



Hitachi Storage Array Management Pack for Microsoft SCOM

User's Guide

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Preface

This document describes and provides instructions for installing the Hitachi Storage Array Management Pack for Microsoft SCOM and performing operations on the Hitachi Adaptable Modular Storage (AMS), Virtual Storage Platform (VSP), and Universal Storage Platform (USP-V) subsystems.

Please read this document carefully to understand how to use this product, and maintain a copy for reference purposes.

This preface includes the following information:

- [Intended audience](#)
- [Software Version](#)
- [Document revision level](#)
- [Document organization](#)
- [Document conventions](#)
- [Convention for storage capacity values](#)
- [Getting help](#)
- [Comments](#)

Notice: The use of Hitachi Storage Array Management Pack for Microsoft SCOM and all other Hitachi Data Systems products is governed by the terms of your agreement(s) with Hitachi Ltd.

Intended audience

This document is intended for system administrators, Hitachi Ltd. representatives, and authorized service providers who are involved in installing, configuring, and operating the Hitachi Adaptable Modular Storage (AMS), Virtual Storage Platform (VSP), and Universal Storage Platform (USP-V) subsystems, Workgroup Modular Storage, and Simple Modular Storage subsystems.

This document assumes the following:

- The user has a good understanding of RAID storage subsystems and their basic functions.
- The user is familiar with Hitachi Adaptable Modular Storage (AMS), Virtual Storage Platform (VSP), and Universal Storage Platform (USP-V) storage subsystems.
- The user is familiar with the Microsoft System Center Operations Manager software.

Software version

This revision applies to Storage Array Management Pack version 01.2.0 and later.

Document revision level

Revision	Date	Description
MK-09DF8195-00	June 2010	Initial Release
MK-09DF8195-01	September 2010	Revision 01, supersedes and replaces MK-09DF8195-00
MK-09DF8195-02	October 2010	Revision 02, supersedes and replaces MK-09DF8195-01
MK-09DF8195-03	February 2011	Revision 03, supersedes and replaces MK-09DF8195-02
MK-09DF8195-04	June 2011	Revision 04, supersedes and replaces MK-09DF8195-03
MK-09DF8195-05	September 2011	Revision 05, supersedes and replaces MK-09DF8195-04
MK-09DF8195-06	December 2011	Revision 06, supersedes and replaces MK-09DF8195-05
MK-09DF8195-07	March 2012	Revision 07, supersedes and replaces MK-09DF8195-06
MK-09DF8195-08	May 2012	Revision 08, supersedes and replaces MK-09DF8195-07

Document organization

The following table provides an overview of the contents and organization of this document. Click the [chapter title](#) in the left column to go to that chapter. The first page of each chapter provides links to the sections in that chapter.

Chapter	Description
About Hitachi Storage Array Management Pack for Microsoft SCOM	Provides an overview of the Hitachi Storage Array Management Pack for Microsoft SCOM and describes the specifications and operations.
Requirements and Installation	Specifies the system requirements and provides instructions for preparing for Hitachi Storage Array Management Pack for Microsoft SCOM operations.
Navigating the SCOM GUI	Describes the user interface for Hitachi Storage Array Management Pack for Microsoft SCOM.
Subsystem Views	Provides instructions for performing Hitachi Storage Array Management Pack for Microsoft SCOM operations.
Relationships	Provides instructions for performing relationship monitoring operations with the Hitachi Storage Array Management Pack for Microsoft SCOM software
Troubleshooting	Details how to contact Hitachi Data Systems if you have problems with the product.
Glossary	Defines the terms, acronyms and abbreviations used in this document.





Document conventions

The terms "Adaptable Modular Storage", "Workgroup Modular Storage", and "Simple Modular Storage" refer to all models of Hitachi Adaptable Modular Storage (AMS), Virtual Storage Platform (VSP), and Universal Storage Platform (USP-V) subsystems unless otherwise noted.

This document uses the following typographic conventions:

Convention	Description
Bold	Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click OK .
<i>Italic</i>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: <i>copy source-file target-file</i> Note: Angled brackets (< >) are also used to indicate variables.
screen/code	Indicates text that is displayed on screen or entered by the user. Example: # pairdisplay -g oradb
< > angled brackets	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: # pairdisplay -g <group> Note: Italic font is also used to indicate variables.
[] square brackets	Indicates optional values. Example: [a b] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a b } indicates that you must choose either a or b.
vertical bar	Indicates that you have a choice between two or more options or arguments. Examples: [a b] indicates that you can choose a, b, or nothing. { a b } indicates that you must choose either a or b.
underline	Indicates the default value. Example: [<u>a</u> b]

This document uses the following icons to draw attention to information:

Icon	Meaning	Description
	Note	Calls attention to important and/or additional information.
	Tip	Provides helpful information, guidelines, or suggestions for performing tasks more effectively.
	Caution	Warns the user of adverse conditions and/or consequences (e.g., disruptive operations).
	WARNING	Warns the user of severe conditions and/or consequences (e.g., destructive operations).

Convention for storage capacity values

Physical storage capacity values (e.g., disk drive capacity) are calculated based on the following values:

Physical capacity unit	Value
1 KB	1,000 bytes
1 MB	1,000 ² bytes
1 GB	1,000 ³ bytes
1 TB	1,000 ⁴ bytes
1 PB	1,000 ⁵ bytes
1 EB	1,000 ⁶ bytes

Logical storage capacity values (e.g., logical device capacity) are calculated based on the following values:

Logical capacity unit	Value
1 KB	1,024 (2 ¹⁰) bytes
1 MB	1,024 KB or 1,024 ² bytes
1 GB	1,024 MB or 1,024 ³ bytes
1 TB	1,024 GB or 1,024 ⁴ bytes
1 PB	1,024 TB or 1,024 ⁵ bytes
1 EB	1,024 PB or 1,024 ⁶ bytes
1 BLOCK	512 BYTES

Referenced Documents

- System Centers Operations Manager 2007 R2 Operations User's Guide (OM2007R2_OperationsUsersGuide.docx)
- Hitachi Storage Navigator Modular 2 Storage Features Reference Guide for AMS MK-97DF8148
- Hitachi Storage Navigator Modular 2 Advanced Settings User's Guide MK-97DF8039
- Hitachi Storage Snap-in for Windows PowerShell software User's Guide, MK-99DF8229-07
- Hitachi Storage AMS 2000 Family Dynamic Provisioning Configuration Guide
- Hitachi Storage Manager User's Guide

Getting Help

The Hitachi Data Systems Support Center staff is available 24 hours a day, seven days a week. Provisions for patches and fixes are restricted to normal business hours, 8 a.m. to 5 p.m. PST.

To reach us, please visit the support Web site for current telephone numbers and other contact information: <http://www.hds.com/services/support/>. If you purchased this product from an authorized HDS reseller, contact that reseller for support.

Before calling the Hitachi Data Systems Support Center, please provide as much information about the problem as possible, including:

- The circumstances surrounding the error or failure.
- The exact content of any error message(s) displayed on the host system(s).

Comments

Please send us your comments on this document: doc.comments@hds.com. Include the document title, number, and revision, and refer to specific section(s) and paragraph(s) whenever possible.

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

About Hitachi Storage Array Management Pack for Microsoft SCOM

This chapter describes the Hitachi Storage Array Management Pack for Microsoft SCOM Software:

- [Overview of Hitachi Storage Array Management Pack for Microsoft SCOM](#)

Overview of the Hitachi Storage Array Management Pack for Microsoft SCOM

System Center Operations Manager (SCOM) is a performance, health and state monitoring product for Microsoft Windows operating systems. The Hitachi Storage Array Management Pack for Microsoft SCOM integrates with the SCOM server to discover and monitor Hitachi AMS, VSP, and USP-V subsystem families.

The management pack provides the following object views that are displayed inside the Monitoring pane (under "Hitachi Storage" root) of the Operations Manager console.

- **Subsystem** -> displays all the Hitachi Storage Subsystems managed by SCOM.
- **RAID Group** -> displays all the RAID Groups for the discovered storage subsystems.
- **Logical Unit** -> displays all the Logical Units for the discovered storage subsystems.
- **HDP Pool** -> displays all the HDP Pools for the discovered storage subsystems.
- **Storage Pool** -> displays all the storage pools for the discovered AMS, VSP and USP storage subsystems.
- **Drive** -> displays all the Drives for the discovered storage subsystems.
- **Controller** -> displays all the Controllers for the discovered storage subsystems.
- **Controller Port** -> displays all the Ports for the discovered storage subsystems

The management pack provides the following storage performance object views that are displayed inside the Monitoring pane (under "Hitachi Storage -> Performance" root) of the Operations Manager console.

- **AMS Controller Port** -> displays controller port performance data for the discovered AMS storage subsystems.
- **VSP Controller Port** -> displays controller port performance data for the discovered VSP storage subsystems.
- **HDP Pool** -> displays HDP pool performance data for the discovered storage subsystems.
- **Logical Unit** -> displays logical unit performance data for the discovered storage subsystems.
- **RAID Group** -> displays RAID group performance data for the discovered storage subsystems.

Health of a subsystem is monitored based on the health/status of the physical components of the subsystem. This version of the management pack only supports monitoring of the above subsystem components.

Requirements and Installation

This chapter provides system requirements, installation and uninstallation instructions, and requirements for use:

- [System Requirements](#)
- [Install](#)
-

□ Uninstall

System Requirements

Table 2-1 Server Hardware Requirements

#	Item	Requirements
1	CPU	Pentium III or more
2	Memory	1 Gigabyte or more
3	Graphics	800x600, 16-bit color or more
4	HDD Capacity	1 Gigabyte or more
5	iSCSI	Microsoft iSCSI Software Initiator Version 2.08
6	Supported HBAs	All the HBAs certified by Microsoft at the OS are supported.

Table 2-2 Subsystem Requirements

Item	Requirements
Windows operating system	<ul style="list-style-type: none"> ▪ Microsoft Windows Server 2003 SP2 ▪ Microsoft Windows Server 2003 R2 SP2 ▪ Microsoft Windows Server 2008 ▪ Microsoft Windows Server 2008 SP2 ▪ Microsoft Windows Server 2008 R2 ▪ Microsoft Windows Server 2008 R2 SP1
Microsoft SQL Server	<ul style="list-style-type: none"> ▪ Microsoft SQL Server 2008 Standard/Enterprise Edition with SP1
Microsoft SCOM	<ul style="list-style-type: none"> ▪ Microsoft System Center Operations Manager 2007 R2
Hitachi storage	<ul style="list-style-type: none"> ▪ Hitachi Adaptable Modular Storage (AMS 200/500/1000) ▪ Hitachi Adaptable Modular Storage 2000 Family (AMS2100/2300/2500) ▪ Hitachi Virtual Storage Platform (VSP) ▪ Hitachi Universal Storage Platform V (USP-V)

Table 2-3 Storage Pre-Operation Requirements

#	Item	Configuration
1	Licenses	Required array licenses: <ul style="list-style-type: none"> ▪ LUN-Manager ▪ ShadowImage (optional) ▪ Copy-on-write Snapshot (optional) ▪ Account Authentication (optional)
2	Host Ports	(1) In case FC is used <ul style="list-style-type: none"> ▪ Host Group Security is enabled on all the ports. ▪ LU Mapping mode is enabled. (2) In case iSCSI is used <ul style="list-style-type: none"> ▪ Target Security is enabled on all the ports. ▪ LU Mapping mode is enabled.
3	LUs	Supported LUN Type: Single, Parent, V-VOL, S-VOL, CM, and DMLU.
4	CMDDEV LU (AMDS only)	More than one CMDDEV-LU (Command device LU) is required for DF700. <ul style="list-style-type: none"> ▪ For AMS, minimum size is 33MB.
6	Controller	IP address is assigned for the subsystem controller.
7	Account Authentication License	Account Authentication license must be installed and enabled in the participating subsystems which the Account Authentication feature is required.
8	Storage Administrator Role	In order for the Hitachi SCOM Management Pack to display the authenticated subsystem information, the user account must have Storage Administrator role (View Only) enabled.
9	DM-LU	Two DM-LU (differential Management LU) is created. <ul style="list-style-type: none"> ▪ For AMS 200/500/1000, minimum size of each DM-LU is 5GB ▪ For AMS2000, minimum size of each DM-LU is 10GB
10	Dynamic Provisioning pool(s) and volumes	In the case Dynamic Provisioning is enabled, DP pools DP-VOLs must be defined by SNM2 GUI or CLI for use in the SCOM management pack.
11	Dynamic Provisioning License	Dynamic Provisioning license (D_PROVISIONING) must be installed and enabled in the subsystems if the Account Authentication feature is used.
12	Device Manager	Hitachi HiCommand Device Manager software provides a single platform for centrally managing, configuring and monitoring Hitachi storage systems
13	In-Band CMDDEV LUN	Command device must be created using the Hitachi Storage Navigator GUI and mapped to the Host group. Once the command device is configured, the Hitachi VSS Hardware Provider SCOM connector service will automatically select the command device for all the VSP and USP-V replication operations.

Installation Prerequisites

You must install the following items and verify they are running properly before using Hitachi Storage Array Management Pack for Microsoft SCOM:

- Microsoft System Center Operations Manager 2007 R2.
- Microsoft .NET Framework 3.5 SP1.
- Microsoft Management Console 3.0.

During the installation, you must provide an account user name and password for the connector service. Refer to Configuring the SCOM Server.

The Hitachi Storage Connector and the System Center Operations Manager need to be able to communicate via LAN (Ethernet).

The subsystem must have dual controller configuration and both of the controllers must be connected to the Ethernet network.

The Hitachi Subsystem Connector Windows service must be running with adequate Windows security requirement in order to communicate to the System Center Operation Manager running on a different host.

For VSP and USP-V subsystems, the machine that runs the Hitachi Storage Connector Windows service must have the Command Device for the subsystem setup correctly.

The Command Device must have the following attributes enabled:

1. Command Device Security
2. User Authentication

In order for the Connector service to be able to communicate with the Device manager, port 2001 must be opened between the two servers.

Installing the software

The Hitachi Storage Array Management Pack for Microsoft SCOM is available for download from the Hitachi Data Systems Support Portal.

While installing the Hitachi Storage Array Management Pack for Microsoft SCOM software the Hitachi Storage Connector Service is also installed. The Hitachi Storage Connector Service runs in the background and drives the Hitachi Storage Systems processes displayed in the SCOM console.

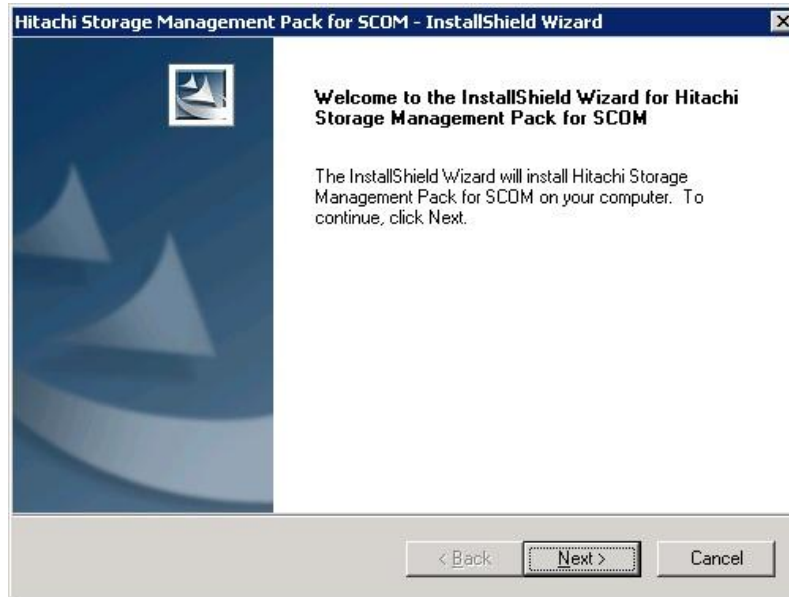


Note: Before installing the Hitachi Storage Array Management Pack for Microsoft SCOM, verify Microsoft System Center Operations Manager 2007 R2 is installed first.

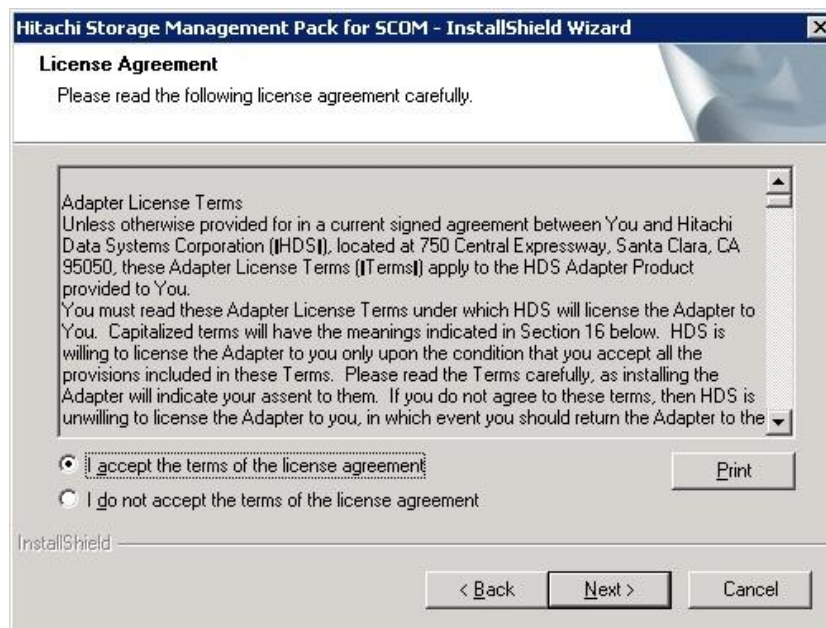
To install the Hitachi Storage Array Management Pack for Microsoft SCOM, perform the following steps:

1. Run the appropriate .msi file that launches the setup wizard. The **Preparing to Install...** screen appears while the installation setup file is being extracted.

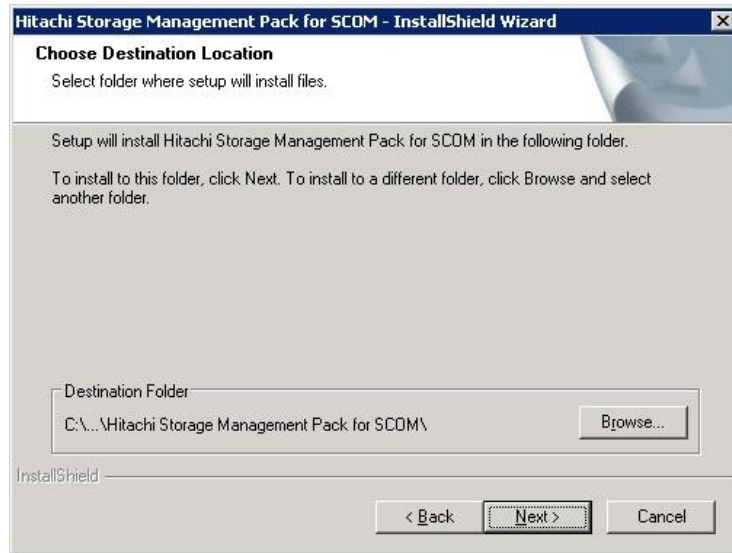




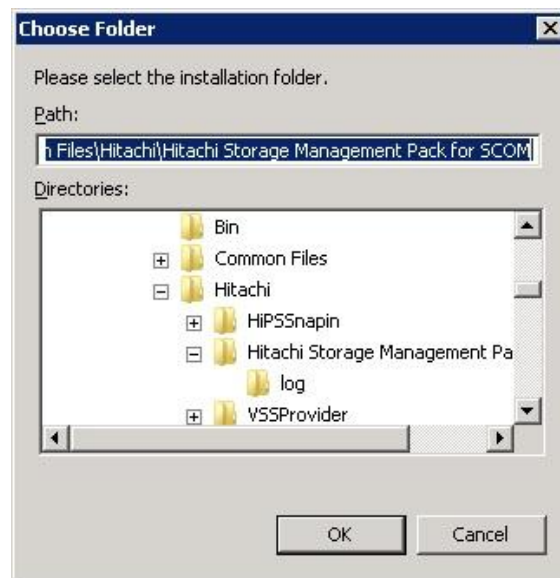
2. When the Welcome screen appears, click **Next**.



3. Read the license agreement carefully. Select **I accept the terms of the license agreement** and click **Next**.



4. Optionally, click **Browse** to navigate to a file system location to be the target installation folder.



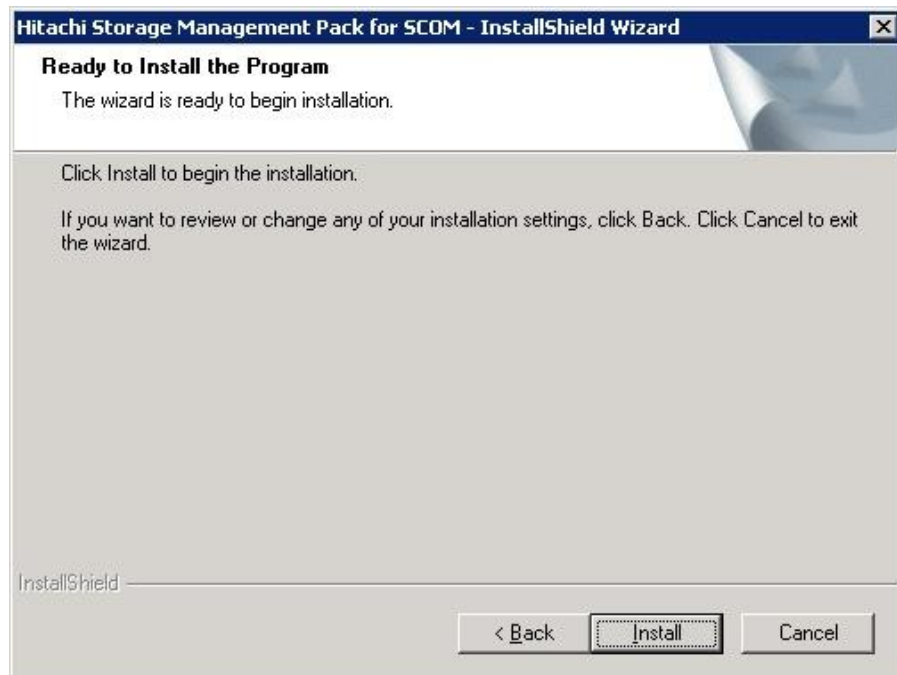
5. Select a location and click **OK**.

