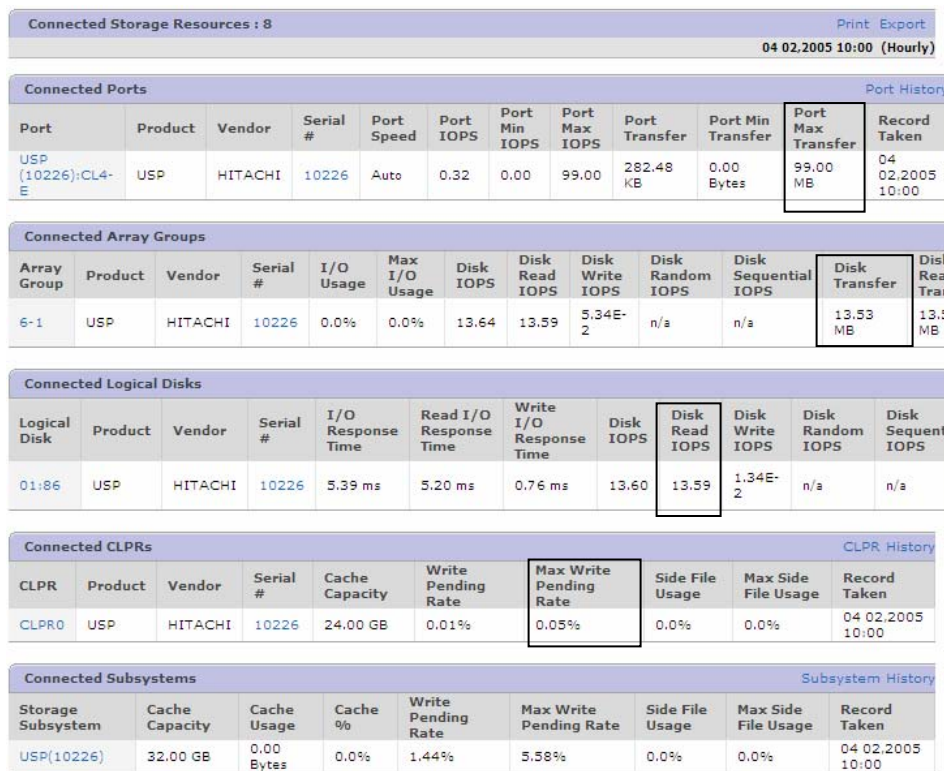


Figure 5.21 Performance Summary of Correlated Storage Resources

According to this report, the cache CLPR0 does not seem to be a problem since **Max Write Pending Rate** is very low (0.05%), but we need to check the port, logical disk and array group performance in detail because the **Port Max Transfer** is very high (99MB/s), **Disk Read Transfer** is also relatively high (13.53MB/s) for **Array Group 6-1**, and **Disk Read IOPS** is relatively high (13.59MB/s) for **Logical Disk 01:86**.

*Note:* **I/O Usage** and **Max I/O Usage** for the array group 6-1 appear as 0% in this example because these metrics were not supported in the array microcode version where this data was captured. However, **I/O Usage** and **Max I/O Usage** are usually very important metrics to decide whether an array group is heavily loaded.

6. Check the detailed storage performance.

Check the LDEV. In Performance Reporter, select the RAID Agent corresponding to server GatewayB, and then click **User Reports, Storage, and then LDEV Read Xfer/sec History**.

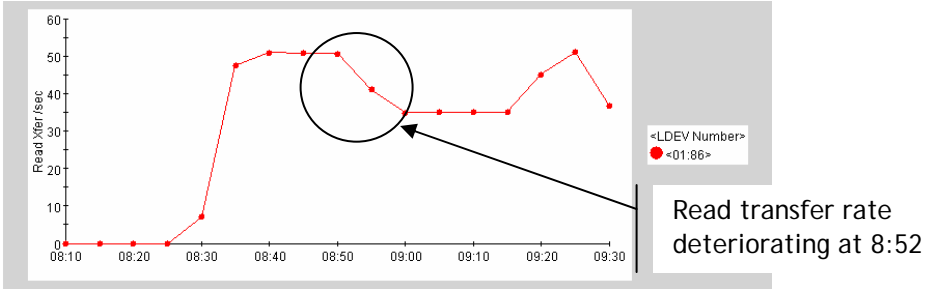


Figure 5.22 Read Xfer/sec Trend of LDEV #01:86

Check the Array Group. In Performance Reporter, click **User Reports, Storage, and then Array Group Read Xfer/sec History**.

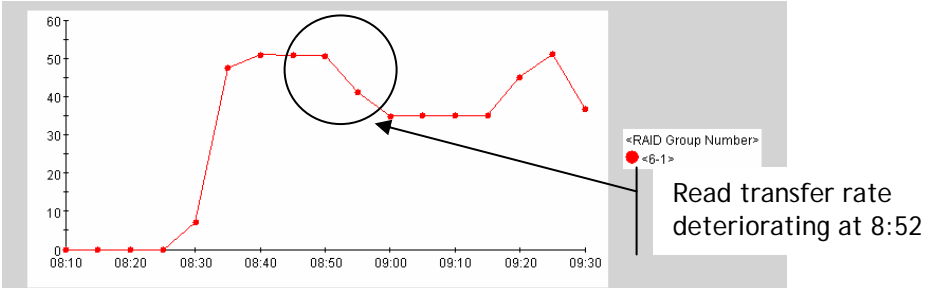


Figure 5.23 Read Xfer/sec Trend of Array Group #6-1

Check the port. In Performance Reporter, click **User Reports, Storage, and then Port Xfers/sec History**.