By default, the binaries will be installed in the following default location:
<Drive Letter>:\Program Files\Hitachi\Hitachi Storage Management Pack for SCOM

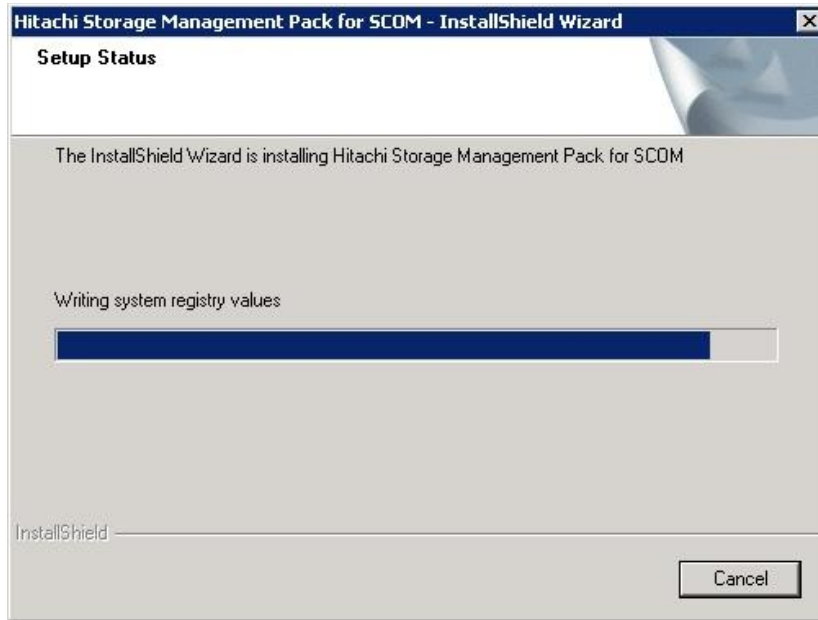
6. To choose the default location, click **Next**.



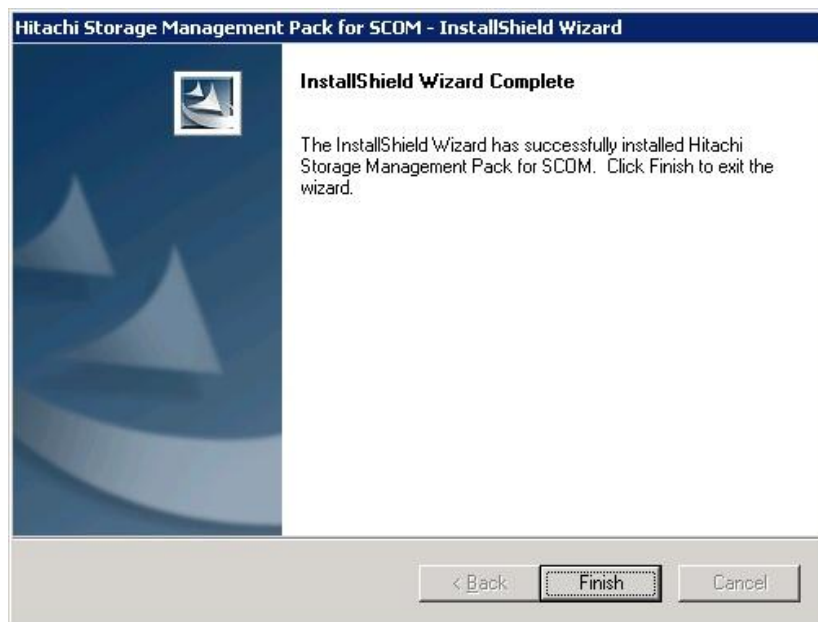
7. The **Service Login Information** dialog displays. Enter the user credentials and click **Next**.



8. Click **Install** to begin the installation.



9. The **Setup Status** screen shows the progress of the installation.



10. When installation is complete, click the **Finish** button.

Uninstalling the Software

To remove the Storage Array Management Pack software:

1. Open the Windows **Control Panel**.
2. Double-click **Programs and Features**.
3. Select **Hitachi Storage Management Pack for SCOM**, and click **Remove**.
4. Follow the instructions on screen to remove the Hitachi software.

Navigating the SCOM GUI

The Hitachi Storage Array Management Pack for Microsoft SCOM View can be seen from the Monitoring View of the SCOM console.

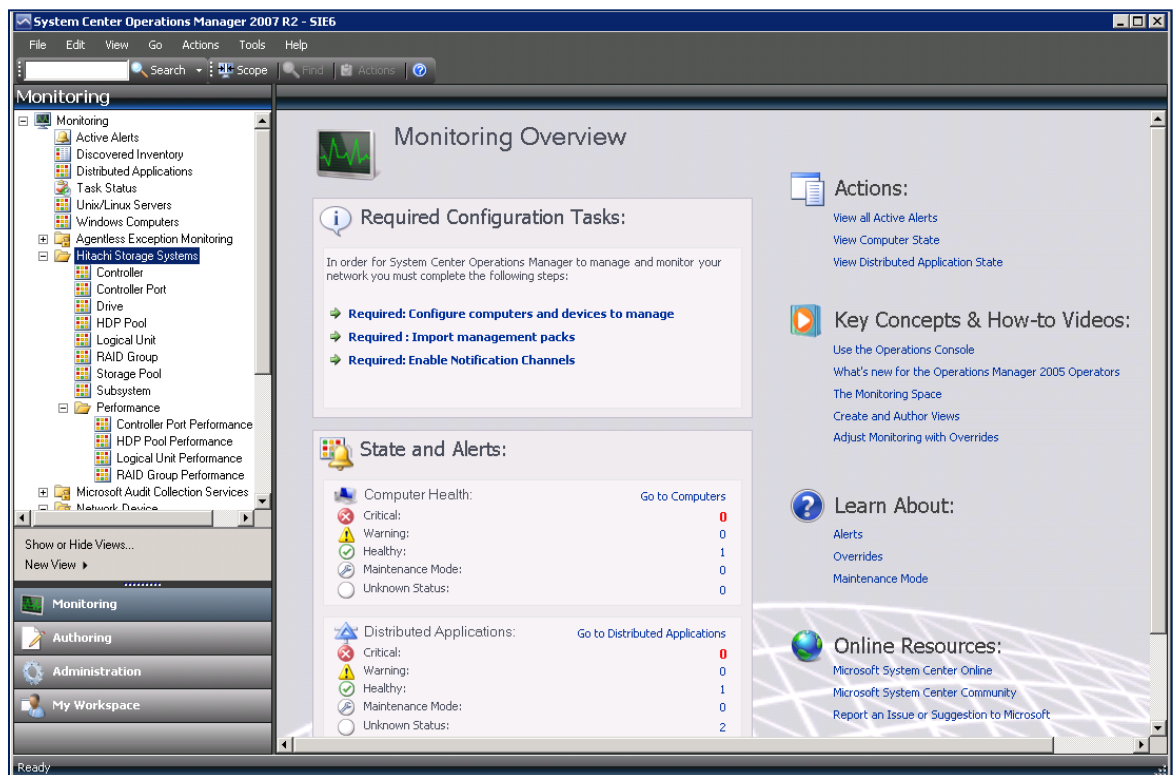


Figure 3-1 Monitoring View

Discovering a Subsystem

1. From the **Start>All Programs**, select **Hitachi>Hitachi Storage Management Pack for SCOM>Hitachi Storage Connector Configuration**. The MMC Snap-In will be displayed as follows:

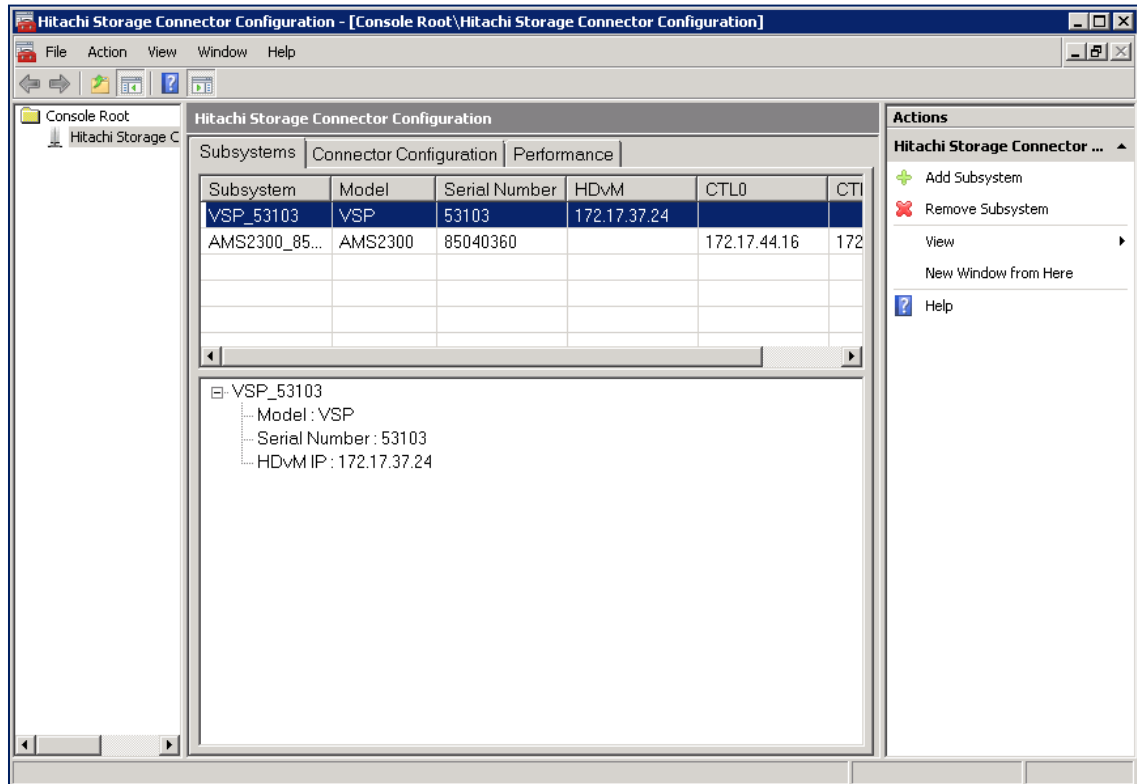


Figure 3-2 Configuration Window

2. Select the Subsystems tab under the Hitachi Storage Connector Configuration pane and then click Add Subsystem button from the Actions pane.
3. Select the subsystem model from the **Subsystem, Select Model: menu**.

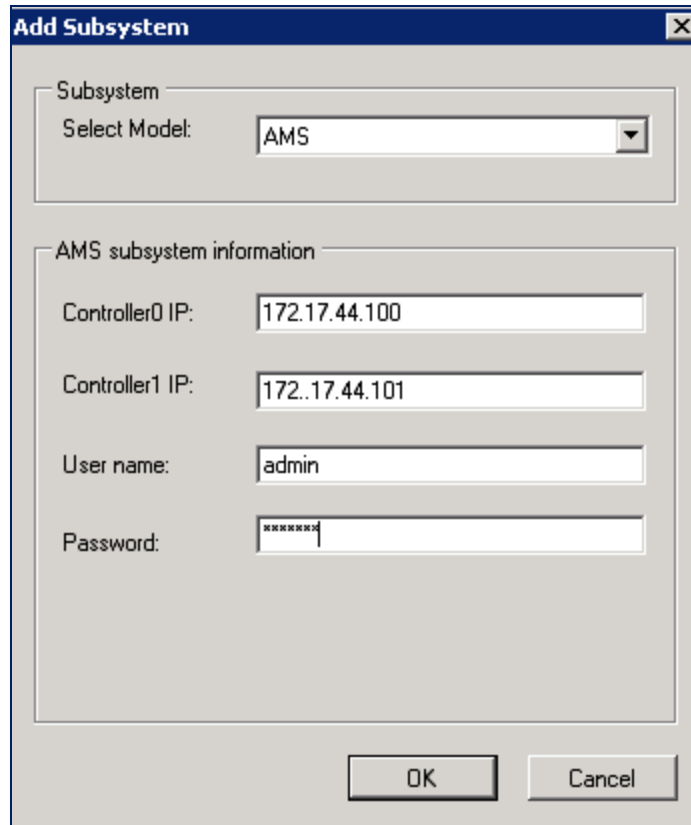


Figure 3-3 Add AMS subsystem Window

- a. When adding an AMS subsystem, select **AMS** from the **Subsystem, Select Model: menu**.
- b. Enter the Controller 0 and 1 IP addresses of the Hitachi AMS subsystem, username, and password. Enter User ID and Password only for authenticated subsystem. Click **OK** to accept entries.
- c. When adding a VSP or USP-V subsystem, select **VSP** from the **Subsystem, Select Model: menu**.

The screenshot shows a dialog box titled "Add Subsystem". It has a "Subsystem" section with a "Select Model:" dropdown menu set to "VSP". Below that is a "Device manager information" section with the following fields: "Server IP:" (172.17.37.137), "HDvM User name:" (system), "HDvM Password:" (*****), "VSP Serial #:" (53103), "User name:" (admin), and "Password:" (*****). "OK" and "Cancel" buttons are at the bottom right.

Figure 3-4 Add VSP/USP-V subsystem Window

- d. Enter the device manager information including the following:
 - Server IP address
 - Device Manager user name
 - Device Manager password
 - Serial number of the subsystem
 - User ID for VSP / USP-V subsystem
 - password for VSP / USP-V subsystem
- e. Click **OK** to accept the entries.

Configuring the Hitachi Storage Connector

1. From **Start>All Programs**, select **Hitachi>Hitachi Storage Management Pack for SCOM>Hitachi Storage Connector Configuration**. The MMC Snap-In will be displayed as follows:

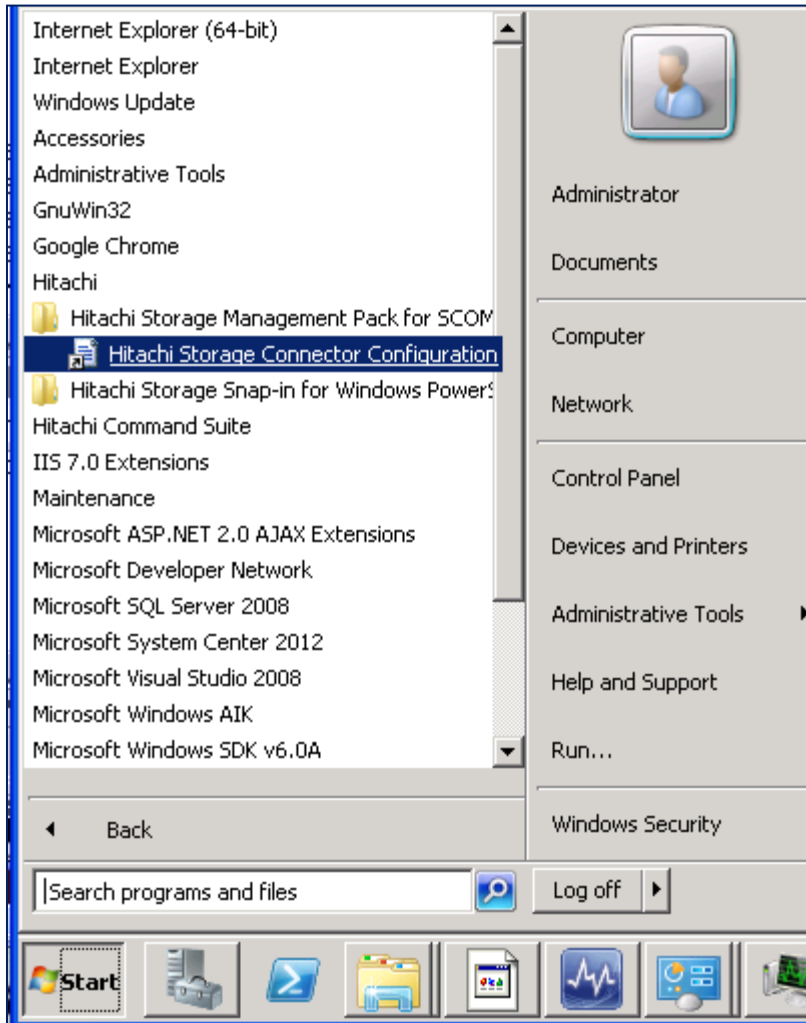


Figure 3-5 Hitachi Storage Connector Window

2. Enter the appropriate SCOM server address. If the server is remote, enter the IP address or DNS name of the SCOM server. If the SCOM server is local, enter "LOCALHOST".
3. Select the **Start Service** button from the **Actions** pane. The Connector service status should change from "Not Running" to "Starting", and then finally to "Running". The Connector service status will automatically be updated.



Note: (1) The first connector server started installs the Hitachi Storage Array Management Pack for Microsoft SCOM and connector settings to the SCOM server. (2) The connector service cannot be started when System Center Data Access in the SCOM server is not running.

4. To test the connection between the Hitachi Storage Array Management Pack for Microsoft SCOM and the SCOM server, select **Test Connection**.
5. Select **Save Configuration** to update the settings to the configuration file.
6. If there is any change to the SCOM server address or the refresh rate, stop and restart the Connector servers.



Note: The Hitachi Storage Array Management Pack for Microsoft SCOM installer will not remove the management pack and the connector settings from SCOM. Instead, select **Uninstall Management Pack** from the **Actions** pane.

7. To verify the Management Pack is installed in the designated SCOM server, from the SCOM Administration console, select **Administration > Management Packs**. The Hitachi Storage Systems 1.0.0.0 management pack should be displayed as follows:

Name	Version	Sealed	Date Created	Description
Application Log Library	6.1.7221.0	Yes	9/13/2011 4:30:...	System Application
Baselining Tasks Library	6.1.7221.0	Yes	9/13/2011 4:30:...	System Baselining 1
Client Monitoring Internal Library	6.1.7221.0	Yes	9/13/2011 4:31:...	Microsoft System C
Client Monitoring Library	6.1.7221.0	Yes	9/13/2011 4:31:...	Microsoft System C
Client Monitoring Overrides Management Pack	6.1.7221.0		9/13/2011 4:31:...	This management p
Client Monitoring Views Library	6.1.7221.0	Yes	9/13/2011 4:31:...	Microsoft System C
Data Warehouse Library	6.1.7221.0	Yes	9/13/2011 4:31:...	Microsoft System C
Default Management Pack	6.1.7221.0		9/13/2011 4:31:...	This management p
Distributed Application Designer Library	6.1.7221.0	Yes	9/13/2011 4:31:...	Microsoft System C
Health Internal Library	6.1.7221.0	Yes	9/13/2011 4:31:...	System Health Inte
Health Library	6.1.7221.0	Yes	9/13/2011 4:30:...	System Health Libr
Hitachi Storage Systems	2.0.0.0		9/14/2011 11:4:...	Hitachi Storage Ma
Image Library (System Center)	6.1.7221.0	Yes	9/13/2011 4:31:...	Microsoft System C
Image Library (System)	6.1.7221.0	Yes	9/13/2011 4:30:...	System Image Libr
Image Library (Windows)	6.1.7221.0	Yes	9/13/2011 4:30:...	Microsoft Windows
Instance Group Library	6.1.7221.0	Yes	9/13/2011 4:31:...	Microsoft System C
Microsoft Audit Collection Services	6.1.7221.0	Yes	9/13/2011 4:31:...	

Figure 3-6 System Center Operations Manager

Accessing the Hitachi Storage PowerShell Console

The Hitachi Storage Snap-In for Windows PowerShell software allows Hitachi storage administrators to extend the Microsoft® Windows® PowerShell window with Hitachi storage management functionality. The software provides a set of Hitachi Storage cmdlets for working Hitachi storage systems.

Before opening the PowerShell Console directing from the System Center Operations Manager Window you must install the Hitachi Storage Snap-in for Windows PowerShell software on the system where you want to open the console.

The Hitachi Storage PowerShell Console can be accessed using the PowerShell Console link in SCOM Console Actions pane under Hitachi Storage Subsystems Tasks.

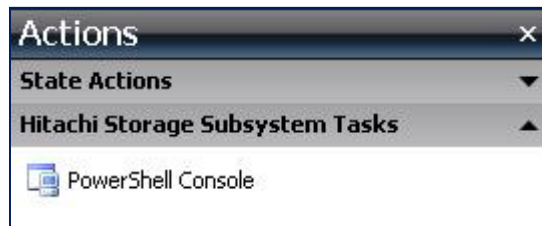


Figure 3-7 Actions Pane of the SCOM Console

The PowerShell Console link is available in Subsystem, HDP Pool, Storage Pool, RAID Group, Drive, Controller, Controller Port, and Logical Unit state views and the alert view of the monitoring components.

For more information see the *Hitachi Storage Snap-in for Windows PowerShell software User's Guide*, MK-99DF8229-07.

Accessing the Hitachi Storage Connect Service Properties

To access the **Hitachi Storage Connector Service Properties** window, open the Windows **Services** pane.

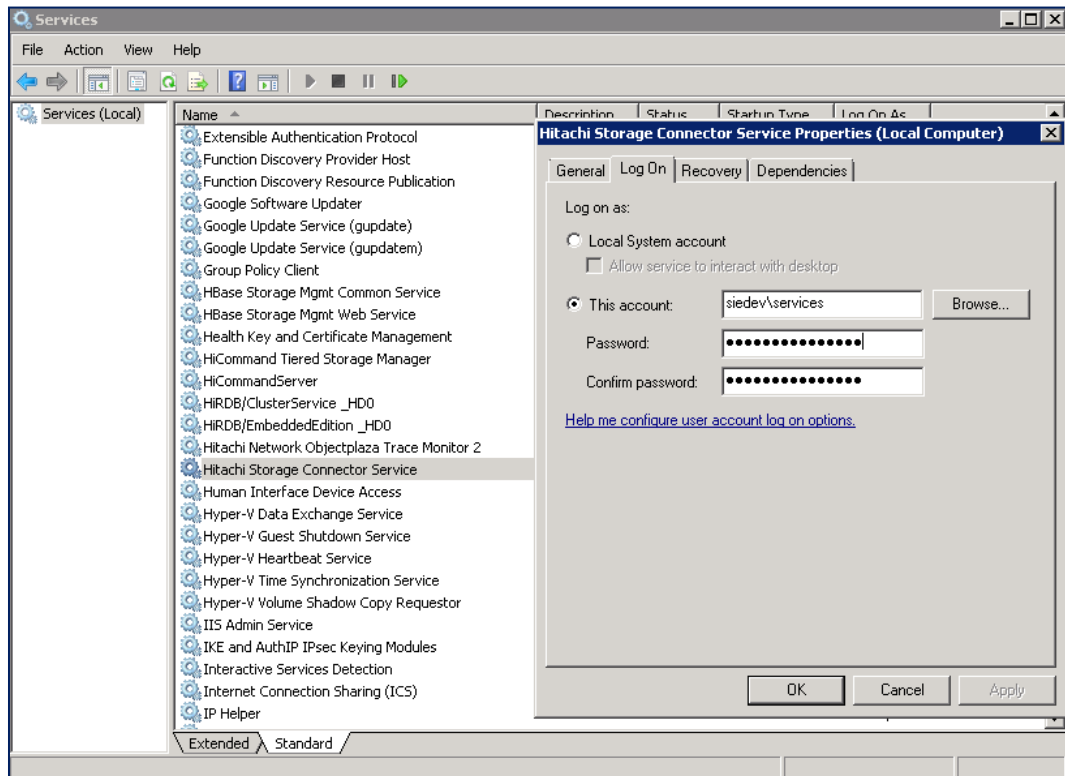


Figure 3-8 Hitachi Storage Connector Service Properties

Subsystem Views

This chapter provides instructions for performing subsystem viewing operations with the Hitachi Storage Array Management Pack for Microsoft SCOM software.

- [Subsystem View](#)
- [RAID Group View](#)
- [Logical Unit View](#)
- [HDP Pool View](#)
- [Drive View](#)
- [Controller View](#)
- [Controller Port View](#)
- [Controller Port Performance View](#)
- [HDP Pool Performance View](#)
- [Logical Unit Performance View](#)
- [RAID Group Performance View](#)
- [VSP Controller Port Performance View](#)

Subsystem View

The Subsystem View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Subsystem** as follows:

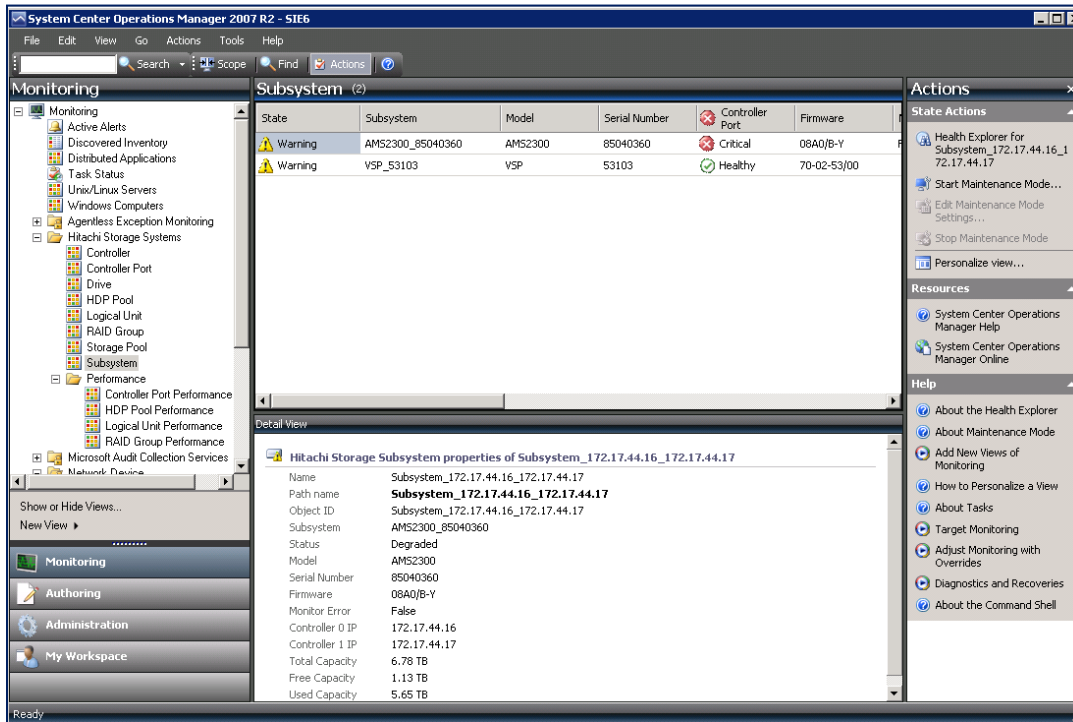


Figure 4-1 Monitoring Window

The Subsystem View contains the following columns and their definitions:

Table 4-1 Subsystem View Column and Definitions

Field	Description
State	Availability State of Subsystem
Subsystem	Name of the Subsystem
Model	Model of the AMS, USP-V or VSP storage device
Serial Number	Subsystem Serial Number
Firmware	Microcode level of the storage array
Device Manager	Device Manager IP address
Controller 0 IP	Subsystem Controller 0 IP address
Controller 1 IP	Subsystem Controller 1 IP address
Total Capacity	Subsystem total physical capacity
Free Capacity	Subsystem free capacity
Used Capacity	Subsystem used capacity

RAID Group View

The Subsystem View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > RAID Group** as follows:

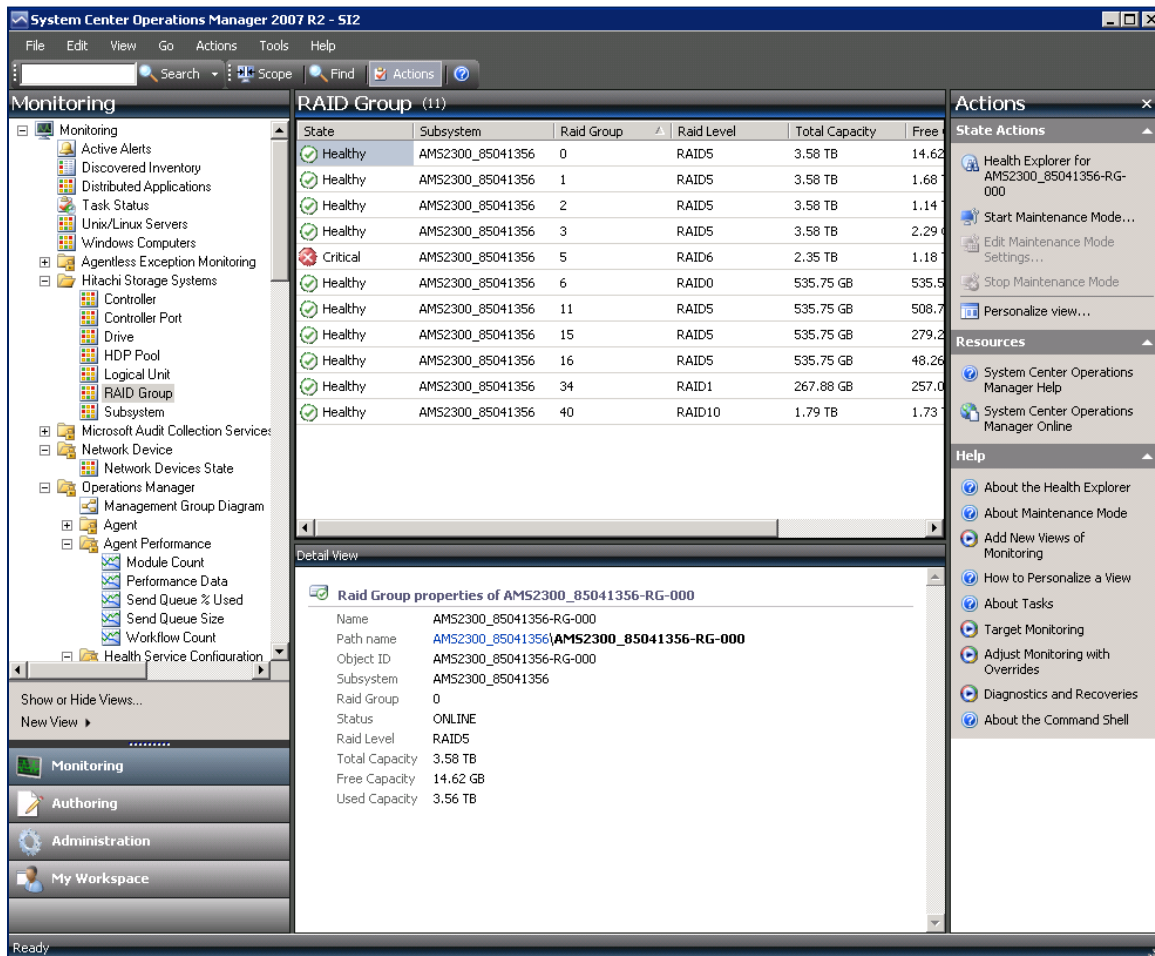


Figure 4-2 Subsystem View- RAID Group

The RAID Group View contains the following columns and their definitions:

Table 4-2 RAID Group View Columns and Definitions

Field	Description
State	Availability State of RAID Group
Subsystem	Name of the Subsystem
RAID Group	Subsystem RAID Group Number
Total Capacity	RAID Group total physical capacity
Free Capacity	RAID Group free capacity
Used Capacity	RAID Group used capacity

Logical Unit View

The **Logical Unit View** can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Logical Unit** as follows:

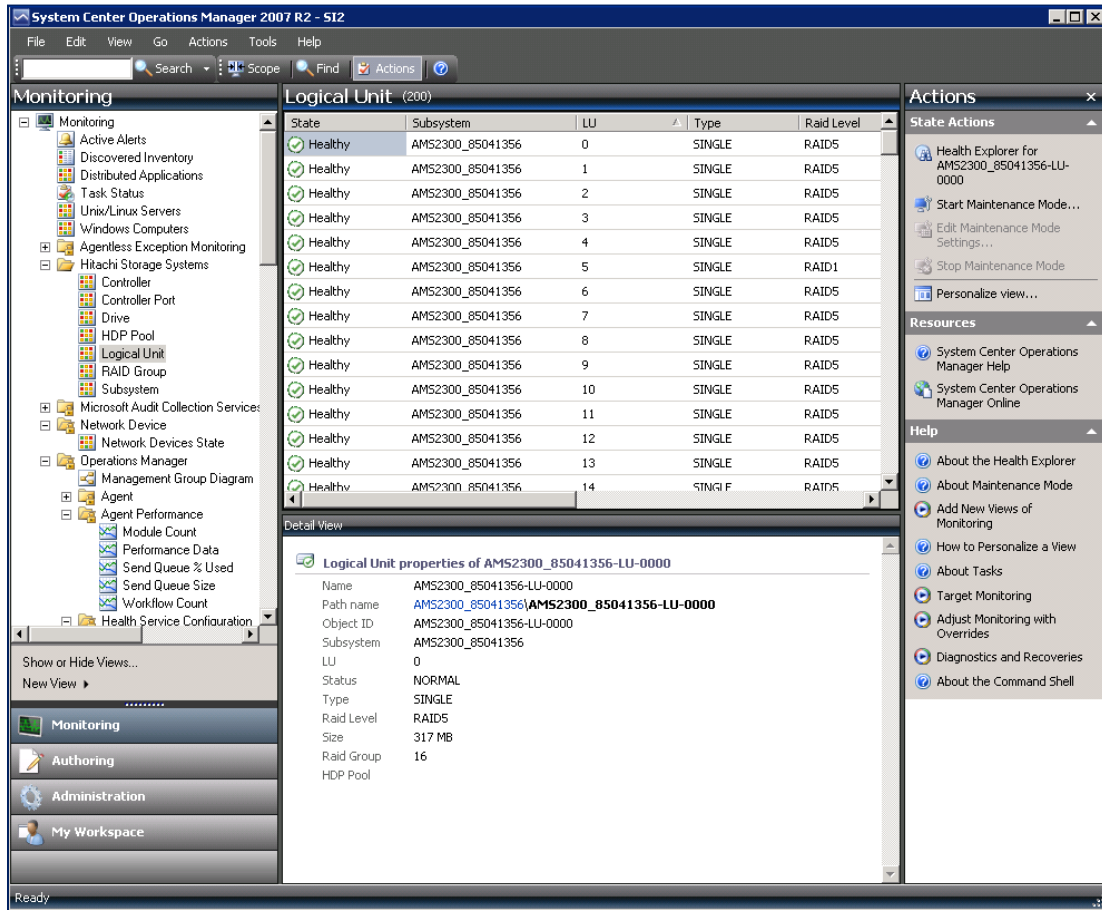


Figure 4-3 Subsystem View-Logical Unit Properties

The Logical Unit View contains the following columns and their definitions:

Table 4-3 Logical Unit View columns and Definitions

Field	Description
State	Availability State of Logical Unit
Subsystem	Name of the Subsystem
LU	LUN Number
Type	Possible LU types are Single, Parent, or VVOL
RAID Level	Possible RAID Levels are 0, 1, 5, 6, or 10
Size	Total available capacity of the LUN

HDP Pool View

The HDP Pool View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > HDP Pool** as follows:

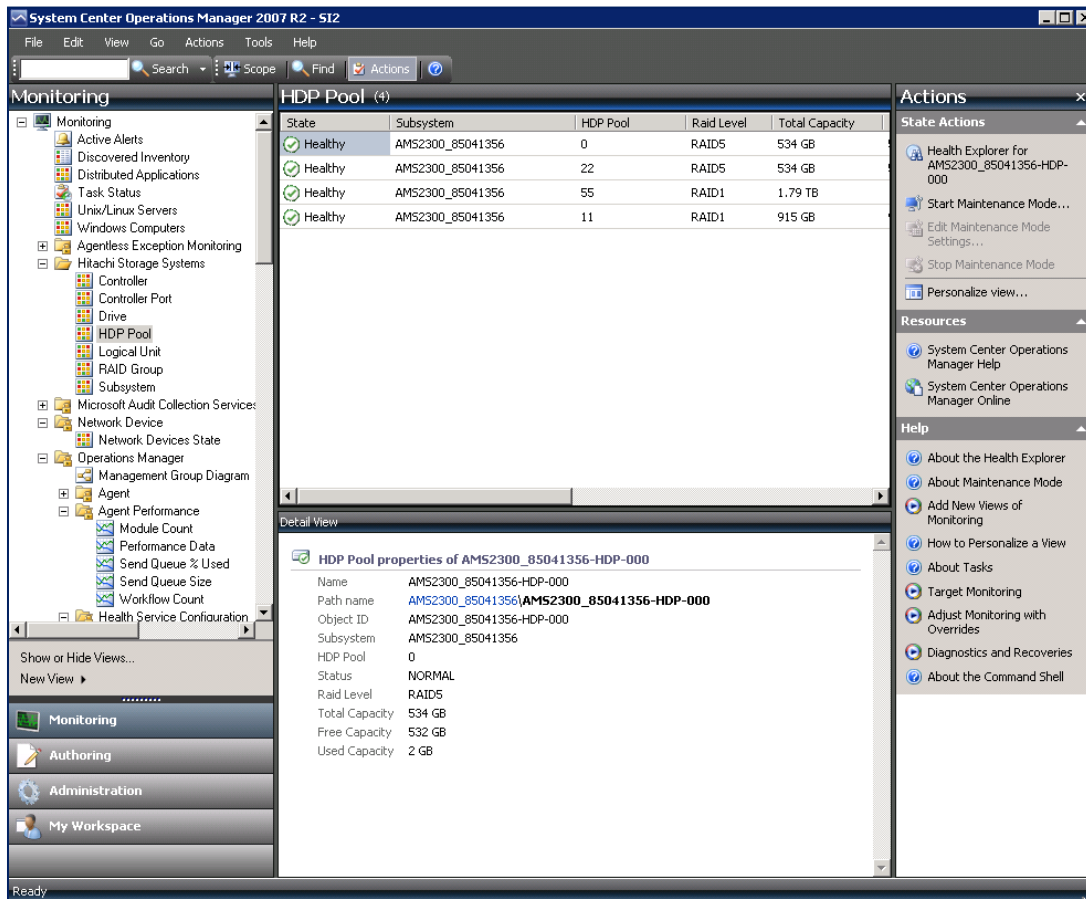


Figure 4-4 HDP Pool View

The HDP Pool View contains the following columns and their definitions:

Table 4-4 HDP Pool Columns and Definitions

Field	Description
State	Availability State of HDP Pool
Subsystem	Name of the Subsystem
HDP Pool	Subsystem HDP Pool Number
RAID Level	Possible RAID Levels are 0, 1, 5, 6, or 10
Total Capacity	HDP Pool total physical capacity
Free Capacity	HDP Pool free capacity
Used Capacity	HDP Pool used capacity

Drive View

The Drive View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Drive** as follows:

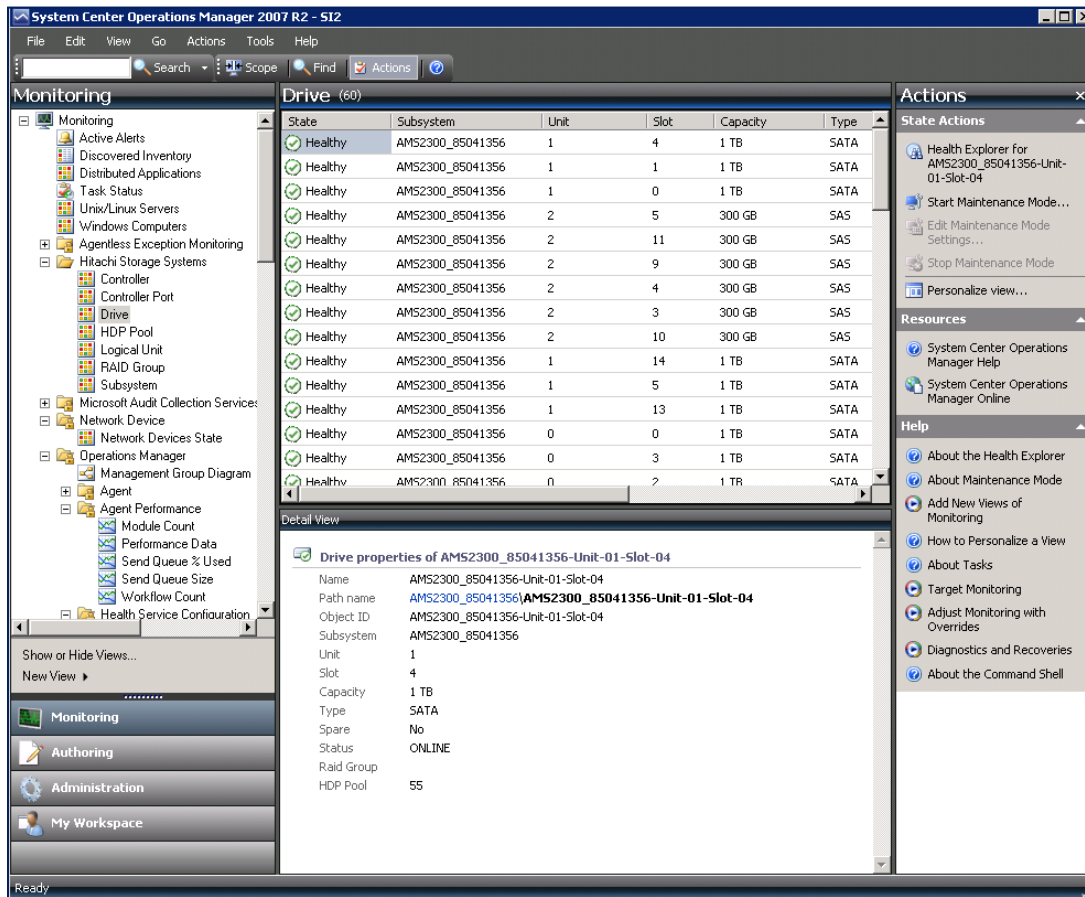


Figure 4-5 Drive View Window

The Drive View contains the following columns and their definitions:

Table 4-5 Drive View Columns and Windows

Field	Description
State	Availability State of Drive
Subsystem	Name of the Subsystem
Unit	The unit location number of the drive inside the subsystem
Slot	The slot number of the drive inside the subsystem
Capacity	The total drive physical capacity
Type	Possible drive types are SATA, SAS, or SSD

Field	Description
Spare	Yes if the drive is a spare, No if drive is in use
RAID Group	The RAID Group number the drive belongs to
HDP Pool	The HDP Pool number the drive belongs to
Location	Physical location of the disk drive.

Controller View

The **Controller View** can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Controller** as follows:

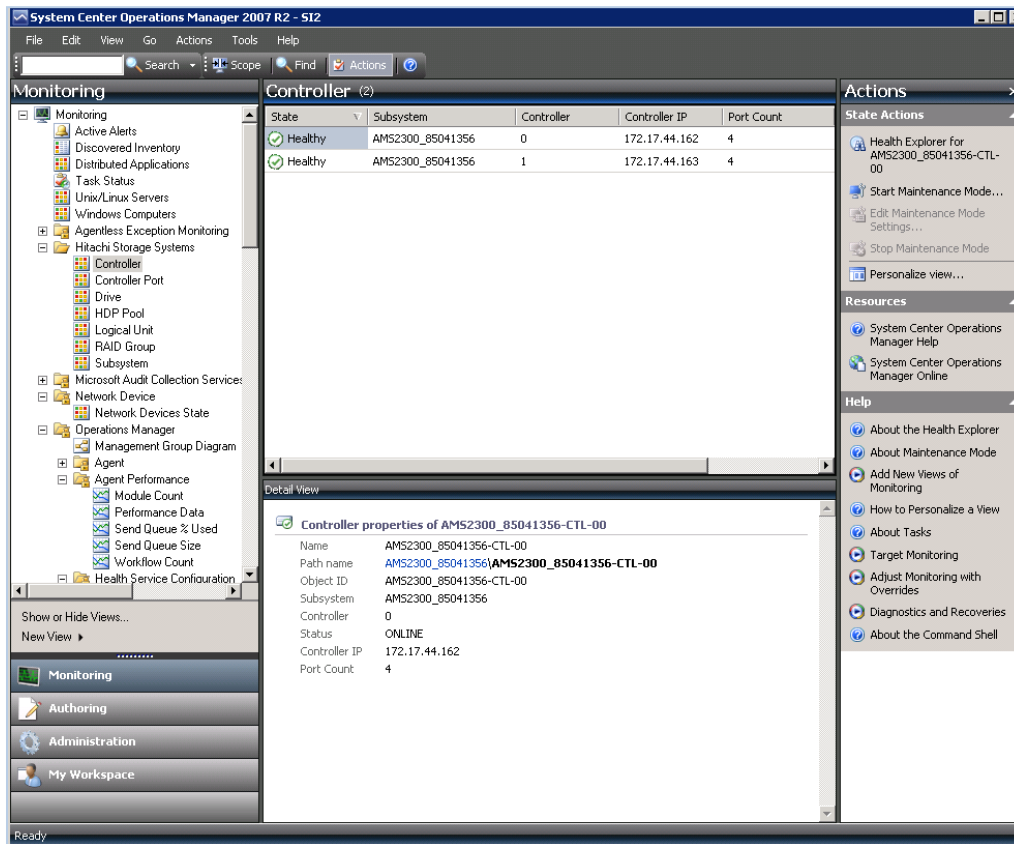


Figure 4-6 Controller View Window

The Controller **View** contains the following columns and their definitions:

Table 4-6 Controller View Columns and Definitions

Field	Description
State	Availability State of Controller
Subsystem	Name of the Subsystem

Field	Description
Controller	The controller number of the subsystem controller
Controller IP	The controller IP address of the subsystem controller
Port Count	The total number of ports for that given subsystem controller

Controller Port View

The Controller Port View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Controller Port** as follows:

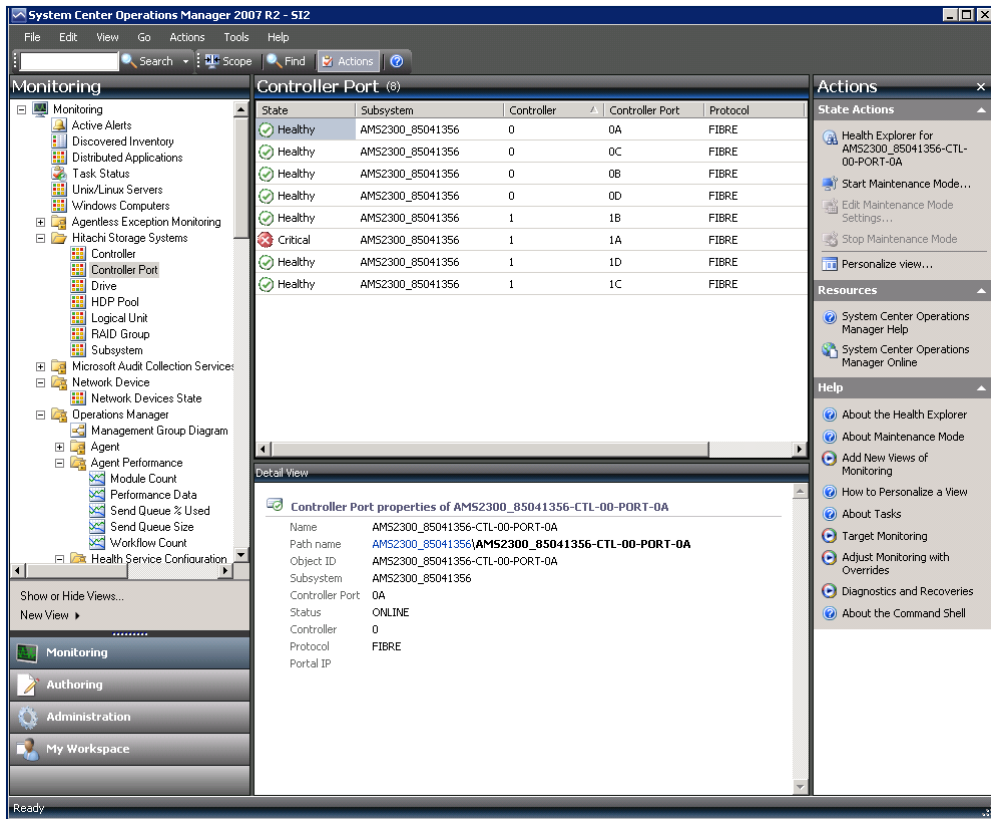


Figure 4-7 Controller Port View

The Controller Port View contains the following columns and their definitions:

Table 4-7 Controller Port View Columns and Definitions

Field	Description
State	Availability State of Controller Port
Subsystem	Name of the Subsystem

Controller	The controller number of the subsystem controller
Controller Port	Name of the Controller Port
Protocol	Possible values are Fibre or iSCSI
Portal IP	The IP address of the controller port

Controller Port Performance View

AMS only

The Controller Port Performance View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Performance > Controller port** Performance as follows:

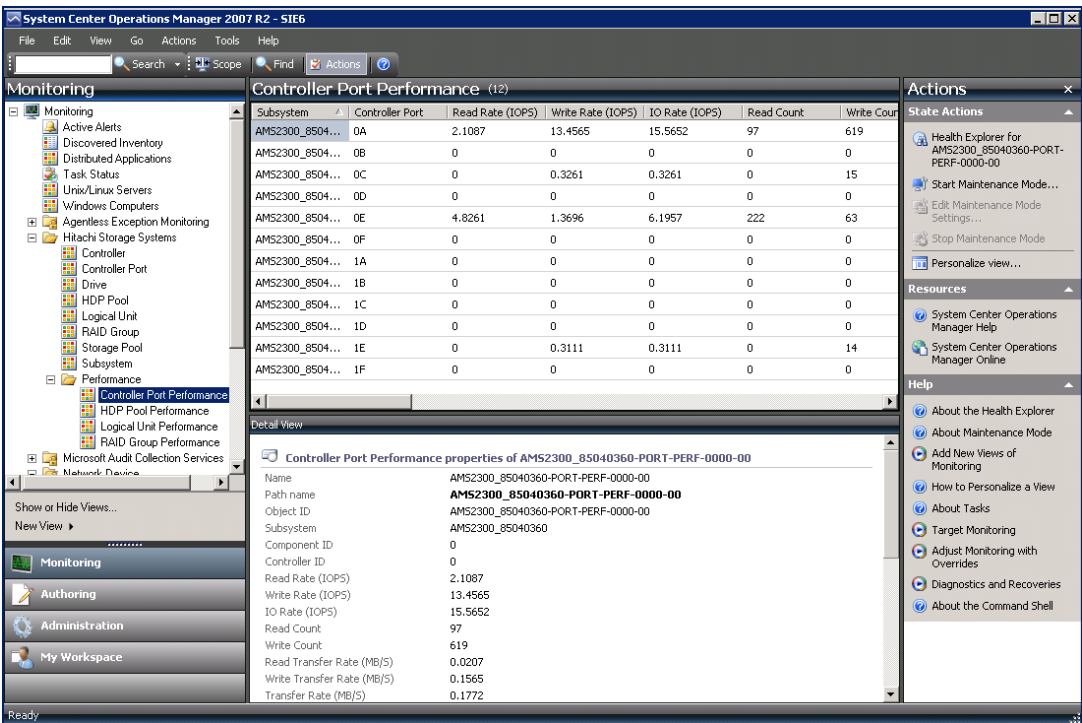


Figure 4-8 Controller Port Performance View

The Controller Port Performance View contains the following columns and their definitions:

Table 4-8 Controller Port Performance View Columns and Definitions

Field	Description
Subsystem	System unit name
Controller Port	Controller Port display name
CTL	Controller ID

Field	Description
ReadRate	Read Rate (IOPS)
WriteRate	Write Rate (IOPS)
IORate	IO Rate in (IOPS)
ReadCount	Read Command Count per second
WriteCount	Write Command Count per second
ReadTransRate	Read Transfer Rate (MB/S)
WriteTransRate	Write Transfer Rate (MB/S)
TransRate	Transfer Rate (MB/S)
SequentialReadRate	Sequential Read Rate (IOPS) (IOPS)
SequentialWriteRate	Sequential Write Rate in (IOPS)
SequentialIORate	Sequential IO Rate in (IOPS)
SequentialReadCount	Sequential Read Command Count per second
SequentialWriteCount	Sequential Write Command Count per second
SequentialReadTransRate	Sequential Read Transfer Rate (MB/S)
SequentialWriteTransRate	Sequential Write Transfer Rate (MB/S)
SequentialTransRate	Sequential Transfer Rate (MB/S)
RandomReadRate	Random Read Rate (IOPS)
RandomWriteRate	Random Write Rate (IOPS)
RandomIORate	Random IO Rate (IOPS)
RandomReadCount	Random Read Command Count per second
RandomWriteCount	Random Write Command Count per second
RandomReadTransRate	Random Read Transfer Rate (MB/S)
RandomWriteTransRate	Random Write Transfer Rate (MB/S)
RandomTransRate	Random Transfer Rate (MB/S)
Time	Last performance data collection time. Format : MM/DD/YYYY HH:MM:SS AM/PM

HDP Pool Performance View

AMS only

The HDP Pool Performance View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Performance > HDP pool Performance** as follows:

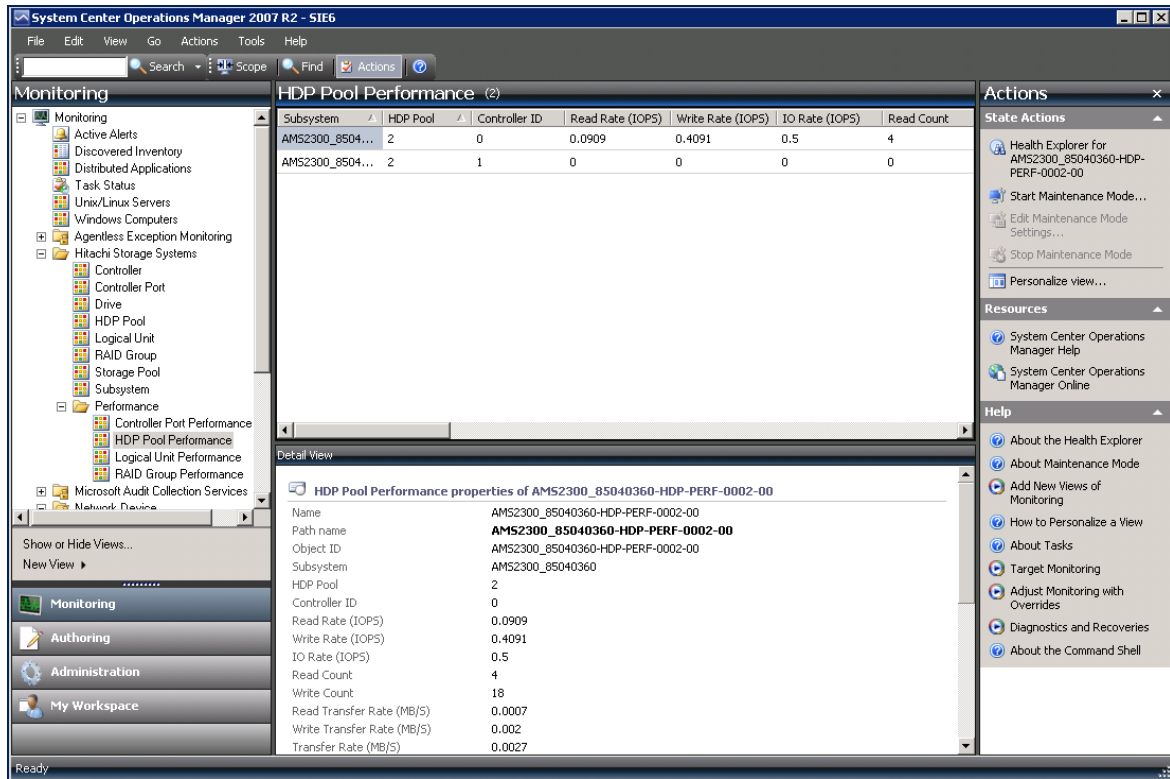


Figure 4-9 HDP Pool Performance View

The HDP Pool Performance View contains the following columns and their definitions:

Table 4-9 HDP Pool Performance View Columns and Definitions

Field	Description
Subsystem	System unit name
HDP Pool	HDP Pool ID
CTL	Controller ID
ReadRate	Read Rate (IOPS)
WriteRate	Write Rate (IOPS)
IORate	IO Rate in (IOPS)
ReadCount	Read Command Count per second
WriteCount	Write Command Count per second
ReadTransRate	Read Transfer Rate (MB/S)
WriteTransRate	Write Transfer Rate (MB/S)
TransRate	Transfer Rate (MB/S)
SequentialReadRate	Sequential Read Rate (IOPS) (IOPS)
SequentialWriteRate	Sequential Write Rate in (IOPS)

Field	Description
SequentialIORate	Sequential IO Rate in (IOPS)
SequentialReadCount	Sequential Read Command Count per second
SequentialWriteCount	Sequential Write Command Count per second
SequentialReadTransRate	Sequential Read Transfer Rate (MB/S)
SequentialWriteTransRate	Sequential Write Transfer Rate (MB/S)
SequentialTransRate	Sequential Transfer Rate (MB/S)
RandomReadRate	Random Read Rate (IOPS)
RandomWriteRate	Random Write Rate (IOPS)
RandomIORate	Random IO Rate (IOPS)
RandomReadCount	Random Read Command Count per second
RandomWriteCount	Random Write Command Count per second
RandomReadTransRate	Random Read Transfer Rate (MB/S)
RandomWriteTransRate	Random Write Transfer Rate (MB/S)
RandomTransRate	Random Transfer Rate (MB/S)
Time	Last performance data collection time. Format : MM/DD/YYYY HH:MM:SS AM/PM

Logical Unit Performance View

The Logical Unit Performance View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Performance > Logical Unit Performance** as follows:

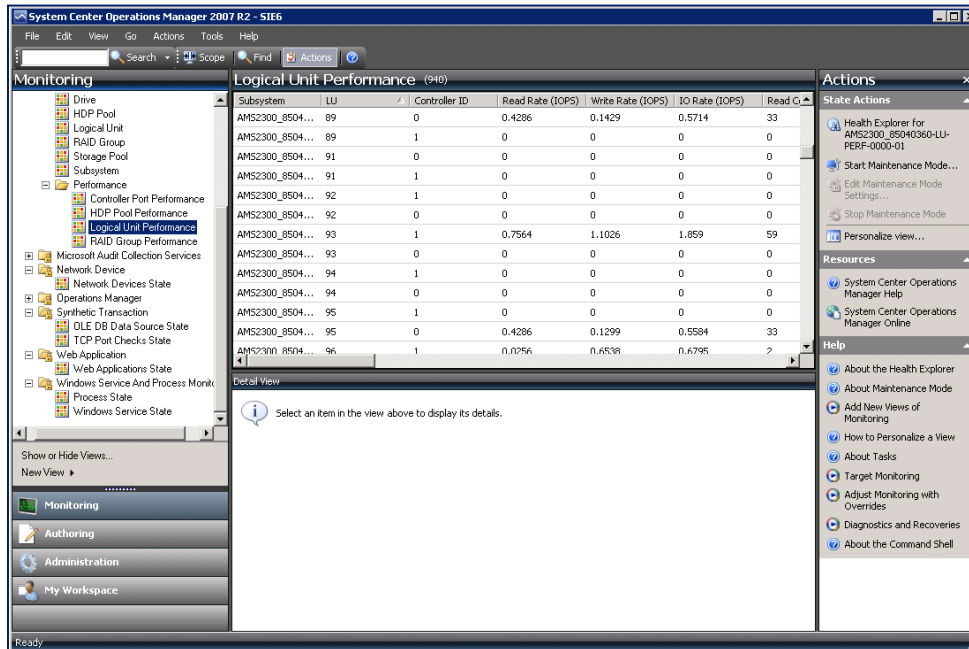


Figure 4-10 Logical Unit Performance View

The Logical Unit Performance View contains the following columns and their definitions:

Table 4-10 Logical Unit Performance View Columns and Definitions

Field	Description
Subsystem	System unit name
Logical Unit	Logical Unit Number
CTL	Controller ID (AMS only)
ReadRate	Read Rate (IOPS)
WriteRate	Write Rate (IOPS)
IORate	IO Rate in (IOPS)
ReadCount	Read Command Count per second
WriteCount	Write Command Count per second
ReadTransRate	Read Transfer Rate (MB/S)
WriteTransRate	Write Transfer Rate (MB/S)
TransRate	Transfer Rate (MB/S)

Field	Description
SequentialReadRate	Sequential Read Rate (IOPS) (IOPS)
SequentialWriteRate	Sequential Write Rate in (IOPS)
SequentialIORate	Sequential IO Rate in (IOPS)
SequentialReadCount	Sequential Read Command Count per second
SequentialWriteCount	Sequential Write Command Count per second
SequentialReadTransRate	Sequential Read Transfer Rate (MB/S)
SequentialWriteTransRate	Sequential Write Transfer Rate (MB/S)
SequentialTransRate	Sequential Transfer Rate (MB/S)
RandomReadRate	Random Read Rate (IOPS)
RandomWriteRate	Random Write Rate (IOPS)
RandomIORate	Random IO Rate (IOPS)
RandomReadCount	Random Read Command Count per second
RandomWriteCount	Random Write Command Count per second
RandomReadTransRate	Random Read Transfer Rate (MB/S)
RandomWriteTransRate	Random Write Transfer Rate (MB/S)
RandomTransRate	Random Transfer Rate (MB/S)
Time	Last performance data collection time. Format : MM/DD/YYYY HH:MM:SS AM/PM

RAID Group Performance View

AMS only

The RAID Group Performance View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Performance > RAID Group Performance** as follows:

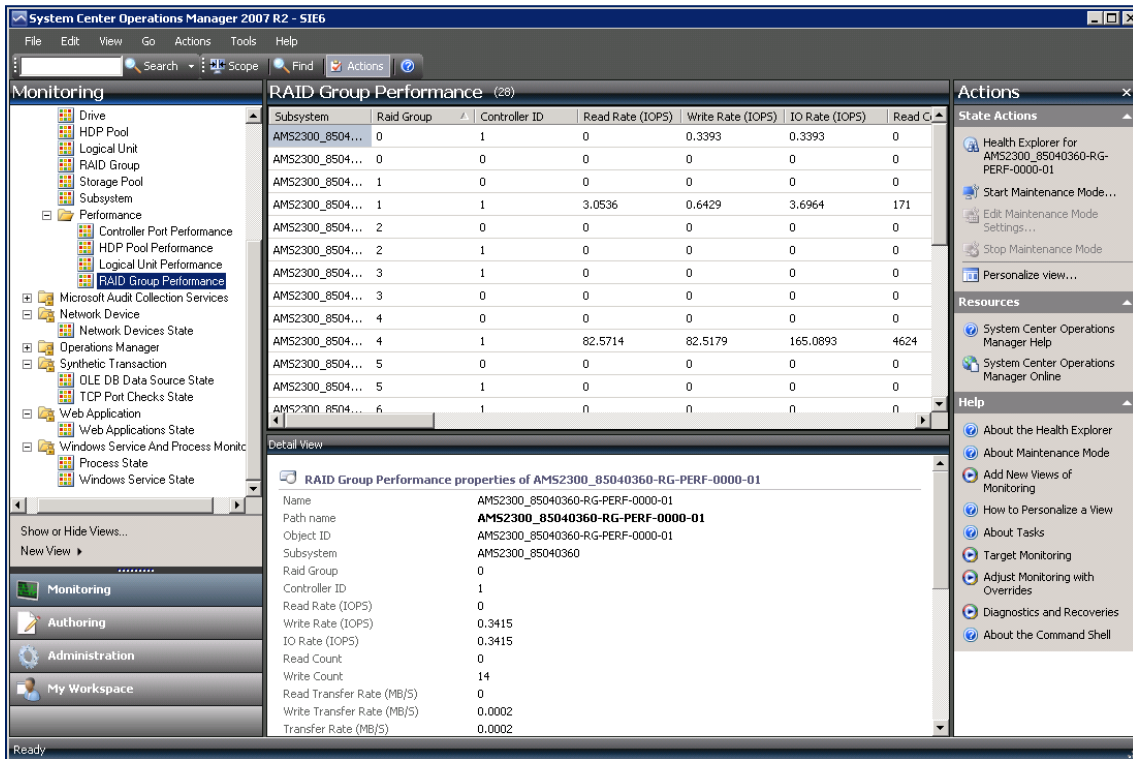


Figure 4-11 RAID Group Performance View

The RAID Group Performance View contains the following columns and their definitions:

Table 4-11 RAID Group Performance View Columns and Definitions

Field	Description
Subsystem	System unit name
RG	RAID Group ID
CTL	Controller ID
ReadRate	Read Rate (IOPS)
WriteRate	Write Rate (IOPS)
IORate	IO Rate in (IOPS)
ReadCount	Read Command Count per second

Field	Description
WriteCount	Write Command Count per second
ReadTransRate	Read Transfer Rate (MB/S)
WriteTransRate	Write Transfer Rate (MB/S)
TransRate	Transfer Rate (MB/S)
SequentialReadRate	Sequential Read Rate (IOPS) (IOPS)
SequentialWriteRate	Sequential Write Rate in (IOPS)
SequentialIORate	Sequential IO Rate in (IOPS)
SequentialReadCount	Sequential Read Command Count per second
SequentialWriteCount	Sequential Write Command Count per second
SequentialReadTransRate	Sequential Read Transfer Rate (MB/S)
SequentialWriteTransRate	Sequential Write Transfer Rate (MB/S)
SequentialTransRate	Sequential Transfer Rate (MB/S)
RandomReadRate	Random Read Rate (IOPS)
RandomWriteRate	Random Write Rate (IOPS)
RandomIORate	Random IO Rate (IOPS)
RandomReadCount	Random Read Command Count per second
RandomWriteCount	Random Write Command Count per second
RandomReadTransRate	Random Read Transfer Rate (MB/S)
RandomWriteTransRate	Random Write Transfer Rate (MB/S)
RandomTransRate	Random Transfer Rate (MB/S)
Time	Last performance data collection time. Format : MM/DD/YYYY HH:MM:SS AM/PM

VSP Controller Port Performance View

The VSP Controller Port Performance View can be accessed from the SCOM console by selecting Monitoring > Hitachi Storage Systems > Performance > VSP Controller Port Performance as follows:

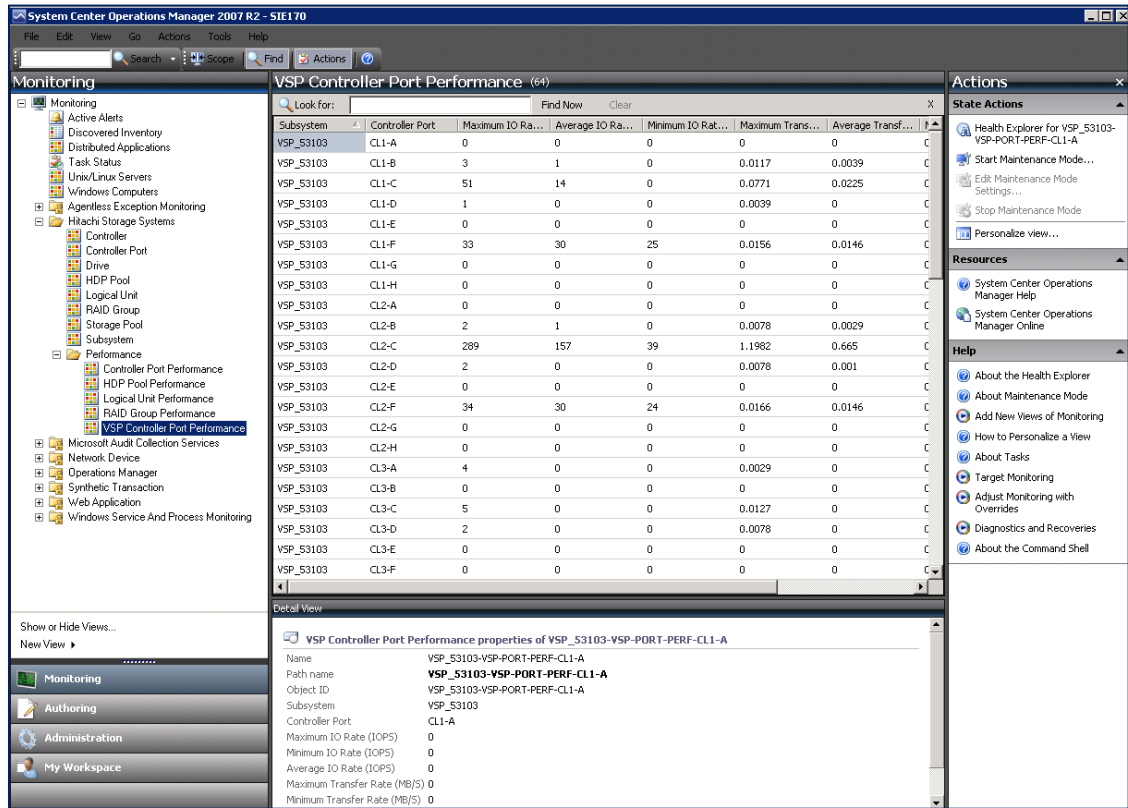


Figure 4-12 VSP Controller Port Performance View

The VSP Controller Port Performance View contains the following columns and their definitions:

Table 4-12 VSP Controller Port Performance View Columns and Definitions


Field	Description
Subsystem	System unit name
Port	VSP/USP-V Port number
DateTime	Time stamp
MaxIOCount	Maximum IO Count (IOPS)
MinIOCount	Minimum IO Count (IOPS)
AverageIOCount	Average IO Count (IOPS)
MaxTransferRate	Maximum Transfer Rate (MB/S)

Field	Description
MinTransferRate	Minimum Transfer Rate (MB/S)
AverageTransferRate	Average Transfer Rate (MB/S)
Version	Cmdlet version

Relationships

This chapter provides instructions for performing relationship monitoring operations with the Hitachi Storage Array Management Pack for Microsoft SCOM software.

- [Subsystem Relationships](#)
- [RAID Group Relationships](#)
- [Controller Relationships](#)

A Check Mark  next to a column Item means there is a relationship and clicking on it provides a **Detailed view**.

Subsystem Relationships

A subsystem object hosts multiple Drive objects.