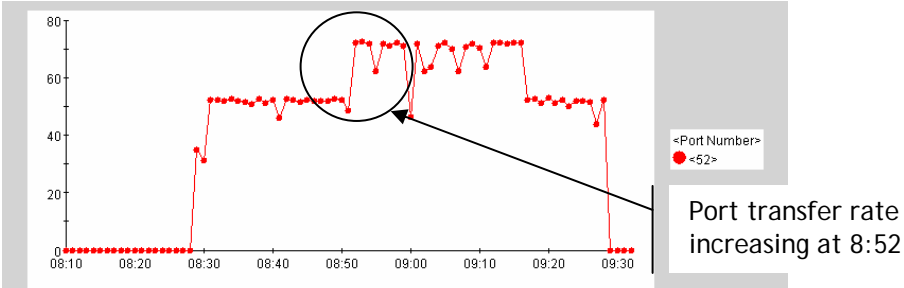


Figure 5.24 Mini. Xfer/sec Trend of Port CL4-E

It seems that read transfer rate is deteriorating in LDEV #01:86 and in Array Group #6-1 at 8:52, while it is known that an application on GatewayB is accessing the disk at a constant rate. Why is port transfer rate suddenly increasing at 8:52? Use Main Console to determine which resources are using the same port.

In Main Console, show the summary of port CL4-E.



Figure 5.25 Main Console Displaying the Port CL4-E

Click the List Connected Servers report. Figure 5.26 shows the list of resources using port CL4-E.

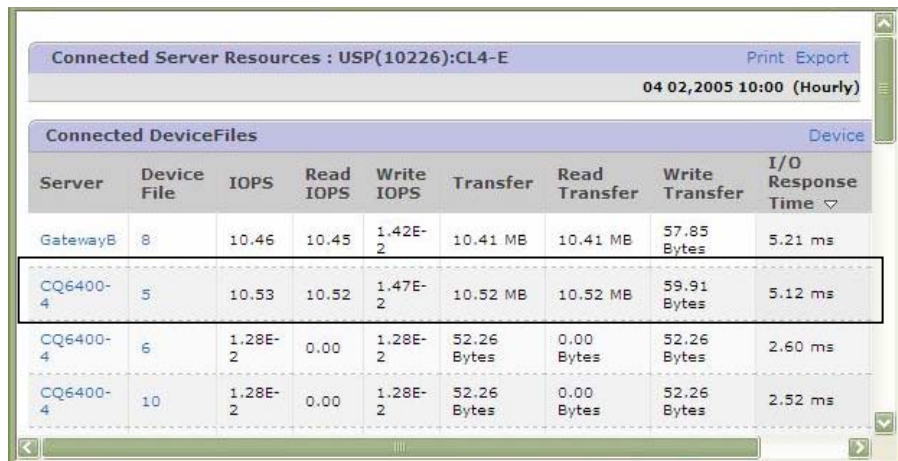


Figure 5.26 List of Resources Using Port CL4-E

In addition to Server GatewayB, server CQ6400-4 is also using the same port CL4-E, especially the device file #5 on server CQ6400-4.

7. Check the performance of the resources using the same port. Specifically check the device file using the same storage port on CQ6400-4. In Performance Reporter, click the Agents tab, select the Windows Agent corresponding to the CQ6400-4 server, and then click User Reports, Server, and Device File Xfer/sec History.

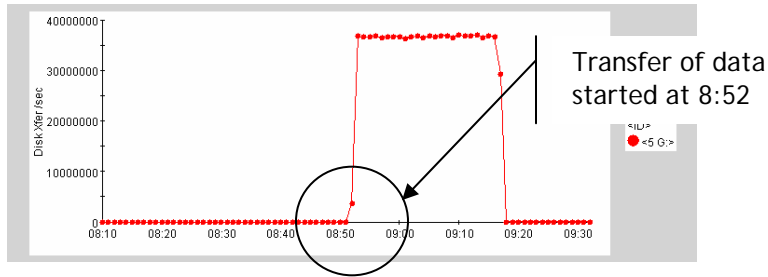


Figure 5.27 Xfer/sec Trend of Device File #5 (LDEV #01:08) in Server CQ6400-4

Notice that some unknown application (Application #2) on Server CQ6400-4 started transferring data to device file #5 at 8:52.

Reviewing the Xfers/sec trends of the related resources as shown once again in Figure 5.28, Figure 5.29, and Figure 5.30, it seems that the transfer rate of device file #8 in GatewayB server has decreased, in contrast to the transfer rate of device file #5 in CQ6400-4 server beginning to increase. And the total number of Xfer/sec in device file #8 and device file #5 equals the number of Xfer/sec in port CL4-E. You can conclude that the port congestion occurs in port CL4-E.