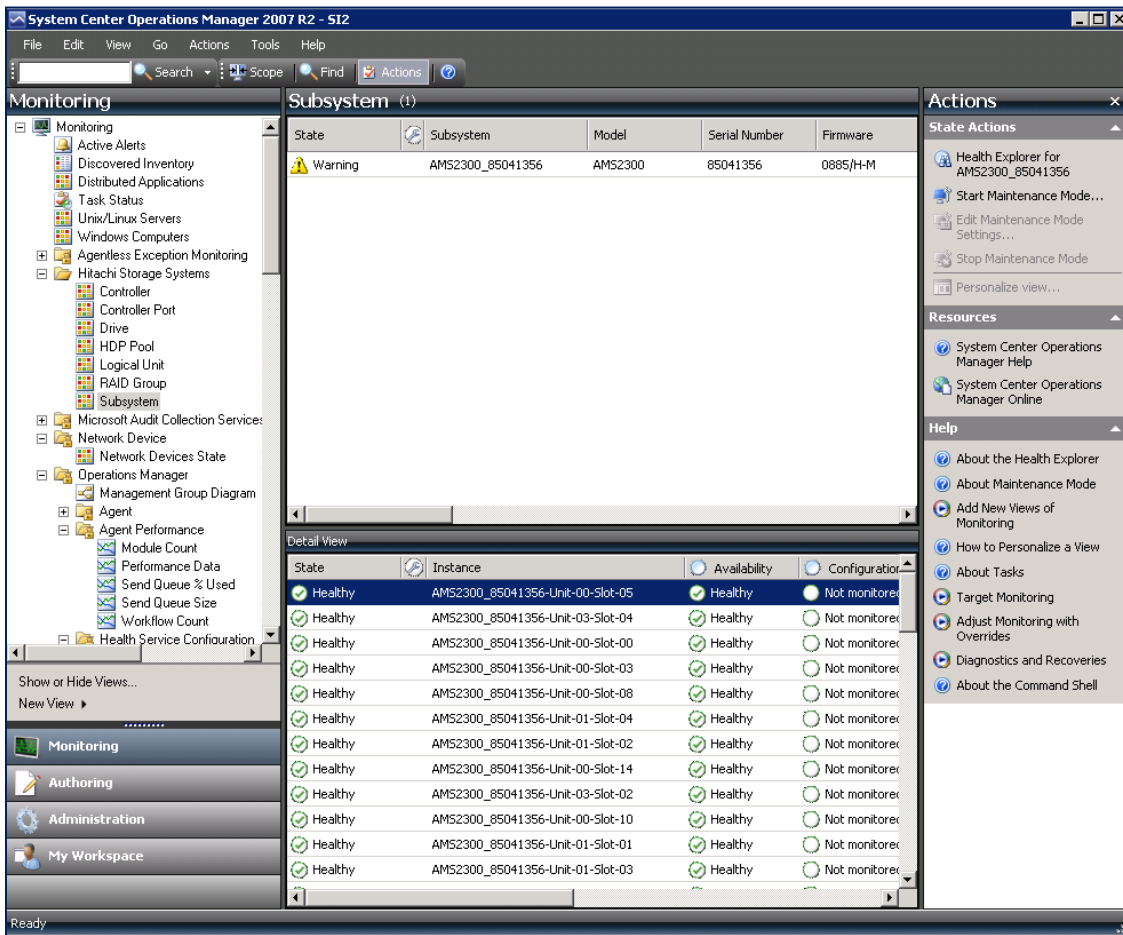


Figure 5-1 Multiple Drive Object View

A subsystem object hosts multiple RAID Group objects.

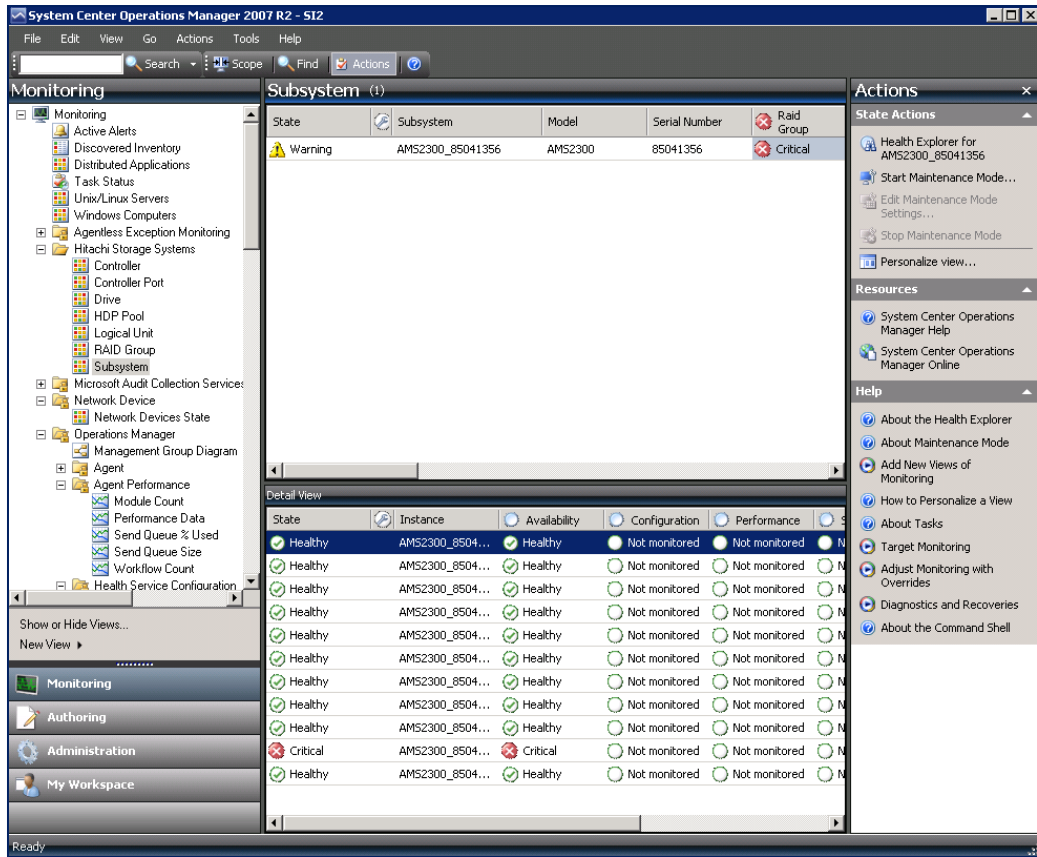


Figure 5-2 Multiple RAID Group Objects

A subsystem object hosts multiple HDP Pool objects.

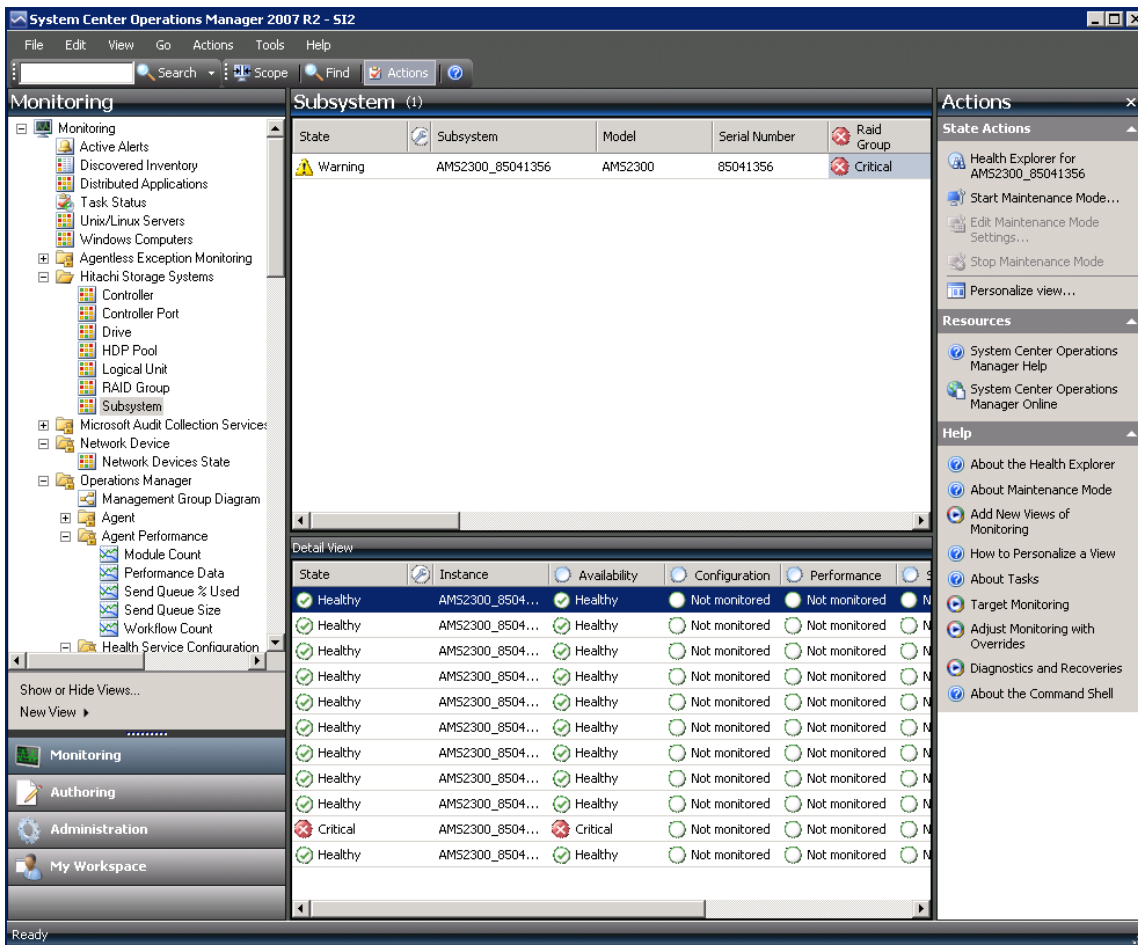


Figure 5-3 HDP Objects

A subsystem object hosts multiple Logical Unit objects.

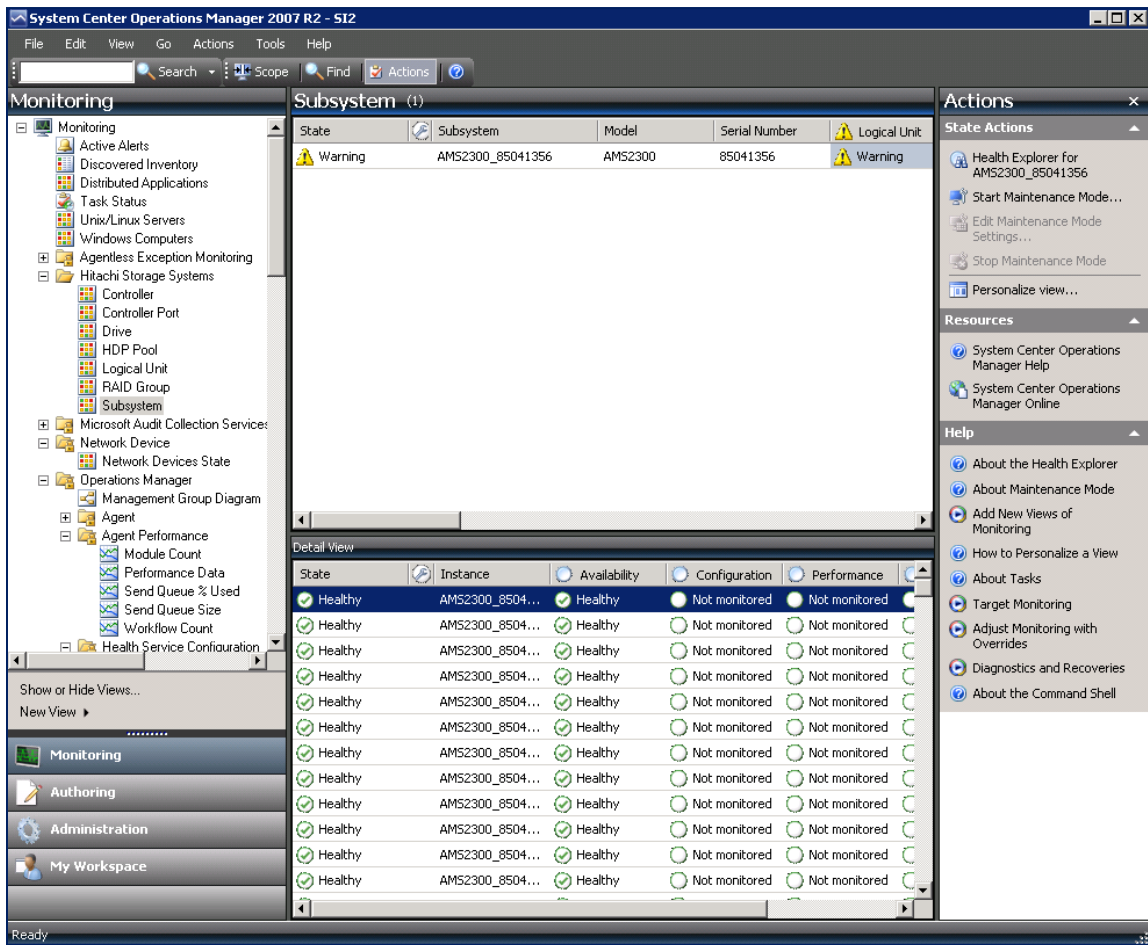


Figure 5-4 Multiple Logical Unit Objects

A subsystem object hosts multiple Controller objects.

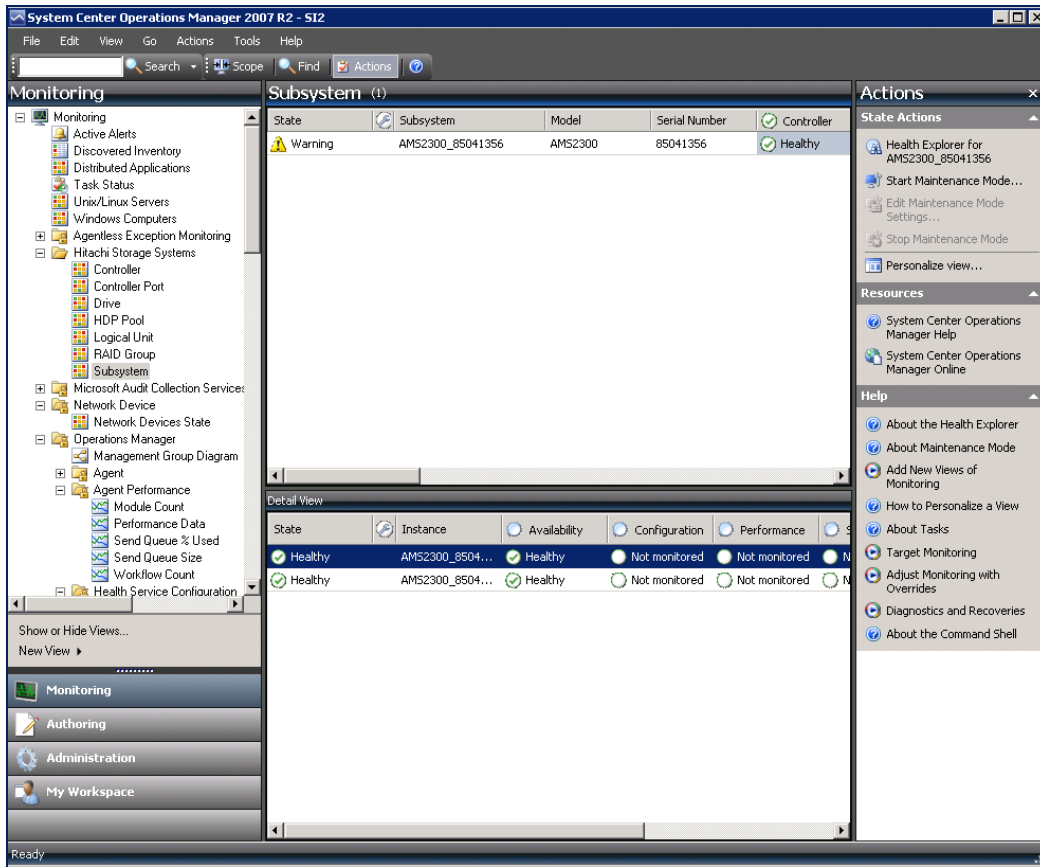


Figure 5-5 Controller Objects

A subsystem object hosts multiple Controller Port objects.

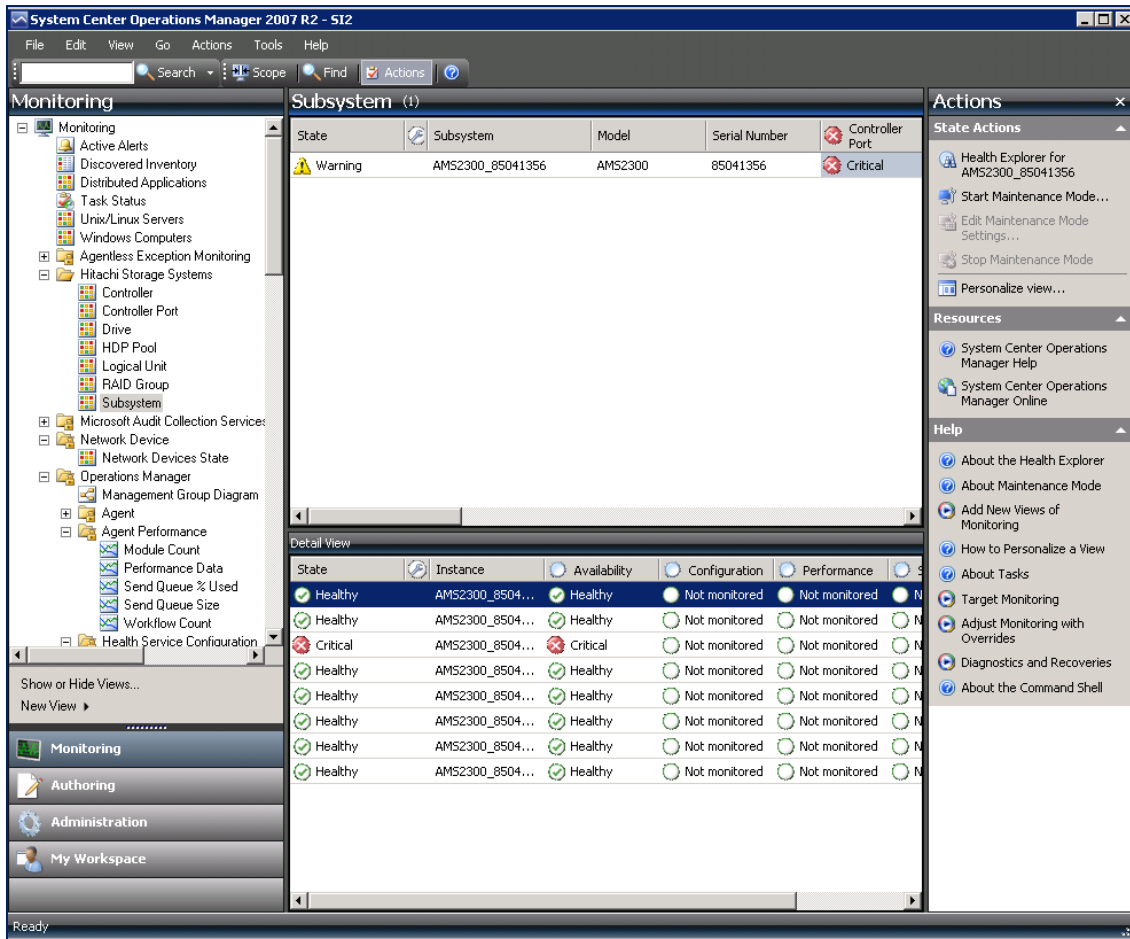


Figure 5-6 Controller Port Objects

RAID Group Relationships

A RAID Group object hosts multiple Logical Unit objects.

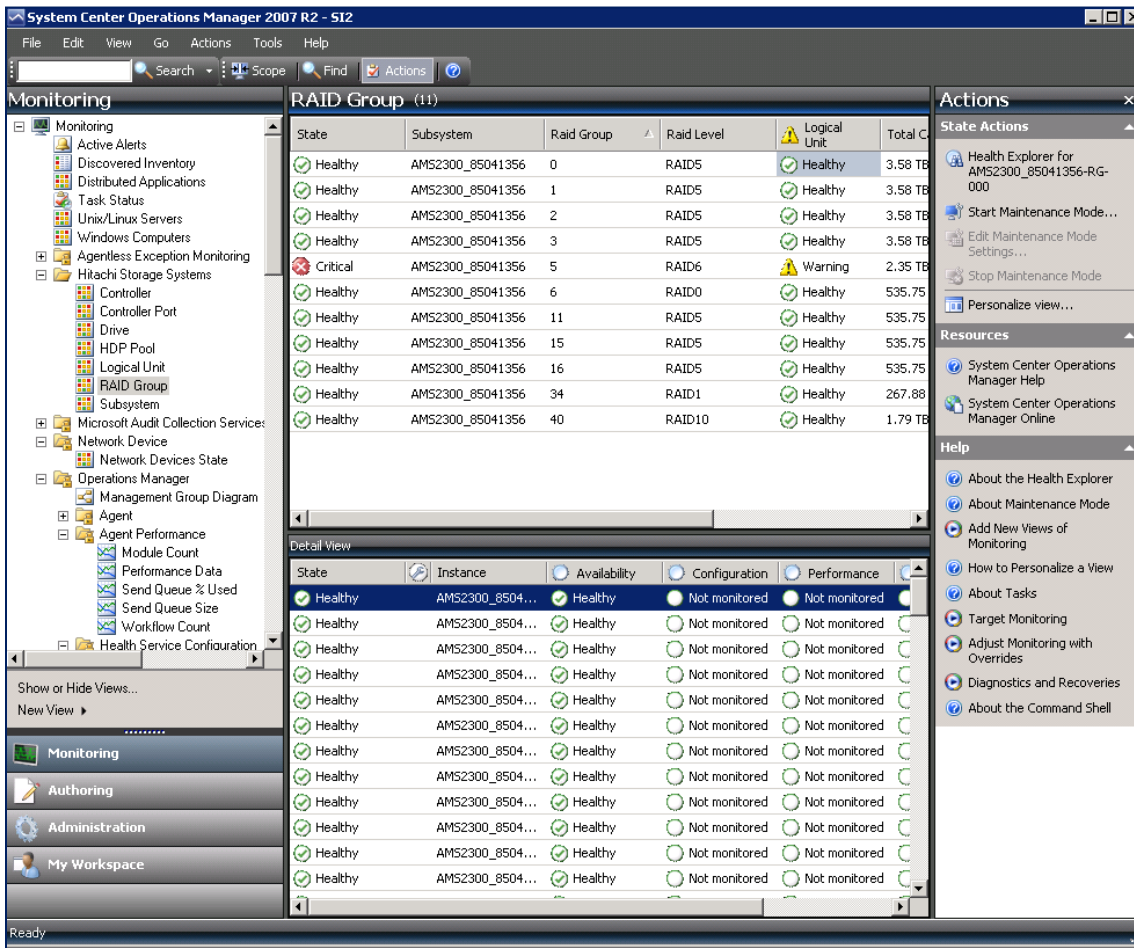


Figure 5-7 Logical Unit Objects

Controller Relationships

A Controller object hosts multiple Controller Port objects.

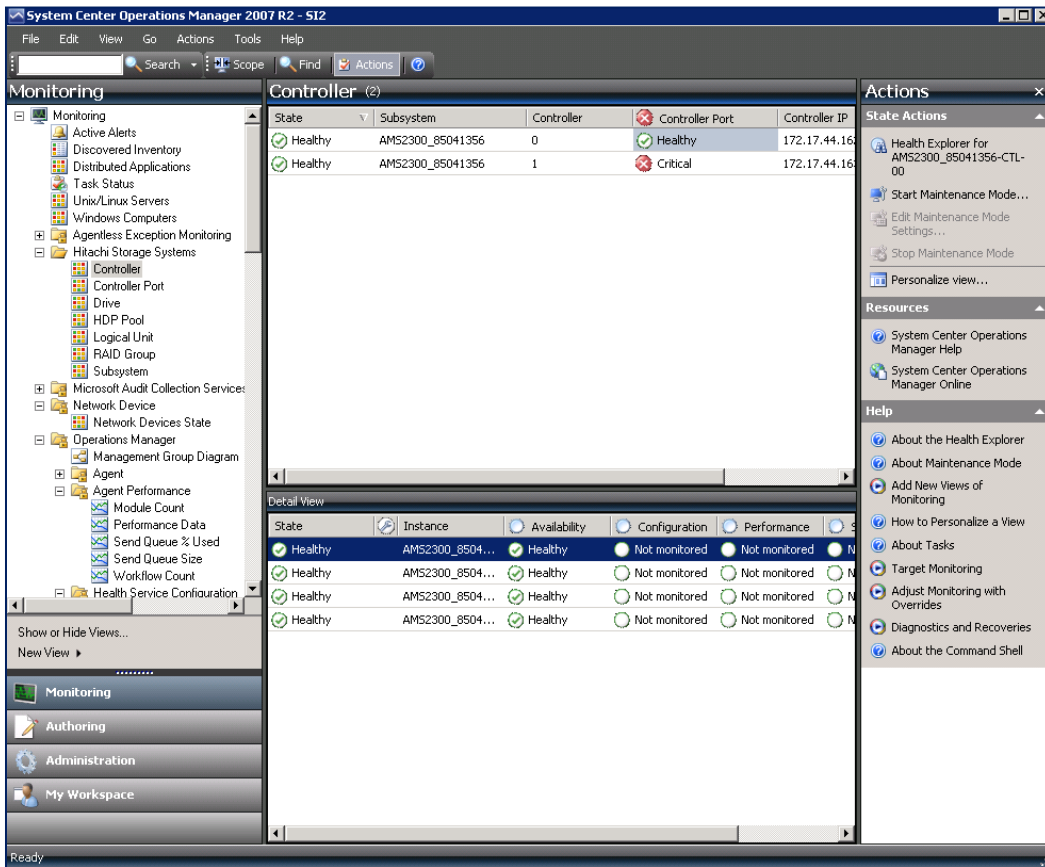






Figure 5-8 Controller Port Objects





Monitoring Views





This chapter provides instructions for performing subsystem viewing operations with the Hitachi Storage Array Management Pack for Microsoft SCOM software.





- [Subsystem View](#)
- [RAID Group View](#)
- [Logical Unit View](#)
- [HDP Pool View](#)
- [Storage Pool View](#)
- [Drive View](#) Drive View
- [Controller View](#)
- [Controller Port View](#)
- [Replication View](#)





Each Component has a Column called State that tells the condition of the particular component.










Subsystem Health State	Subsystem Status
 Healthy	Online
 Warning	Degraded
 Critical	Unknown
 Critical	Offline











Controller Health State	Controller Status
 Healthy	Online
 Critical	Unknown
 Critical	Offline
 Critical	Failed















Controller Port Health State	Controller Port Status
 Healthy	Online
 Critical	Unknown
 Critical	Offline
 Critical	Failed













Drive Health State	Drive Status
 Healthy	Online
 Warning	Rebuilding
 Critical	Unknown
 Critical	Detached

Raid Group Health State	Raid Group Status
 Healthy	Online
 Critical	Failed
 Critical	Offline
 Critical	Unknown

HDP Pool Health State	Status
 Healthy	Normal
 Warning	Regressed
 Warning	Overthreshold
 Warning	Warning
 Warning	Shrinking
 Critical	Detached
 Critical	Blocked
 Critical	Offline
 Critical	Unknown

Storage Pool Health State	Status
 Healthy	Normal
 Warning	Regressed
 Warning	Overthreshold
 Warning	Warning
 Warning	Shrinking
 Critical	Failure
 Critical	Detached
 Critical	Blocked
 Critical	Offline
 Critical	Unknown

Logical Unit Health State	Status
 Healthy	Normal
 Healthy	Normal Quick Format
 Healthy	Preparing Quick Format
 Warning	Regressed
 Warning	Format Waiting
 Warning	Format
 Warning	Unformatted
 Warning	Correction Access
 Warning	Copying
 Warning	Read Only
 Warning	Shredding
 Critical	Blocked
 Critical	Detached
 Critical	Unknown

Replication Health State	Status
 Critical	Invalid
 Healthy	SMPLEX
 Healthy	COPY
 Healthy	PAIR
 Healthy	PSUS : Pair SUSpend
 Critical	PSUE : Pair SUSpend Error
 Healthy	PDUB : Pair DUB
 Healthy	RCPY : Reverse CoPY
 Healthy	PFUL : Pair SideFile 30% over
 Healthy	PFUS : Pair SideFile over Suspend
 Healthy	SSWS : Svol SWap ready Suspend
 Critical	UNKNOWN

Subsystem View

The Subsystem View can be accessed from the SCOM console by selecting Monitoring > Hitachi Storage Systems > Subsystem as follows:

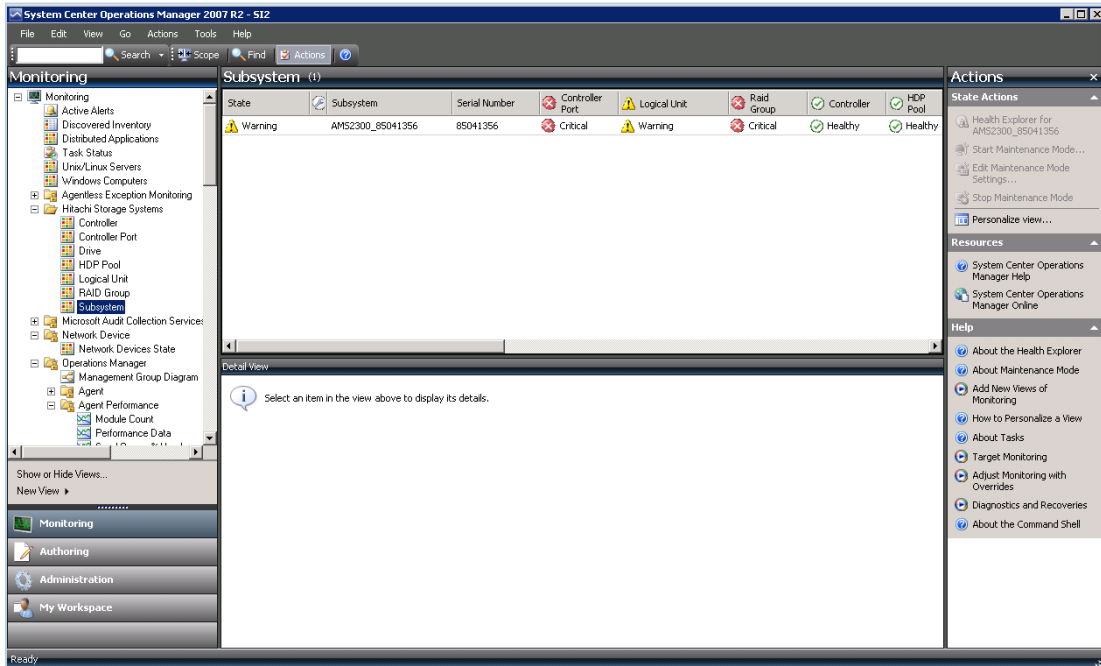


Figure 6-1 Monitoring Window

The Subsystem View contains the following columns and their definitions:

Table 6-1 Subsystem View Column and Definitions

Field	Description
State	Monitored Subsystem State – Healthy, Warning or Critical
Subsystem	Name of the Subsystem
Model	Model of the AMS storage device
Serial Number	Subsystem Serial Number
Firmware	Microcode level of the storage array
Controller 0 IP	Subsystem Controller 0 IP address
Controller 1 IP	Subsystem Controller 1 IP address
Device Manager	Device Manager IP address
Total Capacity	Subsystem total physical capacity
Free Capacity	Subsystem free capacity
Used Capacity	Subsystem used capacity

RAID Group View

The Subsystem View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > RAID Group** as follows:

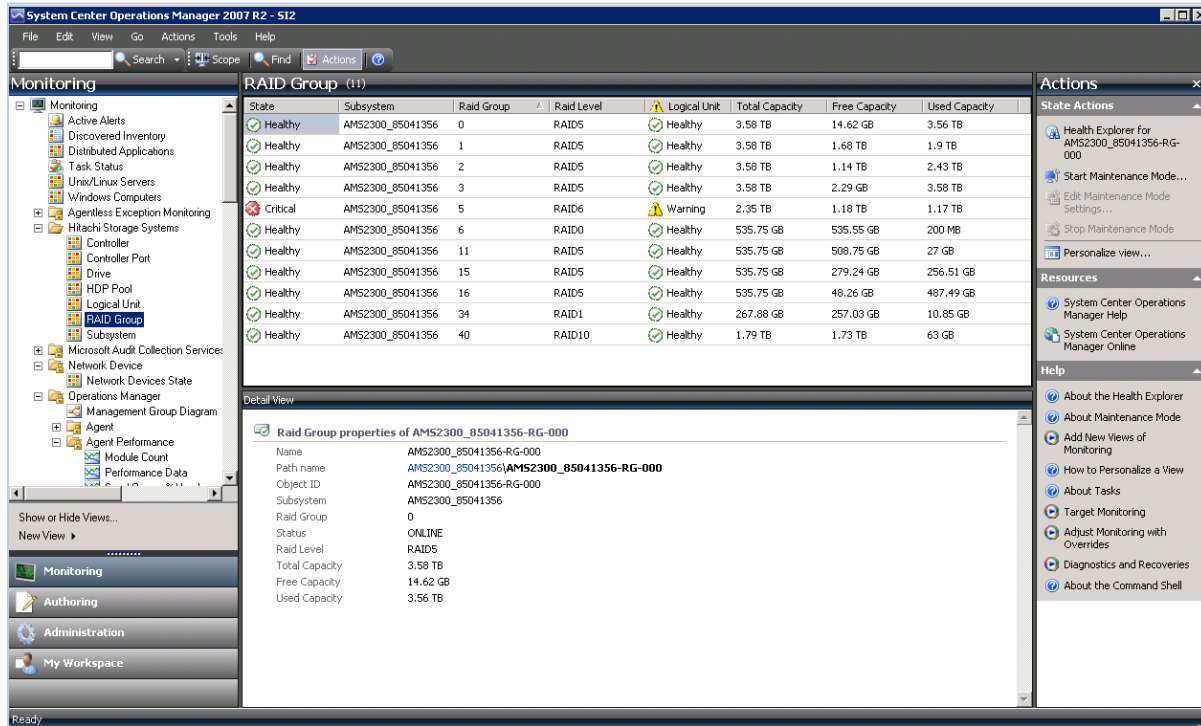


Figure 6-2 RAID Group Monitoring

The RAID Group View contains the following columns and their definitions:

Table 6-2 RAID Group View Columns and Definitions

Field	Description
State	Monitored Raid Group State – Healthy, Warning or Critical
Subsystem	Name of the Subsystem
RAID Group	Subsystem RAID Group Number
Status	Online, Regressed or Failed status of the RAID Group
Total Capacity	RAID Group total physical capacity
Free Capacity	RAID Group free capacity
Used Capacity	RAID Group used capacity
Controller 0 IP	IP address of subsystem controller 0. (AMS only)
Controller 1 IP	IP address of subsystem controller 1. (AMS only)
Device Manager	IP address of device manager. (USP-V and VSP only)

Logical Unit View

The **Logical Unit View** can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Logical Unit** as follows:

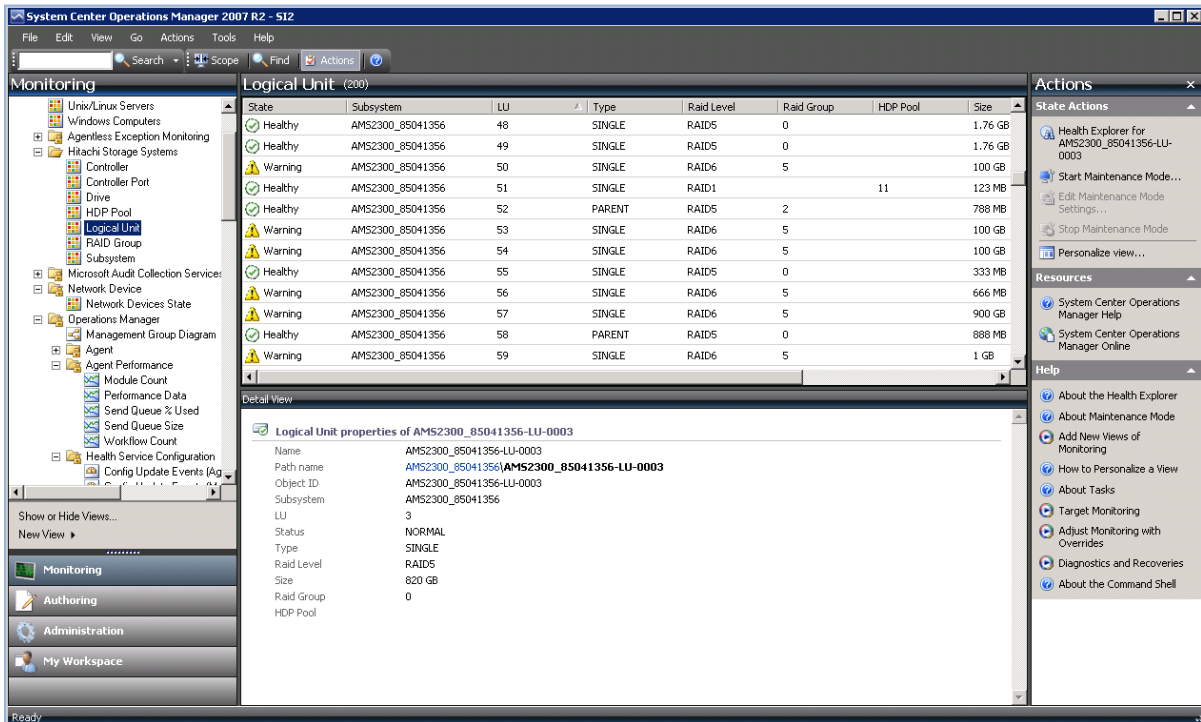


Figure 6-3 Logical Unit Monitoring Properties

The Logical Unit View contains the following columns and their definitions:

Table 6-3 Logical Unit View columns and Definitions

Field	Description
State	Monitored Logical Unit Status – Healthy, Warning or Critical
Subsystem	Name of the Subsystem
LU	LUN Number
Type	Possible LU types are Single, Parent, or VVOL
RAID Level	Possible RAID Levels are 0, 1, 5, 6, or 10
RAID Group	RAID Group Number
HDP Pool	HDP Pool Number
Storage Pool	Storage Pool ID
Size	Total available capacity of the LUN

HDP Pool View

The HDP Pool View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > HDP Pool** as follows:

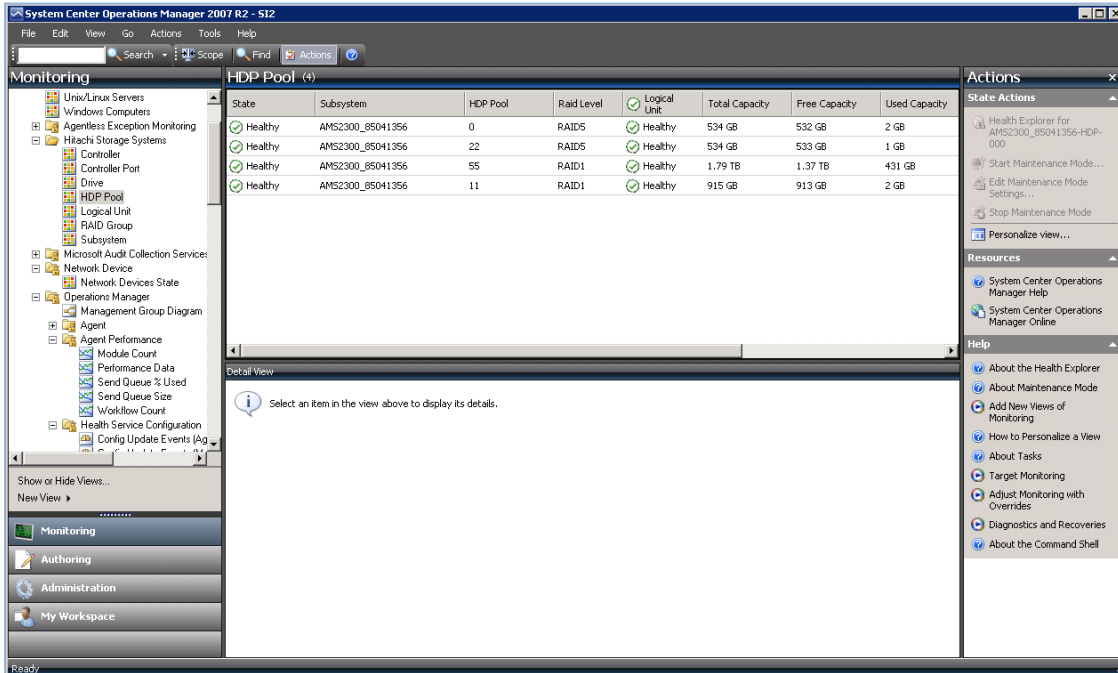


Figure 6-4 HDP Pool View

The HDP Pool View contains the following columns and their definitions:

Table 6-4 HDP Pool Columns and Definitions

Field	Description
State	Monitored HDP Pool State – Healthy, Warning or Critical
Subsystem	Name of the Subsystem
HDP Pool	Subsystem HDP Pool Number
RAID Level	Possible RAID Levels are 1, 5, 6, or 10
Total Capacity	HDP Pool total physical capacity
Free Capacity	HDP Pool free capacity
Used Capacity	HDP Pool used capacity

Storage Pool View

The Storage Pool View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Storage Pool** as follows:

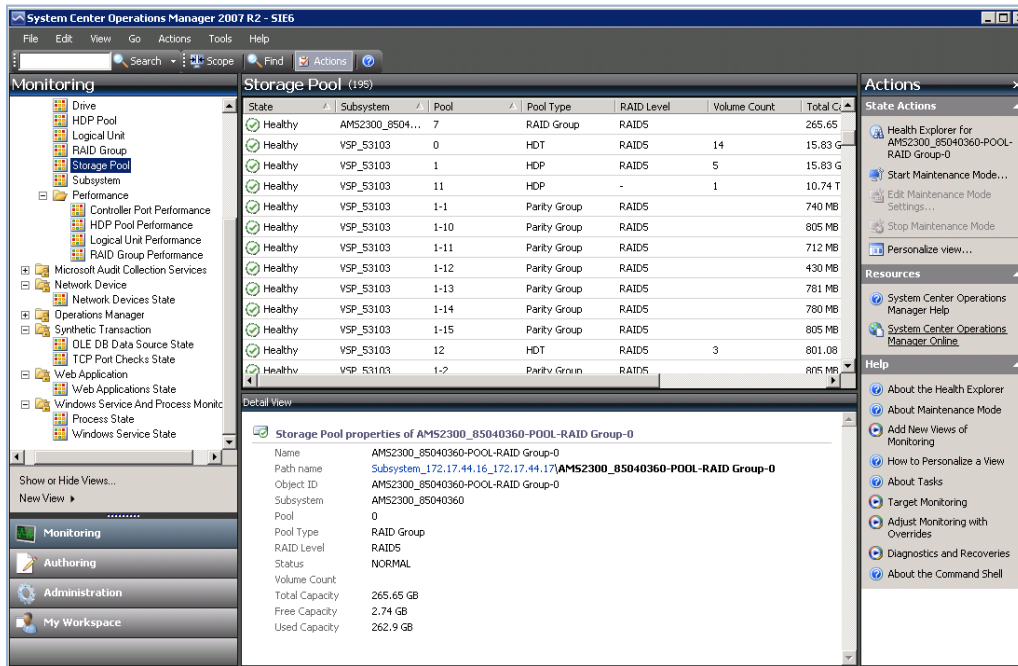


Figure 6-5 Storage Pool View

The Storage Pool View contains the following columns and their definitions:

Table 6-5 Storage Pool Columns and Definitions

Field	Description
State	Monitored Storage Pool State – Healthy, Warning or Critical
Subsystem	Name of the Subsystem
Pool	Subsystem Pool Number
Pool Type	Pool type: DP , DT, COW, RG , PG, MJNL, RJNL, INITJNL, EMPTYJNL, MJNL_RJNL_UR, MJNL_UR, RJNL_UR, INITJNL_MF, HDP_MF
RAID Level	Possible RAID Level is RAID0, RAID1, RAID5, RAID6, or RAID10.
Volume Count	Volume Count
Total Capacity	Storage Pool total capacity
Free Capacity	Storage Pool free capacity
Used Capacity	Storage Pool used capacity

Drive View

The Drive View can be accessed from the SCOM console by selecting Monitoring > Hitachi Storage Systems > Drive as follows:

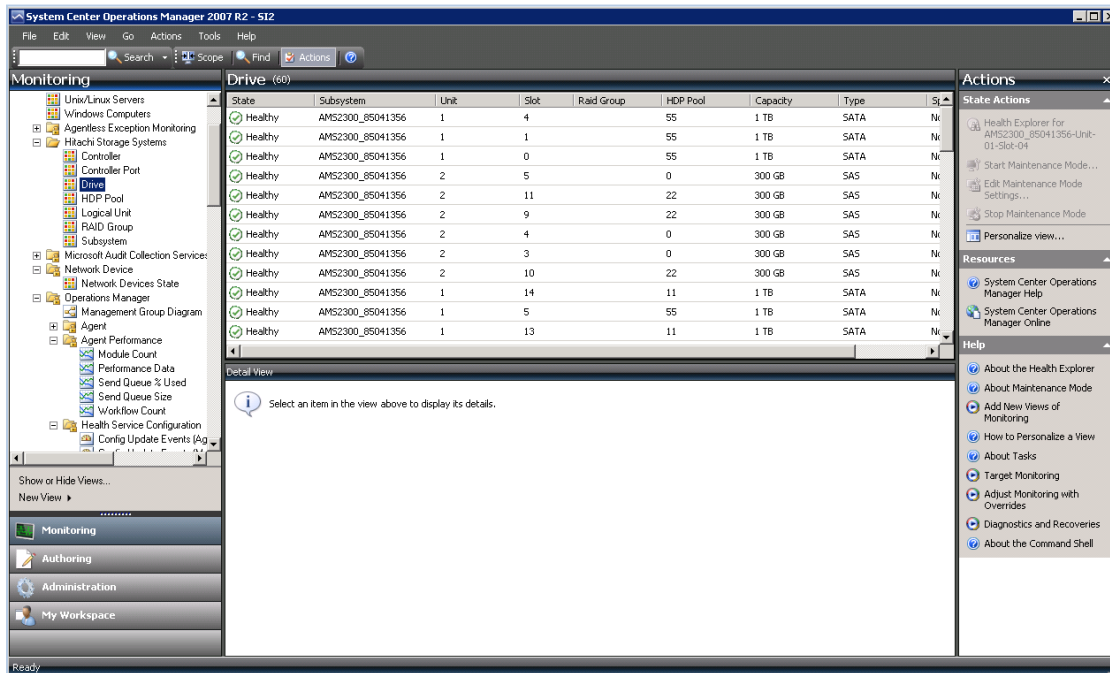


Figure 6-6 Drive View Window

The Drive View contains the following columns and their definitions:

Table 6-6 Drive View Columns and Windows

Field	Description
State	Monitored Drive State – Healthy, Warning or Critical
Subsystem	Name of the Subsystem
Unit	The unit location number of the drive inside the subsystem
Slot	The slot number of the drive inside the subsystem
Capacity	The total drive physical capacity
Type	Possible drive types are SATA, SAS, or SSD
Spare	True if the drive is a spare, false if drive is in use
RAID Group	The RAID Group number the drive belongs to
HDP Pool	The HDP Pool number the drive belongs to
Location	Location of the disk drive.