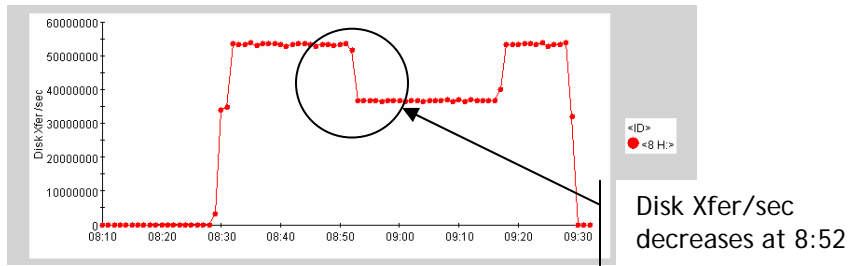


Figure 5.28 Xfer/sec Trend of Device File #8 in GatewayB Server

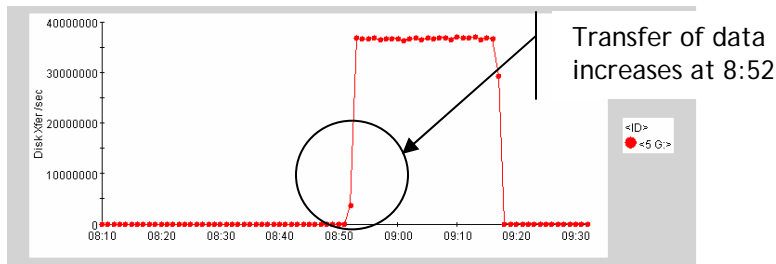


Figure 5.29 Xfer/sec Trend of Device File #5 in CQ6400-4 Server

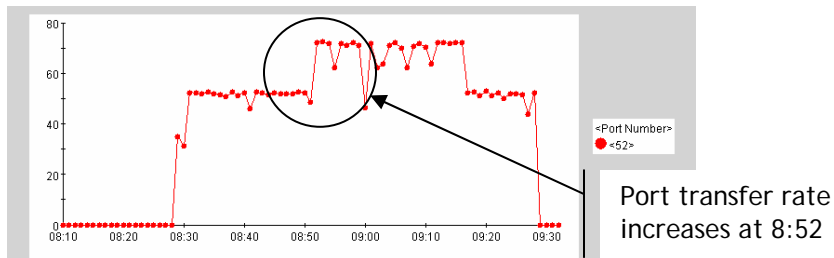


Figure 5.30 Avg Xfer/sec Trend of Port CL4-E

According to the above analysis, it turns out that a port congestion problem is observed in port CL4-E. You also need to find out whether this port congestion is caused either by a bandwidth limitation of port CL4-E or by a CHA processor for CL4-E being overloaded. You should check the CHA processor utilization for CL4-E.

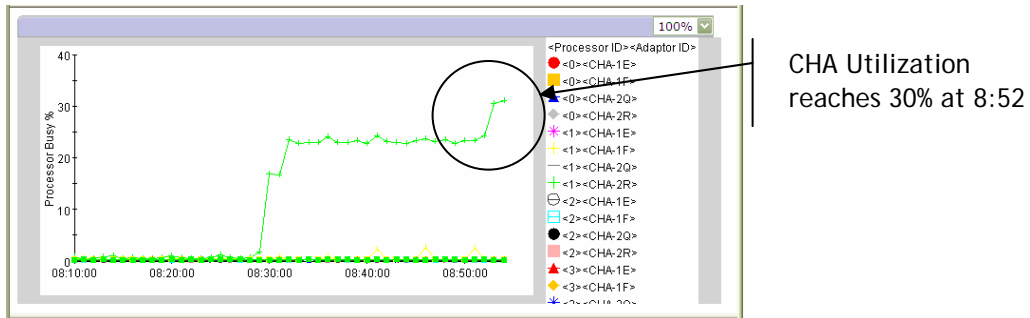


Figure 5.31 CHA Processor Busy Rate

CHA processor utilization reaches around 30% at most, which is considered to be low utilization. Therefore, you can conclude that the port bandwidth has been reached for CL4-E.

**Note:** Performance Reporter can also show back-end DKA processor utilization. You can check DKA processor utilization to see whether back-end performance bottleneck occurs, when necessary.

To maintain the transfer rate for device file #8 in the GatewayB server as in the same level before the port congestion mentioned above, you can either give lower priority to the access from the CQ6400-4 server by using Server Priority Manager (formally known as Prioritized Port Control or Priority Access) in Storage Navigator, or you can use another storage port for the access from CQ6400-4 by changing the path configuration between CQ6400-4 and the array using Device Manager and HDLM.

## Chapter 6 Using the Command Line Interface (CLI)

This chapter contains the following topics:

- Overview (see section 6.1)
- Starting and Stopping the Server (see section 6.2)
- Commands for Administration (see section 6.3)
- Commands for Reporting (see section 6.4)
- Confirming the Operating Environment for a RAID Agent (see section 6.5)
- Creating and Updating an Instance for an Agent that Allows Multiple Instances (see section 6.6)

## 6.1 Overview

The Tuning Manager command line interface (CLI) provides a way to access 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. Some Tuning Manager tasks that are not available for execution with the GUI are available for execution with the CLI. This chapter describes the commands that provide functions which the GUI does not provide. Specifically, this chapter describes the commands that are used to start and stop the server and commands (such as commands that are used to set retention periods) that are used to output and update information that cannot be output or updated from the GUI. Note that many more commands are available.

Common ways to use the CLI are by:

- 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.)

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.

### 6.1.1 Executing Commands

All Tuning Manager commands are contained in an installation directory. For all the available commands, command parameters, and command options, see the *HiCommand Tuning Manager Command Line Interface Guide*. Two main types of commands are used in Tuning Manager: HiCommand Suite Common Component commands (hcmdss commands) and Tuning Manager commands. Tuning Manager commands are further categorized into Main Console commands (htm commands) and Collection Manager and Performance Reporter commands (jpc commands).

HiCommand Suite Common Component commands, Tuning Manager commands, and Collection Manager and Performance Reporter commands are installed in separate directories. The directories are different as well in Windows and Solaris. The installation directories for the commands are as follows:

#### Windows:

HiCommand Suite Common Component commands: `c:\Program Files\HiCommand\Base\bin\`

Main Console commands: `"c:\Program Files\HiCommand\TuningManager\bin\"`

Performance Reporter commands: "c:\Program  
Files\HiCommand\TuningManager\PerformanceReporter\tools\"

Collection Manager commands: "c:\Program  
Files\HiCommand\TuningManager\jplpc\tools\"

#### Solaris:

HiCommand Suite Common Component commands:  
/opt/HiCommand/TuningManager/bin/

Main Console commands: /opt/HiCommand/TuningManager/bin/

Performance Reporter commands:  
/opt/HiCommand/TuningManager/PerformanceReporter/tools/

Collection Manager commands: /opt/jplpc/tools/

## 6.2 Starting and Stopping the Server

Before logging into Tuning Manager for the first time, you must start the Tuning Manager server and related services. The following commands are used to start and stop the Tuning Manager server, the services of Collection Manager, and the Agents at the local host.

- Starting the server (hcmdssrv /start, then jpcstart all)
- Starting the services of Collection Manager and the Agent at the local host (jpcstart)
- Stopping the server (hcmdssrv /stop, then jpcstop all)
- Stopping the services of Collection Manager and the Agent at the local host (jpcstop)

**Caution:** Hitachi strongly recommends that you use the `jpcstop` command, instead of the Windows Services Panel, to stop Tuning Manager.

## 6.2.1 Starting the Server

The Tuning Manager server automatically starts when the HiCommand Suite Tuning Manager service, HiCommand Suite Performance Reporter service, and HiCommand Suite Tuning Service services are started. To manually start the Tuning Manager server, start the services in the following order. To start the HiCommand Suite Tuning Service service only, just complete step 3.

1. Execute the following command to start the HiCommand Suite Tuning Manager service:

Windows:

```
c:\Program Files\HiCommand\Base\bin\ hcmdssrv /start /server  
TuningManager
```

Solaris:

```
/opt/HiCommand/Base/bin/ hcmdssrv -start -server TuningManager
```

2. Execute the following command to start the HiCommand Performance Reporter service:

Windows:

```
c:\Program Files\HiCommand\Base\bin\ hcmdssrv /start /server  
PerformanceReporter
```

Solaris:

```
/opt/HiCommand/Base/bin/ hcmdssrv -start -server PerformanceReporter
```

3. If necessary, execute the following command to start the HiCommand Suite Tuning Service service:

Windows:

```
c:\Program Files\HiCommand\Base\bin\ hcmdssrv /start /server Tuning  
Service
```

Solaris:

```
/opt/HiCommand/Base/bin/ hcmdssrv -start -server Tuning Service
```

4. Execute the following command to start the services of Collection Manager and the Agent at the local host (the services of Collection Manager and the Agent at a remote host cannot be started):

Windows:

```
c:\Program Files\HiCommand\TuningManager\jplpc\tools\ jpcstart all
```

UNIX®:

```
/opt/jplpc/tools/ jpcstart all
```

The command returns a 0 to indicate that the command terminated normally. If a different number is returned, see the description of the `jpcstart` command in the *HiCommand Tuning Manager Command Line Interface Guide* for details.

5. To check the status of the services of Collection Manager and the Agent, use the `jpcctrl list` command. The `jpcstart` command cannot be executed in duplicate or simultaneously with the `jpcstop` command.

For details about the other parameters available with the `jpcstart` command and notes on using the command, see the *HiCommand Tuning Manager Command Line Interface Guide*.

## 6.2.2 Stopping the Server

To stop Tuning Manager, stop the services in the following order. To stop only the HiCommand Suite Tuning Service service, perform just step 3.

1. Execute the following command to stop the HiCommand Suite TuningManager service:

Windows:

```
c:\Program Files\HiCommand\Base\bin\ hcmdssrv /stop /server  
TuningManager
```

Solaris:

```
/opt/HiCommand/Base/bin/ hcmdssrv -stop -server TuningManager
```

2. Execute the following command to stop the HiCommand Performance Reporter service:

Windows:

```
c:\Program Files\HiCommand\Base\bin\ hcmdssrv /stop /server  
PerformanceReporter
```

Solaris:

```
/opt/HiCommand/Base/bin/ hcmdssrv -stop -server PerformanceReporter
```

3. When the HiCommand Suite Tuning Service service is being used, execute the following command to stop it:

Windows:

```
c:\Program Files\HiCommand\Base\bin\ hcmdssrv /stop /server Tuning  
Service
```

Solaris:

```
/opt/HiCommand/Base/bin/ hcmdssrv -stop -server Tuning Service
```

4. Execute the following command to stop the HBase Storage Mgmt Web Service service.

**Notes:**

- When other HiCommand Suite products are using HBase Storage Mgmt Web Service, this step is not required.
- When you attempt to stop HBase Storage Mgmt Web Service, the KAPM06445-E message is output if it takes a long time to stop HiRDB. If this message is output, wait for a while and then re-execute the command.

Windows:

```
c:\Program Files\HiCommand\Base\bin\ hcmdssrv /stop
```

Solaris:

```
/opt/HiCommand/Base/bin/ hcmdssrv -stop
```

5. Execute the following command to stop the services of Collection Manager and the Agent at the local host (The services of Collection Manager and the Agent at a remote host cannot be stopped):

Windows:

```
c:\Program Files\HiCommand\TuningManager\bin\tools\ jpcstop all
```

UNIX:

```
/opt/HiCommand/TuningManager/bin/opt/jp1pc/tools/ jpcstop all
```

The command returns a 0 to indicate that the command terminated normally. If a different number is returned, see the description of the `jpcstart` command in the *HiCommand Tuning Manager Command Line Interface Guide* for details.

6. To check the status of the services of Collection Manager and the Agent, use the `jpcctrl list` command. The `jpcstop` command cannot be executed in duplicate or simultaneously with the `jpcstart` command.

**Notes:**

- Do not stop the `HiRDB/EmbeddedEdition _HD0` service if it is registered in the Services panel. This service must be active at all times.
- For details about the other parameters available with the `jpcstop` command and notes on using the command, see the *HiCommand Tuning Manager Command Line Interface Guide*.
- Do not stop the service when polling is being performed. If scheduled polling is set for every hour, avoid stopping the service during the period 10 minutes before and after the specified polling time, and make sure that `Polling in progress` is not displayed in the status column.

## 6.3 Commands for Administration

As examples of the commands used for administration, this section describes commands for modifying defined information recording methods of the Store database and commands used to connect to an Agent and modify definition information regarding the data retention conditions of the Store database.

### 6.3.1 Customizing Collection and Recording Methods of a Store Database

You can use the `jpcasrec` commands to modify the defined methods for recording information of a Store database. The `jpcasrec output` command outputs definition information related to Store database recording methods in XML format. Output files can be specified as `jpcasrec update` command input files. The following example command outputs the definition information related to the recording method of the Store database of the Agent whose service ID is `TA1host11`. The command outputs the information to the parameter file `asrec_output.xml`.