Controller View

The **Controller View** can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Controller** as follows:

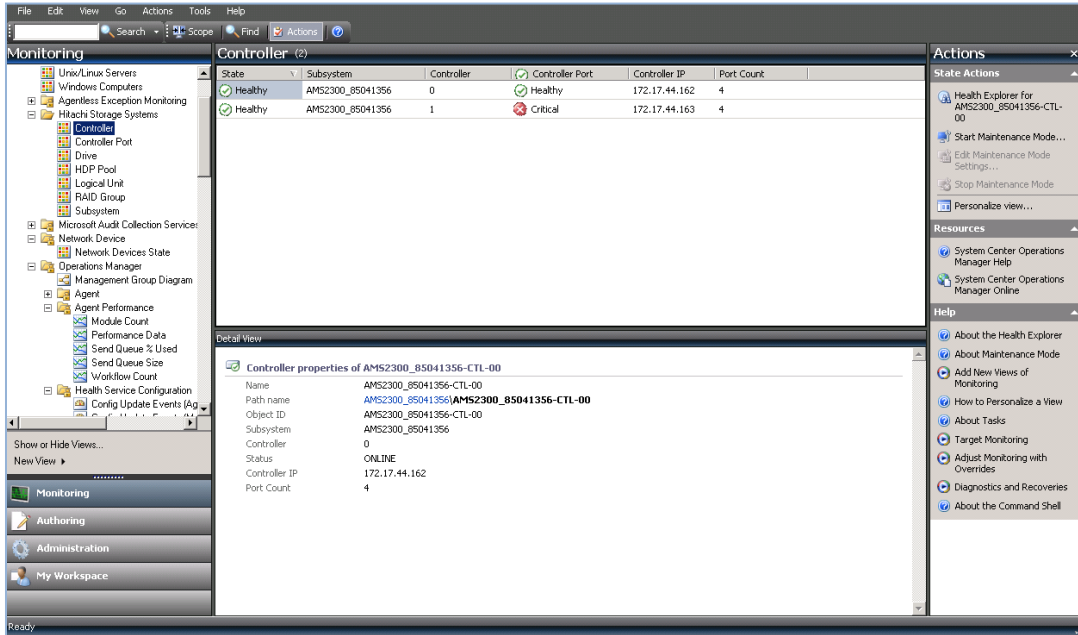


Figure 6-7 Controller View Window

The **Controller View** contains the following columns and their definitions:

Table 6-7 Controller View Columns and Definitions

Field	Description
State	Monitored Controller State – Healthy, Warning or Critical
Subsystem	Name of the Subsystem
Controller	The controller number of the subsystem controller
Controller IP	The controller IP address of the subsystem controller
Port Count	The total number of ports for that given subsystem controller

Controller Port View

The Controller Port View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Controller port** as follows:

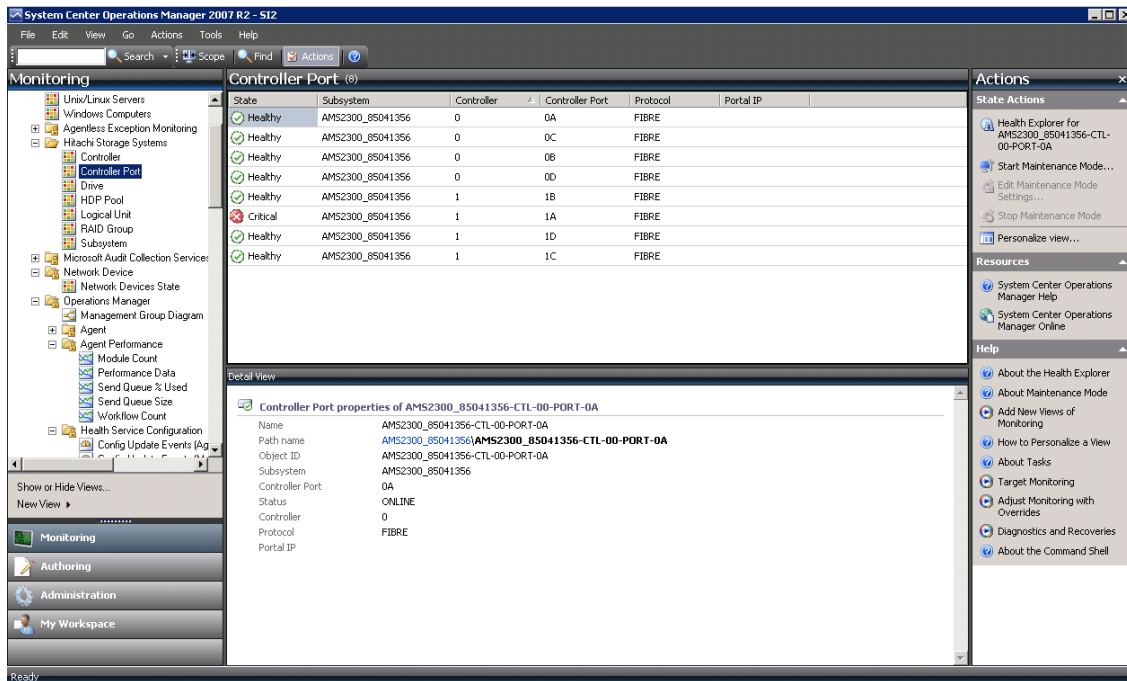


Figure 6-8 Controller Port View

The Controller Port View contains the following columns and their definitions:

Table 6-8 Controller Port View Columns and Definitions

Field	Description
State	Monitored Controller Port State – Healthy, Warning or Critical
Subsystem	Name of the Subsystem
Controller	The controller number of the subsystem controller
Controller Port	Name of the Controller Port
Protocol	Possible values are Fibre or iSCSI
Portal IP	The IP address of the controller port

Replication View

The Replication View can be accessed from the SCOM console by selecting **Monitoring > Hitachi Storage Systems > Replication** as follows:

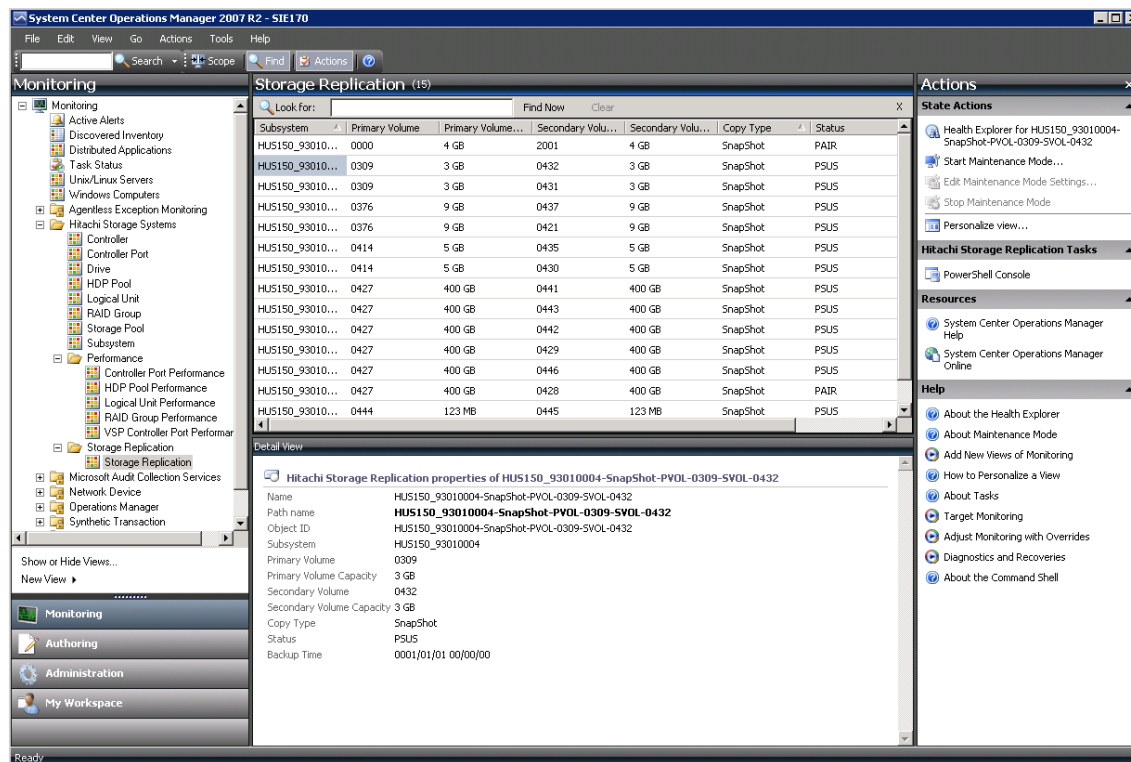


Figure 6-9 Replication View

The Replication contains the following columns and their definitions:

Table 6-9 Replication Columns and Definitions

Field	Description
Subsystem	Subsystem unit name
Primary Volume	Primary volume
Primary Volume Capacity	Primary volume capacity
Secondary Volume	Secondary volume
Secondary Volume Capacity	Secondary volume capacity
Copy Type	ShadowImage/ Snapshot
Status	Status can be : SMPL, COPY, PAIR, PSUS, PSUE, PDUB, RCPY, PFUL, PFUS, SSWS, PSUS_SP See Table 6-10 below.
Backup	Backup Time

Table 6-10 Pair status definitions

Status	Description	P-VOL access	V-VOL access
SMPL	The volume is not assigned to a pair. SMPL not display.	Yes	Not applicable
COPY	The initial copy is in progress. If the P-VOL is already paired with another V-VOL, status does not change to COPY.	Yes	Read only
PAIR	The initial copy is complete and the volumes are paired. Update copy from the primary volume to the secondary volume occurs. Note that in PAIR status, the primary and secondary volumes may not be synchronized	Yes	Read only
PSUS	The pairsplit operation is completed. Updates are written to the P-VOL but not the V-VOL.	Yes	R/W enabled. Can be mounted.
PFUL	The data pool threshold is exceeded in PAIR status.	Yes	No R/W
PFUS	The data pool threshold is exceeded in PSUS status.	Yes	R/W enabled
RCPY *	A reverse resync operation is in progress. Only secondary-volume differential data is copied to the primary volume. Update copying is not executed.	Yes	Read only
PSUE	The pair is suspended by the system. Update copy operations are stopped to the secondary volume. The system records the entire primary volume as differential data. The entire primary volume is copied to the secondary volume when the suspended pair is resynchronized.	Yes	Read only

* Starting time of the copy depends on numbers of pairs and your system environment.



Troubleshooting

This chapter provides troubleshooting information for Hitachi Storage Array Management Pack for Microsoft SCOM:

- [Troubleshooting](#)
- [Error Messages](#)
- [Logging](#)
- [Log Generation and Rotation](#)
- [Error Messages](#)
- [Calling the Hitachi Data Systems Support Center](#)

Troubleshooting

The following table provides general troubleshooting information for operations. If you need technical assistance, see

Table 7-1 General Troubleshooting

Problem	Recommended Action
Hitachi Storage Connector Windows service fails to connect to Microsoft Operation Manager	Perform the following diagnostic steps: <ol style="list-style-type: none"> 1. Verify if the Operation manager server name is valid using Hitachi Storage Connector configuration tool. 2. Use Test connector connection feature of the configuration tool to test the Operation manager connection. 3. Verify the logon account information for Hitachi Storage Connector service is still valid and has enough security privilege to communicate with the Operation manager running in different host. 4. Verify host that runs the Connector service is member of the Windows domain of the Operation manager.
Hitachi Storage Array Management Pack for Microsoft SCOM and the connector settings are still existed in the Operation manager after uninstalling Hitachi Storage Array Management Pack for Microsoft SCOM	Reinstall Hitachi Storage Array Management Pack for Microsoft SCOM and uses Uninstall Management Pack of Hitachi Storage Connector Configuration.
Hitachi Storage Connector Windows service fails to update the state of the monitoring components	Perform the following steps in the Connector Configuration tab of the MMC Snapin: <ol style="list-style-type: none"> 1. Uninstall the management pack. 2. Start the Connector Windows Service.
Hitachi Storage Connector Windows service fails to discover VSP or USP-V subsystem.	Make sure the machine that runs the Windows service has the Command Device for the VSP setup correctly. The Command Device must have the following attributes enabled: <ol style="list-style-type: none"> 1. Command Device Security 2. User Authentication
MMC displays "MMC could not create the snap-in." error when the user starts Hitachi Storage Connector Configuration from the Start menu.	Reinstall Hitachi SCOM MP
Hitachi MMC Snapin displays "Failed to add subsystem." when the user adds authenticated subsystem with correct user ID and password.	<ol style="list-style-type: none"> 1. Check SystemCenterCfg.log file in "Log" folder of the installation directory. 2. Re-install Hitachi SCOM MP when Error Code: [0x800401F3] is found in SystemCenter.Cfg.log file.

Problem	Recommended Action
MMC Snapin cannot start.	The logged in user must be part of the domain administrator's group.
Service could not start.	<ol style="list-style-type: none"> 1. The login credential for the Connector Windows service must have administrative rights. 2. Verify that the IP address of the server running "System Center Data Access" Windows service is valid. 3. Verify that the system clocks of the server running Hitachi Connector Windows service and server running System Center Data Access are synchronized. 4.
MMC displays "The sdk service is either not running or not yet initialized."	<p>Verify that "System Center Data Access" Windows service is up and running in the server specified in "Enter server address" of the MMC Snapin.</p> <p>Verify that the system clocks of the server running the Hitachi MM Snapin, server running Hitachi Connector Windows service, and server running System Center Data Access are synchronized.</p>
Monitoring component data are out of date.	Check the refresh rate in "Connector Configuration" of Hitachi SCOM MMC Snapin.

Logging

The SCOM Management Pack writes to the logs as shown below:

Table 7-2 Log Output of Each Module

Program	Log file	Event Log	Other output
HiScomConnectorService	SystemCenter.log HiScomConnectorServiceLog.log Uses SNM2API and also outputs log statements to its log files.	Yes	-
Installer	-	-	Message dialog

The log levels defined in the Windows registry are shown below:

Table 7-3 Log Level

Log level	Value*1	Output to log file*2	Output to event log	Description
STAT	0x00000000	X	-	Write operational status to the log file.
INFO	0x00000001	X	-	Enable informational logging that provides information about the operations. Informational logging option is usually enabled specifically for troubleshooting because it creates a large log file and can slow down performance.
WARNING	0x00000000	X	-	The program can continue its process, but alerts the user.
ERROR	0x00000000	X	-	Error occurred and the program stopped processing.
PARAM	0x00000080	X	-	Writes parameter values of the invoked methods to the log file.
All	0xFFFFFFFF	X	-	Writes all log level statements to the log file.

Log Files

Log files are created in the "log" subdirectory of the installation directory of the Hitachi Storage Subsystem Management Pack.

Log file has the following format has one log item per line.

In each log item, the following columns are connected with a blank:

Table 7-4 Log Item Fields

Format (<i><u>Italic and Underline</u></i> are variable)	Description of the Variables
"[<u><i>process ID</i></u>]"	<u><i>process ID</i></u> : Process ID of the Hitachi SCOM connector Windows service.
"[<u><i>Date-Time</i></u>]"	<u><i>Date</i></u> : MM/DD/YY format, MM: month, DD: date, YY: year <u><i>Time</i></u> : hh:mm:ss hh: hour(01-24), mm: minutes, ss: seconds Each value is 2-digits (spaces filled with 0).
"[<u><i>Module</i></u>]"	<u><i>Module</i></u> : Class name When the name is less than 7 characters, blanks are filled in to the right.
"[<u><i>Level</i></u>]"	<u><i>Level</i></u> : Log level.

Format (<i><u>Italic and Underline</u></i> are variable)	Description of the Variables	
"Message Code"	Status message	S230####
	Error message	E230####
	Warning message	W230####
	Info message	I230####
	Debug message	-----
** where #### = four hex digit Message ID		
"{ <i><u>Class::Method(Serial)</u></i> }: <i><u>Message</u></i> "	<i><u>Class</u></i> : Class name	
	<i><u>Method</u></i> : Method name	
	<i><u>Serial</u></i> : Serial number of the storage where the S-VOL resides	
	<i><u>Message</u></i> : Message strings	

Sample of a log item (1 line):

```
[3104] [10/01/09-10:12:25] [HI-API ] STAT
{CHiSnmAPI::RegisterDevice(85010071)}:Successfully updated the device
info with SNM API - IP[192.168.29.218/192.168.29.219]
DeviceNum[85010071]
```

Log Setting

The log levels can be set by the variable "DebugLevel" in `HiSystemCenter.config` configuration file.

The "DebugLevel" can have one of value: MINIMAL, NORMAL and VERBOSE.

See the table below for details of Name and Values in Registries.

Table 7-5 Name and Values in Registries

Key(*1)	Name	Type	Value
#1	LoginID	REG_SZ	User ID
#1	Passwd	REG_BINARY	Encrypted Password
#3	LogFileName	REG_SZ	File path of the log file. For example: the value can be "C:/Program Files/Hitachi/HiScom/HiScom.log". When the LogFileName value is not defined, the management pack writes to the log file (hiscom.log) in the management pack installation directory. See section 7.1. Log Files for details.
#3	LogToFile	DWORD Value	A DWORD value to determine that the management pack can write to the log file. When the value is not equal to 0, the logging is turned on. When the value is 0, the logging is turned off.
#3	DebugLevel	DWORD	A DWORD value to control the logging level. See Table

Key(*1)	Name	Type	Value
		Value	7-2 Log Level for details. When DebugLevel is not defined, the log level is STAT, WARNING or ERROR.

Log Generation and Rotation

Hitachi Storage Management Pack for SCOM log files are created when the Hitachi Storage Management Pack for SCOM process starts. The log file generation and rotation of the adapter log files have the following features:

- To allow multiple processes to log to the same file.
 - User-specified Size based Log Rotation.
1. Rotate the current or active log file by incrementing the log file name, by appending consecutive numbers, that starts from 0 up to a user-specified limit, or a system default
 - Log file names are *hiSystemCenter.log*, *hiSystemCenter.log.1*, *hiSystemCenter.log.2*, etc.
 2. If the Active log file is locked, log entries will be written to a temporary file *hiSystemCenter.log.tmp*
 3. When the temporary log files grows larger than the *MaxFileSize* specified, the temporary log files are rotated. (*hiSystemCenter.tmp.1*, *hiSystemCenter.tmp.2*, etc.)
 4. If the backup log file is locked at the time of the rotation, overflow log files will be created. The overflow log files are not deleted. User will have to delete the overflow log files manually. Overflow log file names are: *hiSystemCenter_<YYYYMMDD_hhmmss>*.
 5. Active log file name is *hiSystemCenter.log/ hiSystemCenterCfg.log*.
 6. When either the active log file, the backup log file or the temporary log file are locked for writing you will see the following entries in the Windows Event log
 - a) Warning Message: When the adapter log file is locked for writing

Writing to Adapter log stopped .

Hitachi Logger version : [X.X.X.X]
 - b) Information Message: When the adapter log file is again available for writing

Writing to Adapter log started .

Hitachi Logger version : [X.X.X.X]

- c) Warning message: When the any of the backup log files are locked and an overflow log file is created

Some backup log files are not writable. Writing Overflow log. Please check Adapter log folder and clean up unused overflow log files.

Hitachi Logger version : [X.X.X.X]

Log configuration value

The log configuration values are written in the HiSystemCenter.config or hilogger.config file.

MaxFileSize config value [sub heading]

[MaxFileSize=10], this value can range from 1 to 100, indicating size to be 1MB to 100MB. If the values outside this range are provided, the default value of 10 is used.

Maximum number of backup files, config value [subheading]

[MaxBackupIndex=5], this value can range from 1 to 255. If values outside this range are provided, the default value of 5 is used.

Error Messages

I230A013

Error Message ID	I230A013
Error Message Text	Configuration is saved.
Explanation	The configuration has been successfully saved.
Recommended Action	None

I230A05C

Error Message ID	I230A05C
Error Message Text	Connection to the SCOM server is disconnected. {0}
Explanation	
Recommended Action	

E230A044

Error Message ID	E230A044
Error Message Text	Connector settings is not found in the Operation Manager. {0}
Explanation	
Recommended Action	

E230A04D

Error Message ID	E230A04D
Error Message Text	Failed to add discovery data of subsystem {0} to the data collection. Error={1}.
Explanation	Internal application error.
Recommended Action	Restart the Hitachi Connector service. Contact the administrator for assistance.

E230A03B

Error Message ID	E230A03B
Error Message Text	Failed to add subsystem {0};{1} to the connector. Error={2}.
Explanation	The subsystem may be offline.
Recommended Action	Verify if the subsystem is online and reachable. Contact the administrator for assistance.

E230A029

Error Message ID	E230A029
Error Message Text	Error occurred when checking the Connector service status. {0}
Explanation	This is caused by internal application error. Restart the Hitachi MMC Snapin configuration application.
Recommended Action	If the error persists, contact the administrator for assistance.

E230A042

Error Message ID	E230A042
Error Message Text	Error occurred when checking whether the management pack is installed. {0}.
Explanation	The Operation Manager is not accessible.
Recommended Action	Verify the Ethernet connection. If the error persists, contact the administrator for assistance.

E230A04C

Error Message ID	E230A04C
Error Message Text	Error occurred when collecting performance data. {0}
Explanation	Internal application error.
Recommended Action	Restart the Hitachi Connector service. If the error occurs again, contact the administrator for assistance.

E230A036

Error Message ID	E230A036
Error Message Text	Failed to connect to subsystem (CTL0={0},CTL1={1}). Error={2}. Type={3}.
Explanation	The subsystem may be offline.
Recommended Action	Verify if the subsystem is online and reachable. Contact the administrator for assistance.