#### Windows:

```
c:\Program Files\HiCommand\PerformanceReporter\bin\tools\ jpcasrec
output -o asrec_output.xml TA1host1
```

#### Solaris:

```
/opt/HiCommand/TuningManager/PerformanceReporter/tools/ jpcasrec
output -o asrec_output.xml TA1host1
```

The `jpcasrec update` command connects to an Agent and modifies the defined information recording methods 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.

In the following example, the command specifies the parameter file (`asrec_update.xml`) that contains the definitions related to the recording method of the Store database:

#### Windows:

```
c:\Program Files\HiCommand\PerformanceReporter\bin\tools\ jpcasrec
update asrec_update.xml
```

#### Solaris:

```
/opt/HiCommand/TuningManager/PerformanceReporter/tools/ jpcasrec
update asrec_update.xml
```

The command returns a 0 to indicate that the command ended normally. If a different number is returned, see the description of the `jpcasrec update` command in the *HiCommand Tuning Manager Command Line Interface Guide* for details.

### 6.3.2 Customizing the Retention Conditions of Records in a Store Database

You can use the `jpcaspsv` commands to connect to an Agent and modify definition information regarding the data retention conditions of the Store database. The `jpcaspsv output` command connects to the Agent, obtains definition information regarding the data retention conditions of the Store database, and outputs the obtained information in XML format. Output files can be specified as `jpcaspsv update` command input files.

In the following example, the command outputs definition information related to the recording method of the Store database for the Agent whose service ID is `TS1host1`. The command outputs this information to the parameter file `aspsv_output.xml`:

**Windows:**

```
c:\Program Files\HiCommand\PerformanceReporter\bin\tools\ jpcaspsv
output -o aspsv_output.xml TS1host1
```

**Solaris:**

```
/opt/HiCommand/TuningManager/PerformanceReporter/tools/ jpcaspsv
output -o aspsv_output.xml TS1host1
```

The `jpcaspsv update` command connects to the Agent and modifies definition information regarding the data retention conditions of the Store database. This definition information to be modified is obtained from the XML-format parameter file specified as the command line argument. In the following example, the command specifies the parameter file `aspsv_update.xml` that contains the definition information related to the storage conditions of the Store database.

**Windows:**

```
c:\Program Files\HiCommand\PerformanceReporter\bin\tools\ jpcaspsv
update aspsv_update.xml
```

**Solaris:**

```
/opt/HiCommand/TuningManager/PerformanceReporter/tools/ jpcaspsv
update aspsv_update.xml
```

## 6.4 Commands for Reporting

This section describes commands for acquiring the following information:

- Data on a management server from the HiRDB running on the management server
- Data from the Store database of a remote agent from the management server
- Master Store Service or Agent Store Service database data, locally

### 6.4.1 Exporting Tuning Manager Data in CSV Format on the Management Server

You can use Main Console commands (htm commands) to acquire data from the HiRDB running on the management server. The Main Console commands are typically used to:

- Manually execute the CLI programs from the command line in the OS
- Invoke the CLI programs within scripts, macros, or development products

The htm commands are used mainly to output Tuning Manager database data in CSV file format. The maximum length of resource information displayed as the execution result of the CLI programs is 20 characters for each metric. If you want to check resource information that exceeds 20 characters, specify the `--csv` option for the CLI program parameter to output results to a file in CSV format. For details about Tuning Manager commands, see the *HiCommand Tuning Manager Command Line Interface Guide*.

### 6.4.2 Exporting the Store Database of an Agent Remotely from the Management Server

You can use the `jpcrpt` command from the management server to output a report from a remote Agent server to a file using the CSV format. The output definitions are obtained from the XML-format parameter file that is specified as a command line argument. In the parameter file, you can specify the report to be output and the items in the Show options window.

The following example shows how to execute the command to output the parameter file (`param.xml`) describing the definition for report output to a file (`output.csv`):

#### Windows:

```
c:\Program Files\HiCommand\TuningManager\bin\tools jpcrpt -o output.csv  
-y param.xml
```

#### Solaris:

```
/opt/HiCommand/TuningManager/PerformanceReporter/tools/ jpcrpt -o  
output.csv -y param.xml
```

### 6.4.3 Exporting a Store Database in CSV Format Locally

You can use the `jpcctrl dump` on the local Agent server to export the data stored in the Master Store service or Agent Store service database to a text file. Exporting is executed for each database.

The following types of information are output to an export file:

- Product information
- Field name
- Data

The default execution of the `jpcctrl dump` command creates export files in the following directories:

**When data stored in the Master Store service database is exported:**

Windows: `c:\Program Files\HiCommand\TuningManager\bin\mgr\store\dump\`

UNIX: `/opt/jplpc/mgr/store/dump/`

**When data stored in the Agent Store service database is exported:**

Windows: `c:\Program Files\HiCommand\TuningManager\bin\xxxx(Note 1)\store[\instance-name](Note 2)\dump\`

UNIX: `/opt/jplpc/xxxx(Note 1)/store[/instance-name](Note 2)/dump/`

**Note 1:** `xxxx` indicates the service key of each Agent. For details about service keys, see a list of identifiers in the appendix of the Report Reference manual for the corresponding Agent.

**Note 2:** For an Agent that monitors an application program that can start a set of multiple services at the same host, there are directories with instance names.

For more information on the fields, see the chapter explaining records (a list of record fields) in the Report Reference manual for the corresponding Agent. Fields that are not explained in the Report Reference manual are those that are used in internal processing.

In this example, the command exports the data that is contained in the Processor Overview (PI\_PCSR) record on the HTM Agent for Platform (Windows) host `host02`, and is within the time range of 2:00 a.m. (GMT) on July 25, 2006 to 2:59 p.m. (GMT) on July 26, 2006, to the file `pcsr.out`:

**Windows:**

```
c:\Program Files\HiCommand\TuningManager\bin\tools\ jpcctrl dump TS*
host=host02 2006/07/25 02:00 2006/07/26 14:59 pcsr.out PI PCSR
```

**UNIX:**

```
/opt/jplpc/tools/ jpcctrl dump TS* host=host02 2006/07/25 02:00  
2006/07/26 14:59 pcsr.out PI PCSR
```

The `jpcctrl list` command displays the service configuration and status of a Tuning Manager series program. For example, the command will display service IDs. You execute the `jpcctrl list` command in either of the following installation directories:

**Windows:**

```
c:\Program Files\HiCommand\TuningManager\bin\tools\
```

**UNIX:**

```
/opt/jplpc/tools/
```

**Usage Examples****Example 1**

In this example, the command displays a list of services of all Tuning Manager series programs in the system:

```
jpcctrl list * host=*
```

**Example 2**

In this example, the command displays a list of services of the host `host02` of the HTM Agent for Platform (Windows):

```
jpcctrl list * host=host02
```

**Example 3**

In this example, the command displays the structure and status of services in the logical host (host name: `jpl-hal`) environment:

```
jpcctrl list * lhost=jpl-hal
```

## 6.5 Confirming the Operating Environment for a RAID Agent

To facilitate the setup of RAID Agents, Tuning Manager provides the following two commands:

- `jpctdlistraid`: Outputs a list of the command devices that are open to a host on which HTM Agent for RAID is installed.
- `jpctdchkinst`: Confirms that the setup of the RAID Agent operation is correct and outputs a list of the command devices that are open to a host on which HTM Agent for RAID is installed.

You can use these commands to set up a RAID Agent. For details about the `jpctdlistraid` and `jpctdchkinst` commands and the procedure for using these commands during RAID Agent setup, see the *HiCommand Tuning Manager Command Line Interface Guide* and *HiCommand Tuning Manager Installation Guide*.

## 6.6 Creating and Updating an Instance for an Agent that Allows Multiple Instances

The `jpccinssetup` command creates and updates an instance environment for an Agent that can start multiple instances on one host. For an Agent that can start an instance, execution of this command is required. Note that this command is also the only method available for you to create multiple instances. You cannot create multiple instances with the GUI.

Executing this command creates and updates the following directories that contain, among other things, the setup file for the instance environment:

### Windows:

- `c:\Program Files\HiCommand\TuningManager\bin\xxxx(Note)\agent\instance-name\`
- `c:\Program Files\HiCommand\TuningManager\bin\xxxx(Note)\store\instance-name\`

### UNIX:

- `/opt/jp1pc/xxxx(Note 1)/store/instance-name/`
- `/opt/jp1pc/xxxx(Note 1)/agent/instance-name/`

**Note:** `xxxx` indicates the service key of each Agent. For details about service keys, see a list of identifiers in the appendix of the Report Reference manual for the corresponding Agent.

**Windows:**

```
c:\Program Files\HiCommand\TuningManager\bin\tools\ jpcinssetup agto  
-inst SDC
```

**UNIX:**

```
/opt/jp1pc/tools/ jpcinssetup agto -inst SDC
```

For a complete description of the `jpcinssetup` command and all the other available commands, see the *HiCommand Tuning Manager Command Line Interface Guide*.



## Chapter 7 Setting up Alerts

This chapter describes an example of setting up an alert:

- Overview (see section 7.1)
- Setting Alerts (see section 7.2)
- Creating an Alert Definition (see section 7.3)
- Defining Alert Actions (see section 7.4)
- Binding Alerts (see section 7.5)
- Testing Alerts (see section 7.6)
- Viewing Alerts (see section 7.7)

## 7.1 Overview

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, such as 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 hourly 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 about alertable metrics and alerts, see the *HiCommand Tuning Manager User's Guide* and the *HiCommand Tuning Manager Server Administration Guide*.
- **Alarm:** Tuning Manager issues this warning when the data collected by Agents minutely 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*.

You can also configure Tuning Manager to monitor and send an email alert for indications of polling failure. For details about setting up agent polling status alerts, see the *HiCommand Tuning Manager Server Administration Guide*.

This chapter describes how to set up an Array Group usage alert that monitors the I/O Usage(%) metric of an array group. The setup of an alert requires Manager or Administrator privileges. For complete details about how to set up alerts, see the *HiCommand Tuning Manager User's Guide*.

**Note:** You can also use the `jpcalarm` command to perform alarm operations from the command line interface. For more details about the `jpcalarm` command and a description of the all the available commands, see the *HiCommand Tuning Manager Command Line Interface Guide*.

## 7.2 Setting Alerts

To set up an alert Array Group usage alert that monitors the I/O Usage(%) metric of an array group, follow these steps:

1. **Define the alert.** Specify the characteristics of the alert including the resource type. For our example, we will define an Array Group usage alert that monitors the I/O Usage(%) metric of an array group. We will specify that the alert condition will be monitored constantly and use damping. (Damping is a technique to avoid excessive alerts.) With damping enabled, Tuning Manager only triggers an alert when a specified number of occurrences (damping occurrences) of an event are generated within a specified number of samples (damping interval). For our example, we will specify damping so that the alert will be triggered only when the alert condition is satisfied at least 3 times within 5 successive samples. The alert condition will be satisfied when I/O usage is equal to or exceeds 70%.
2. **Specify the action.** Specify the action(s) you want Tuning Manager to take in the case of an alert event. For our example, we will specify that a message reporting the percent of I/O usage will be sent to the event log or system log.
3. **Bind the alert.** Assign the alert definition and the actions you want performed to a resource. This operation is called a *bind*. For our example we will assign the action specified at step 2, above, to the alert definition created at step 1, above.

*Note:* Allow at least two polling periods for the alert to become effective.

## 7.3 Creating an Alert Definition

This activity requires Manager or Administrator privileges.

To create the example Array Group usage 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.
5. Specify the following:
  - Alert Name:** ArrayGroup\_Usage\_Alert\_1
  - User ID:** system
  - Always Evaluated:** Check this box.
  - Damping Enabled:** Check this box.
  - Occurrence(s):** 3
  - Intervals:** 5

**Data Category:** Array Group

6. Click **Next** to continue. The Alert Setting 2 window appears.

7. Specify the following:

**Metric:** I/O Usage(%)

**Operator:** >=

**Warning Value:** 70

**Critical Value:** 80

*Note:* The message fields (**Warning Condition** and **Critical Condition**) will remain grey when you create a 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: I/O Usage (%) >= 70.

8. Click **Save**.

## 7.4 Defining Alert Actions

Before you define an alert action, you must first create an alert definition as described in the previous section.

To set the alert action definition for the Array Group usage alert:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **Action** tab. The Alert Actions list appears.
3. If an extensive list has already been created, 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.
5. Specify the appropriate values. Window settings are described in Table 7.1.

Table 7.1 Alert Action Settings Fields (1 of 2 Sections)

Name	Description
Action Name	Action_1
Data Category	Storage Subsystem
EventLog/Syslog	Check this box to activate an operating system log entry. This option sends the 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.)

Log Message	Enter a string with embedded variables to be inserted in the operating system log. Messages can use alert message variables. For our Array Group example, we want to create a message that says "Array Group 1 has I/O Usage of 0.0%", so we enter: Array Group %%Name has I/O Usage of %%iusage
-------------	---

6. Click **Save** to add this Action Definition. For details about alert message variables, see the *HiCommand Tuning Manager User's Guide*.

## 7.5 Binding Alerts

Binding the alert to the resource category and action is the final step in setting up an alert. Before you bind an alert, you must define the alert actions as described in the previous section.

To bind the example Array Group usage alert to a 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.
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.
6. Click the radio button for the alert you want to bind.
7. Click **Next**. The Alert Activation 2 window appears.
8. Specify **(Always)** for the Notification type.
9. Assign the action to the Critical and Warning states. Select the alert **Critical** and **Warning** state check boxes.
10. Click **Save** to complete activation. The Confirmation window appears.
11. Click **Close** to close the Confirmation window.

## 7.6 Testing Alerts

You can test the appropriateness of the alert you have already defined and bound. You supply values that should either trigger the alert or should fall outside of its monitored range. Note that Manager or Administrator privileges are required to test alerts. Alerts triggered by testing are not displayed in the Alert History.

To test the Array Group usage alert:

1. Display the **Bind** window for **Alert**.
2. In the Tab area, click the **Bind** tab. The bound alerts list is displayed.
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. For our Array Group usage alert example, specify 75.
5. Click **Test**. The result of the test is displayed in a popup status window.
6. Click **Close** to remove the popup window.

## 7.7 Viewing Alerts

This section describes how to view alerts. Note that alerts have to be completely set up before you can view them.

To view the Array Group usage alert:

1. Click **Explorer** and then **Alert**.
2. In the Tab area, click the **View** tab. The Alerts list is displayed. Table 7.2 shows the information displayed for the Array Group usage alert.

Table 7.2 List of View Alert Data

Column	Description
Record Taken	The date and time for the occurrence of the alert condition.
Resource	Storage Subsystem
Data Category	Array Group
Threshold	The threshold condition for which the alert was triggered, according to the value in the Status field. <ul style="list-style-type: none"><li>▪ If the status is Critical, the critical threshold statement is shown.</li><li>▪ If the status is Warning, the warning threshold statement is shown.</li><li>▪ If the status is OK, the lowest threshold statement is shown.</li></ul> 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. <ul style="list-style-type: none"><li>▪ Red: critical</li><li>▪ Yellow: warning</li><li>▪ Green: OK</li></ul>
Message	The value of the metric that triggered the alert in the format <i>metric = value</i> is displayed. For example, if the I/O Usage has reached 85% (critical), then <code>I/O Usage (%) = 85</code> is displayed.



## Chapter 8 Troubleshooting Basics

This chapter provides troubleshooting scenarios for performance issues:

- Overview (see section 8.1)
- Troubleshooting Excessive or Unbalanced Front-end Channel Processor Utilization (see section 8.2)
- Troubleshooting Low Cache Hit Rates Leading to Higher Back-end Read/Write Activity (see section 8.3)
- Troubleshooting Back-end Disk Path and/or Disk-drive Utilization (see section 8.4)
- Troubleshooting I/O Workload Profiles that may be Sub-optimal for a Specific RAID type (see section 8.5)
- Contacting the Hitachi Data Systems Support Centers (see section 8.6)

## 8.1 Overview

The following table lists troubleshooting scenarios for performance issues and corresponding guidelines for checking certain areas. The high-level procedures for troubleshooting each example are described in the subsequent sections.

**Table 8.1 Subsystem Performance Bottleneck Troubleshooting Examples**

Subsystem Performance Bottleneck	Recommended Guidelines
Excessive or unbalanced front-end channel processor utilization	Less than a certain percent calculated based on your system resources, so that workload peaks can be addressed without introducing host delays.
Low cache hit rates leading to higher back-end read/write activity	Greater than certain percent calculated based on your system resources. To maintain low response times at high I/O rates, the majority of data requests must be satisfied from cache, without requiring back-end disk access.
Back-end disk path and/or disk-drive utilization	Should be less than certain percent calculated based on your system resources, otherwise physical I/O to back-end devices might be delayed.
I/O workload profiles that may be sub-optimal for specific RAID type (e.g. high percentage of Random Write requests on RAID5-formatted Logical devices)	Values are dependent upon many factors, such as workload.

## 8.2 Troubleshooting Excessive or Unbalanced Front-end Channel Processor Utilization

1. In the Explorer area, select **Storage**, and then in the Navigation area, select the subsystem to monitor.
2. From the Advanced Information area, launch Performance Reporter for RAID Agent.
3. Do one of the following; drill-down to:
  - System Reports->RAID->Troubleshooting->Recent Past->Processor Busy Details
  - System Reports->RAID->Troubleshooting->Real Time->Processor Busy Rate - Top 10 to spot the current "hot processors"

### 8.3 Troubleshooting Low Cache Hit Rates Leading to Higher Back-end Read/Write Activity

1. In the Explorer area, select **Storage**, and then in the Navigation area, select the subsystem to monitor.
2. Look at the Write Pending Rate and Max Write Pending Rate summary information:
  - Green with Write-Pending less than a certain percentage calculated based on your system resources
  - Yellow with Write-Pending between a certain percentages calculated based on your system resources
  - Red with Write-Pending between certain percentages calculated based on your system resources

*Note:* For AMS, WMS, USP and NSC, click **CLPR Performance** and **CLPR History** for more information.

### 8.4 Troubleshooting Back-end Disk Path and/or Disk-drive Utilization

Check the Array Group and LDEV utilization:

1. In the Explorer area, select **Storage**, and then in the Navigation area, select the subsystem to monitor.
2. In the Array Group summary, check the I/O Usage column.
3. Within the Advanced Information area, select **Array Group Performance** or **Array Group History** for more details.

### 8.5 Troubleshooting I/O Workload Profiles that may be Sub-optimal for a Specific RAID Type

1. In the Explorer area, select **Storage**, and then in the Navigation area, select the subsystem to monitor.
2. In the Array Group view, check Random vs Sequential IOPS and Transfer Rate to spot any workload conflicts within the Array Group.
3. In the Advanced Information area, select **Array Group Performance** or **Array Group History** for more details.
4. Select Logical Disks Group to review I/O Response Time and Disk IOPS and Transfer Rate.

## 8.6 Contacting the Hitachi Data Systems Support Centers

If you need to call the Hitachi Data Systems Support Center, be sure to provide as much information about the problem as possible, including the circumstances surrounding the error or failure, and the exact content of any error messages.

The worldwide Hitachi Data Systems Support Centers are:

- Hitachi Data Systems North America/Latin America  
San Diego, California, USA  
800-446-0744
- Hitachi Data Systems Europe  
Contact Hitachi Data Systems Local Support
- Hitachi Data Systems Asia Pacific  
North Ryde, Australia  
61-2-9325-3300

## Chapter 9 Frequently Asked Questions

The following table lists answers to questions that are often raised when working with Tuning Manager. If you have a question that is not addressed here or elsewhere in the Tuning Manager documentation set, please check our website at: <http://www.hds.com> or, contact the appropriate Hitachi Data Systems Support Center.

Table 9.1 Frequently Asked Questions

Cluster Configuration and IP Addresses	
Question	Answer
Does Tuning Manager manage Agent clusters from their physical IP addresses or from their service IP addresses?	The Tuning Manager server uses the "Logical IP Address" for its communication with Agents except for HTM Agent.
How do I specify which IP Address is used for the communication between Collection Manager and Agents?	You specify the Host Name/IP Address within the Host Information File, <code>jpchosts</code> . For details about using and modifying this file, please refer to the <i>HiCommand Tuning Manager Installation Guide</i> .
Data Recovery	
Question	Answer
How do I recover from a corrupted Agent Store database?	Use the <code>jpcrestore</code> command to restore the latest backup version that was taken with the backup command <code>jpctrl backup</code> . We suggest backing up the agent database daily, and using 7 as the backup level. For details about the commands and backup and restore procedures, see the <i>HiCommand Tuning Manager Agent Administration Guide</i> and <i>HiCommand Tuning Manager Command Line Interface Guide</i> .
Response Time	
Question	Answer
What are the response times on which Tuning Manager reports?	<ul style="list-style-type: none"> <li>▪ On Device File</li> <li>▪ On Logical Disk (Front End Response Time)</li> </ul>
Is the Host level an OS response time or a pathing response time?	It is a pathing response time that is derived using operating system-specific APIs (for example, Windows uses the WIN API, UNIX uses system calls).
What arrays are supported for Storage system response time?	The 9900V series and TagmaStore USP series.

Agent Management	
Question	Answer
What is the best practice for naming an Agent Instance?	<p>For a RAID Agent, use the agent host platform name and array subsystem serial number that is embedded in the instance name. For example:</p> <p>For a RAID Agent running on a W2k3 host xyzhost, name it W2K3-10259 where 10259 is the USP's serial number. It will appear as DA1W2K3-10259[xyzhost]. In Main Console, it will appear as USP(10259).</p> <p>When using Tuning Manager and DAMP, or, when using Tuning Manager and Device Manager, use the abbreviated serial number (last four digits). For example:</p> <p>DA1SA-62010393[abchost] -&gt; Thunder 9570V(393) (393 = 0393)</p> <p>DA1SA-620107187[abchost] -&gt;Thunder 9570V(7187)</p>
How can I get the Agent for Platform (AIX) to automatically start on a reboot when there are no entries in /etc/inittab?	<p>Step 1: Copy the jpc_start.model file as jpc_start:</p> <pre>cd /opt/jp1pc cp -p jpc_start.model jpc_start chmod 555 jpc_start</pre> <p>Step 2: Execute the following command:</p> <pre>mkitab "jp1pc:2:wait:/etc/rc.jp1_pc &gt;/dev/console 2&gt;&amp;1"</pre>
Data Collection	
Question	Answer
How can I collect data from a DF and USP server machine?	Go to Storage Navigator Modular. From Tools -> Performance -> Settings, check all the boxes to start collecting performance metrics.
How can I collect data from an AMS/WMS server machine?	Use the jpcasrec command to increase the polling time from every 5 minutes or every 1 minute for LDEVs, and port monitoring to 10 minutes or 5 minutes to reduce performance impact on the server.

## Acronyms and Abbreviations

API	Application Program Interface
HTM	HiCommand Tuning Manager
HTTP	HyperText Transfer Protocol
I/O	Input/Output
ID	identifier, identification
IP	Internet Protocol
LDEV	Logical Device Unit
MB	megabyte
OS	Operating System
RAID	redundant array of inexpensive disks
SAN	Storage Area Network
SSO	Single Sign On
TCP	transmission control protocol
WWW	World Wide Web