E230A000

Error Message ID	E230A000
Error Message Text	Connector service configuration file HiScomConnectorService.exe.config is not found.
Explanation	The HiScomConnectorService.exe.config file may be missing in the installation directory.
Recommended Action	Reinstall the Hitachi SCOM MP to recover the missing files.

E230A06A

Error Message ID	E230A06A
Error Message Text	Connection to the SCOM server is not established.
Explanation	The connection to the Operation Manager is broken. Verify the Operation Manager status is healthy and accessible via the network.
Recommended Action	If the Operation Manager is accessible, contact the administrator for assistance.

E230A05B

Error Message ID	E230A05B
Error Message Text	The connector settings do not exist in the SCOM server for setting up connector: Guide={0}, Name={1}, Display Name={2}, Description={3}, ErrorMessage={4}
Explanation	The Operation Manager does not have Hitachi Connector settings information.
Recommended Action	Verify the settings in the Hitachi MMC Snapin configuration application and restart the Connector service.

E230A069

Error Message ID	E230A069
Error Message Text	The ConnectorThread thread has already started.
Explanation	Internet application error.
Recommended Action	Restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A05A

Error Message ID	E230A05A
Error Message Text	Error occurred when the contain relationship between HDP pool and logical unit was being created. {0}
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A03E

Error Message ID	E230A03E
Error Message Text	Failed to create event log source for Hitachi Storage connector for Operation Manager. {0}

Explanation	Verify if the Windows Application event log has not reached the max size and is in operational condition.
Recommended Action	Restart Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A04B

Error Message ID	E230A04B
Error Message Text	Error occurred when creating HDP Pool monitoring objects. {0}
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A058

Error Message ID	E230A058
Error Message Text	Error occurred when host relationship between controller and controller port was being created. {0}
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A059

Error Message ID	E230A059
Error Message Text	Error occurred when host relationship between RAID group and logical unit was being created. {0}
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A054

Error Message ID	E230A054
Error Message Text	Failed to discover all subsystems. The subsystem session timeout. {0}
Explanation	The error is caused by subsystem session timeout. The error will be resolved automatically.
Recommended Action	To minimize the recurrence of the error, increase the session timeout value in the subsystem. If the error persists, contact the administrator for assistance.

E230A01E

Error Message ID	E230A01E
Error Message Text	Failed to discover the configured subsystems. {0}
Explanation	The error is caused by subsystem session timeout.
Recommended Action	The error will be resolved automatically. To minimize the recurrence of the error, increase the session timeout value in the subsystem. If the error persists, contact the administrator for assistance.

E230A03C

Error Message ID	E230A03C
Error Message Text	Fatal Error : {0}. Type={1}.
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A06E

Error Message ID	E230A06E
Error Message Text	Failed to fire event with value {0} of monitoring object {1}.
Explanation	Internet application error.
Recommended Action	If the error persists, uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A066

Error Message ID	E230A066
Error Message Text	XML element for FirstNameSpace could not be found.
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A062

Error Message ID	E230A062
Error Message Text	XML element for FirstPollInterval could not be found.
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A064

Error Message ID	E230A064
Error Message Text	XML element for FirstQuery could not be found.
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A056

Error Message ID	E230A056
Error Message Text	Error occurred when HDP pool monitoring objects were being generated. {0}
Explanation	Internet application error.
Recommended	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration

Action	application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.
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E230A057

Error Message ID	E230A057
Error Message Text	Failed to generate WMI events for subsystem {0}. Error={1} {2}
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A049

Error Message ID	E230A049
Error Message Text	Error occurred when getting monitoring connector object from SCOM. {0}
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A039

Error Message ID	E230A039
Error Message Text	Error occurred in GetDriveDisplayLocation. Location={0}. {1}
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A052

Error Message ID	E230A052
Error Message Text	Error occurred in GetMonitoringObjects. {0}
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A051

Error Message ID	E230A051
Error Message Text	Error occurred when GetSubsystemObject was creating a SubsystemObject. {0}
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A043

Error Message ID	E230A043
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Error Message Text	Error occurred when importing the management pack to the SCOM server. Error={0}.
Explanation	The Operation Manager is not accessible.
Recommended Action	Verify the Ethernet connection. If the error persists, contact the administrator for assistance.

E230A01D

Error Message ID	E230A01D
Error Message Text	Failed to initialize snap-in. {0}
Explanation	Verify Windows MMC Snapin is in working condition.
Recommended Action	Reinstall the Hitachi SCOM MP. If the error persists, contact the administrator for assistance.

E230A04A

Error Message ID	E230A04A
Error Message Text	Error occurred when initializing SubsystemDataConnector object. {0}
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A004

Error Message ID	E230A004
Error Message Text	Internal Error.
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A06F

Error Message ID	E230A06F
Error Message Text	Invalid subsystem object.
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A041

Error Message ID	E230A041
Error Message Text	There is no connection to the operation manager.
Explanation	The Operation Manager is not accessible.
Recommended Action	Verify the Ethernet connection. If the error persists, contact the administrator for assistance.

E230A03A

Error Message ID	E230A03A
Error Message Text	Monitoring class {0} does not have the property {1} of the input object. {2}
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A06B

Error Message ID	E230A06B
Error Message Text	Management Pack file name is required.
Explanation	Content of the HiScomConnectorService.exe.config file is invalid.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A02D

Error Message ID	E230A02D
Error Message Text	Hitachi Storage Management Pack {0} does not exist in the Operation Manager in '\{1}\'.
Explanation	The operation manager does not have the Hitachi MP installed.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Restart the Hitachi Connector Windows service. If the error persists, contact the administrator for assistance.

E230A070

Error Message ID	E230A070
Error Message Text	Management pack {0} version {1} is missing in Operation Manager {2}.
Explanation	The operation manager has incompatible version of the Hitachi MP installed.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Restart the Hitachi Connector Windows service. If the error persists, contact the administrator for assistance.

E230A061

Error Message ID	E230A061
Error Message Text	There is no monitor object.
Explanation	The operation manager has incompatible version of the Hitachi MP installed.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Restart the Hitachi Connector Windows service. If the error persists, contact the administrator for assistance.

E230A01B

Error Message ID	E230A01B
Error Message Text	Fatal error occurred when performing operation {0}. {1}
Explanation	Internet application error.

Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.
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E230A001

Error Message ID	E230A001
Error Message Text	Failed to open Connector service configuration file HiScomConnectorService.exe.config. {0}
Explanation	The HiScomConnectorService.exe.config file may be missing in the installation directory.
Recommended Action	Reinstall Hitachi SCOM MP. If the error persists, contact the administrator for assistance.

E230A00E

Error Message ID	E230A00E
Error Message Text	OperationManager value is missing in HiScomConnectorService.exe.config file.
Explanation	Some settings are missing in the HiScomConnectorService.exe.config file.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A034

Error Message ID	E230A034
Error Message Text	Error occurred when ContinuousPerformanceDataCollectionDelayInSeconds is queried from the configuration file. {0}
Explanation	Some settings are missing or invalid in the HiScomConnectorService.exe.config file.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A031

Error Message ID	E230A031
Error Message Text	Error occurred when ContinuousWmiEventDelayInSeconds is queried from the configuration file. {0}
Explanation	Some settings are missing or invalid in the HiScomConnectorService.exe.config file.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A033

Error Message ID	E230A033
Error Message Text	Error occurred when ManagementPackFileName is queried from the configuration file. {0}
Explanation	Some settings are missing or invalid in the HiScomConnectorService.exe.config file.
Recommended	Open Hitachi MMC Snapin configuration application to verify the settings.

Action	Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.
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E230A02F

Error Message ID	E230A02F
Error Message Text	Error occurred when ManagementPackRefreshRate is queried from the configuration file. {0}
Explanation	Some settings are missing or invalid in the HiScomConnectorService.exe.config file.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A030

Error Message ID	E230A030
Error Message Text	Error occurred when MonitoringEventDelayInSeconds is queried from the configuration file. {0}
Explanation	Some settings are missing or invalid in the HiScomConnectorService.exe.config file.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A00A

Error Message ID	E230A00A
Error Message Text	Failed to query management pack {0} version from Operation Manager \\{1}\. {2}
Explanation	The operation manager does not have the Hitachi MP installed.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Restart the Hitachi Connector Windows service. If the error persists, contact the administrator for assistance.

E230A045

Error Message ID	E230A045
Error Message Text	Error occurred when querying the management pack {0} version. {1}
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A032

Error Message ID	E230A032
Error Message Text	Error occurred when OperationManager is queried from the configuration file. {0}
Explanation	Some settings are missing or invalid in the HiScomConnectorService.exe.config file.
Recommended	Open Hitachi MMC Snapin configuration application to verify the settings.

Action	Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.
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E230A02B

Error Message ID	E230A02B
Error Message Text	Failed to query for the Hitachi Snapin installation directory. {0}
Explanation	The configuration of the Hitachi MMC Snapin is corrupted or missing.
Recommended Action	Reinstall Hitachi SCOM MP. If the error persists, contact the administrator for assistance.

E230A06D

Error Message ID	E230A06D
Error Message Text	Failed to query subsystem data for {0} {1}.
Explanation	The subsystem may be offline.
Recommended Action	Verify that the subsystem is online and reachable. Contact the administrator for assistance.

E230A04F

Error Message ID	E230A04F
Error Message Text	Failed to query subsystem data. {0}.
Explanation	The subsystem may be offline.
Recommended Action	Verify that the subsystem is online and reachable. Contact the administrator for assistance.

E230A037

Error Message ID	E230A037
Error Message Text	Failed to query subsystem(s) and send data to the SCOM server. Error={0}. Type={1}.
Explanation	The subsystem or the Operation manager may be offline.
Recommended Action	Verify if both of the subsystem and the Operation Manager are online and reachable. Contact the administrator for assistance.

E230A01C

Error Message ID	E230A01C
Error Message Text	Failed reading configuration file. {0}
Explanation	
Recommended Action	Verify if the login user has enough Windows security privilege to run the Hitachi MMC snapin application. Verify if HiScomConnectorService.exe.config, HiSystemCenter.config and HiConfigurationSnapin.dll.config files are existed in the installation directory. Reinstall Hitachi MP to resolve the issue. If the error persists, contact the administrator for assistance.

E230A011

Error Message ID	E230A011
Error Message Text	Failed to read Connector service settings from HiScomConnectorService.exe.config file. {0}

Explanation	Some of settings are missing or invalid in the HiScmConnectorService.exe.config file.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A02C

Error Message ID	E230A02C
Error Message Text	Failed to read ConnectorServiceStatusMonitorInterval from the application configuration file.
Explanation	Configuration value for ConnectorServiceStatusMonitorInterval in the HiScmConnectorService.exe.config file.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A038

Error Message ID	E230A038
Error Message Text	Failed to reconnect to operation manager (0). Error={1}.
Explanation	The connection to the Operation Manager is broken or the Hitachi MP is corrupted or missing.
Recommended Action	Verify the Operation Manager status is healthy and accessible via the network. Use the Hitachi MMC Snapin configuration application to stop the Hitachi Connector service and uninstall the MP. Restart the Connector service. If the error persists, contact the administrator for assistance.

E230A028

Error Message ID	E230A028
Error Message Text	Failed to refresh connector configuration settings due to SubsystemListFormViewControl is missing.
Explanation	Internet application error.
Recommended Action	Restart the Hitachi SCOM MMC Snapin configuration application. If the error persists, contact the administrator for assistance.

E230A007

Error Message ID	E230A007 ERROR_REMOVE_SUBSYSTEM_2
Error Message Text	Failed to remove subsystem {0}.{1}
Explanation	The HiSystemCenter.config configuration file may be corrupted.
Recommended Action	Restart the Hitachi SCOM MMC Snapin configuration application. If the error persists, contact the administrator for assistance.

E230A016

Error Message ID	E230A016
Error Message Text	Failed to save the ContinuousPerformanceDataCollectionDelayInSeconds value to the configuration file {0}.
Explanation	The HiScmConnectorService.exe.config file may be exclusively locked by the other application, so some settings are missing or invalid in the

	HiScomConnectorService.exe.config file.
Recommended Action	Close the applications that may lock the configuration file. Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A014

Error Message ID	E230A014
Error Message Text	Failed to save the Operation Manager name to the configuration file. {0}
Explanation	The HiScomConnectorService.exe.config file may be exclusively locked by the other application, so some settings are missing or invalid in the HiScomConnectorService.exe.config file.
Recommended Action	Close the applications that may lock the configuration file. Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A067

Error Message ID	E230A067
Error Message Text	XML element for SecondNameSpace could not be found.
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A063

Error Message ID	E230A063
Error Message Text	XML element for SecondPollInterval could not be found.
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A065

Error Message ID	E230A065
Error Message Text	XML element for SecondQuery could not be found.
Explanation	Internet application error.
Recommended Action	Uninstall the Hitachi SCOM MP using Hitachi SCOM MMC Snapin configuration application and restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A055

Error Message ID	E230A055
Error Message Text	Failed to send WMI events of the subsystem components. {0}
Explanation	The user account that runs the Hitachi Connector Windows service may not have sufficient security privilege, or there may be an internal application error.

Recommended Action	Check the Windows Application event log for more information.
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E230A035

Error Message ID	E230A035
Error Message Text	Failed to set poll interval for the WMI query. {0}
Explanation	Some settings are missing or invalid in the HiScmConnectorService.exe.config file.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A068

Error Message ID	E230A068
Error Message Text	Error occurred when WMI provider was being set in the management pack schema. {0}
Explanation	The error could be caused by insufficient privilege of the user credential that Hitachi Connector Windows service runs on.
Recommended Action	The user credential must have permission to modify and remove the MP installed in the SCOM server.

E230A047

Error Message ID	E230A047
Error Message Text	Failed to setup or initialize connector. {0}
Explanation	The error could be caused by the Operation Manager is not reachable, the Operation Manager does not have the Hitachi Connector settings or the Hitachi Connector service does not have enough security privilege to perform the operation.
Recommended Action	Verify and resolve the conditions. If the error persists, contact the administrator for assistance.

E230A03D

Error Message ID	E230A03D
Error Message Text	Failed to start the connector. {0}
Explanation	The Operation Manager is not reachable.
Recommended Action	Verify the Ethernet connection and the Operation Manager status.

E230A05D

Error Message ID	E230A05D
Error Message Text	Error occurred when Storage Performance Service was requested to start. {0}
Explanation	Internet application error.
Recommended Action	Restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A008

Error Message ID	E230A008
Error Message Text	Failed to start service.\n{0}
Explanation	The error could be caused by the user account for the Hitachi Connector service has insufficient security privilege or the HiScmConnectorService.exe.config file is corrupted.
Recommended Action	Verify the user account and use the Hitachi MMC Snapin configuration application to verify the settings. If the error persists, contact the administrator for assistance.

E230A02A

Error Message ID	E230A02A
Error Message Text	Fatal error while stopping connector windows service. {0}
Explanation	The error could be caused by the insufficient permission of the user ID, the Hitachi Connector Windows service is removed, or Windows server issue.
Recommended Action	Verify the status of Hitachi Connector service using Windows Service manager. Re-install the Hitachi SCOM MP if the Hitachi Connector Windows service cannot be managed using the Windows Service manager.

E230A05E

Error Message ID	E230A05E
Error Message Text	Error occurred when Storage Performance Service was requested to stop. {0}
Explanation	Internet application error.
Recommended Action	Restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A05F

Error Message ID	E230A05F
Error Message Text	Error occurred when Storage Performance Service was stopping. {0}
Explanation	Internet application error.
Recommended Action	Restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A050

Error Message ID	E230A050
Error Message Text	Failed to submit discovery data to the Operation Manager. {0}
Explanation	The Operation Manager is not reachable or the Hitachi MP version is not compatible with the Hitachi Connector service.
Recommended Action	Verify the Ethernet connection, the Operation Manager status and the MP version. If the MP version is not compatible, restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A06C

Error Message ID	E230A06C
Error Message Text	Subsystem value is null.
Explanation	Internet application error.
Recommended Action	Restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A018

Error Message ID	E230A018
Error Message Text	Failed to test connection to Operation Manager. {0}
Explanation	The Operation Manager is not reachable or the login user does not have sufficient security privilege to allow the MMC snapin to make connection to the Operation Manager server.
Recommended Action	Verify the Ethernet connection and the user security privilege. If the MP version is not compatible, restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A019

Error Message ID	E230A019
Error Message Text	Fatal error occurred while uninstalling management pack and the connector settings. {0}
Explanation	The Operation Manager is not reachable or the login user does not have sufficient security privilege to allow the MMC snapin to make connection to the Operation Manager server.
Recommended Action	Verify the Ethernet connection, the health status of the Operation Manager and the user security privilege. If the error persists, contact the administrator for assistance.

E230A046

Error Message ID	E230A046
Error Message Text	Error occurred when uninstalling management pack from the SCOM server. {0}
Explanation	The Operation Manager is not reachable or the login user does not have sufficient security privilege to allow the MMC snapin to make connection to the Operation Manager server.
Recommended Action	Verify the Ethernet connection, the health status of the Operation Manager and the user security privilege. If the error persists, contact the administrator for assistance.

E230A053

Error Message ID	E230A053
Error Message Text	Error occurred when updating monitoring object health state. {0}
Explanation	The monitoring subsystem is not reachable or the connection to the subsystem has session timeout.
Recommended Action	Verify the Ethernet connection to the subsystem and the health status of the subsystem. Re-evaluate the session time out settings for the subsystem.

E230A048

Error Message ID	E230A048
Error Message Text	Error occurred when updating the SCOM monitor configuration. {0}
Explanation	The error could be caused by the user account for the Hitachi Connector service has insufficient security privilege or the Operations Manager is not reachable.
Recommended Action	Verify the user account and the Operation Managers Health status. If the error persists, contact the administrator for assistance.

E230A00B

Error Message ID	E230A00B
Error Message Text	{0} Windows services could not be started. {1} {2}
Explanation	The Hitachi Connector may not be installed successfully or the login user does not have enough security permission to allow the Hitachi MMC Snapin to make connection to the Windows Service.
Recommended Action	Verify the Hitachi Connector installation using the Windows Service manager. Verify the login user id has enough security privilege to start and stop a Windows service.

E230A00C

Error Message ID	E230A00C
Error Message Text	{0} Windows services could not be stopped. {1}
Explanation	The Hitachi Connector may not be installed successfully or the login user does not have enough security permission to allow the Hitachi MMC Snapin to make connection to the Windows Service.
Recommended Action	Verify the Hitachi Connector installation using the Windows Service manager. Verify the login user id has enough security privilege to start and stop a Windows service.

E230A03F

Error Message ID	E230A03F
Error Message Text	Failed to write application event log. Event log ID: [{0}], {1}
Explanation	The error can be caused when the Windows Application event log is full and out of space and the user credential for the Hitachi Connector service does not have sufficient permission to write a Application event log.
Recommended Action	

E230A040

Error Message ID	E230A040
Error Message Text	Failed to write application event log. Event log ID: [{0}]. Event log message: [{1}], {2}
Explanation	The error can be caused when the Windows Application event log is full and out of space and the user credential for the Hitachi Connector service does not have sufficient permission to write a Application event log.
Recommended Action	

E230A020

Error Message ID	E230A020
Error Message Text	Invalid IP address.
Explanation	Please enter Controller 0 IP address in this format : xxx.xxx.xxx.xxx.
Recommended Action	Input a valid IP address for the controller 0.

E230A021

Error Message ID	E230A021
Error Message Text	Invalid IP address.
Explanation	Please enter Controller 1 IP address in this format : xxx.xxx.xxx.xxx.
Recommended Action	Input a valid IP address for the controller 1.

E230A024

Error Message ID	E230A024
Error Message Text	Invalid Device Manager IP address.
Explanation	Please enter IP address in this format : xxx.xxx.xxx.xxx.
Recommended Action	Input a valid IP address for the Device Manager.

E230A026

Error Message ID	E230A026
Error Message Text	Invalid Device Manager password.
Explanation	Please enter valid password between 6 to 255 characters - alphanumeric characters and special symbols !\" # \$ % & ' () * + , - . / : ; < = > ? @ [\\] ^ _ ` { } ~
Recommended Action	Input a valid user password for the Device Manager.

E230A025

Error Message ID	E230A025
Error Message Text	Invalid Device Manager user id.
Explanation	Please enter valid user id between 1 to 255 characters - alphanumeric characters and special symbols ! # \$ % & ' * + - . / = ? @ ^ _ ` { } ~
Recommended Action	Input a valid user ID for the Device Manager.

E230A00F

Error Message ID	E230A00F
Error Message Text	Please enter valid refresh rate value between 1 to 1440 minutes.
Explanation	Invalid management pack refresh rate value \\{0}\\'.
Recommended Action	Input a valid refresh rate for updating the management pack with the update monitoring component data.

E230A060

Error Message ID	E230A060
Error Message Text	Invalid input value for managementPack, managementPackMonitorName or wmiEventClass.
Explanation	Internet application error.
Recommended Action	Restart the Hitachi Connector service. If the error persists, contact the administrator for assistance.

E230A015

Error Message ID	E230A015
Error Message Text	Invalid storage performance data collection interval value \\{0}\\'. Please enter valid interval value between {1} to {2} seconds.
Explanation	
Recommended Action	Input a valid value for the storage performance data collection interval.

E230A012

Error Message ID	E230A012
Error Message Text	Please enter a valid value between 1 to 1440 minutes.
Explanation	Invalid refresh rate.
Recommended Action	Input a valid refresh rate for updating the management pack with the update monitoring component data.

E230A00D

Error Message ID	E230A00D
Error Message Text	Invalid Operation Manager host name '\{0}\'.
Explanation	Please enter a valid IP address or a host name between 1 to 63 characters\n-Alphanumeric characters and special symbols '-', '_', '!'. .
Recommended Action	Input a valid Operation Manager server name in the Hitachi MMC Snapin configuration application.

E230A002

Error Message ID	E230A002
Error Message Text	Invalid storage performance data collection interval value '\{0}\'.
Explanation	Please enter valid interval value between {1} to {2} seconds.
Recommended Action	Input a valid value for the storage performance data collection interval.

E230A022

Error Message ID	E230A022
Error Message Text	Invalid subsystem user id.
Explanation	Please enter valid user id between 1 to 255 characters - alphanumeric characters and special symbols ! # \$ % & ' * + - . / = ? @ ^ _ ` { } ~
Recommended Action	Input a valid user ID for the subsystem.

E230A023

Error Message ID	E230A023
Error Message Text	Invalid subsystem password.
Explanation	Please enter valid password between 6 to 255 characters - alphanumeric characters and special symbols ! \" # \$ % & ' () * + , - . / : ; < = > ? @ [\\] ^ _ ` { } ~
Recommended Action	Input a valid user password for the subsystem.

E230A027

Error Message ID	E230A027
Error Message Text	Please enter serial number in this format : xxxxx.
Explanation	Invalid VSP/USP-V subsystem serial number
Recommended Action	Input a valid serial number for the VSP subsystem.

E230A003

Error Message ID	E230A003
Error Message Text	ContinuousPerformanceDataCollectionDelayInSeconds value is missing in HiScomConnectorService.exe.config file.
Explanation	ContinuousPerformanceDataCollectionDelayInSeconds value is missing in HiScomConnectorService.exe.config file.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A010

Error Message ID	E230A010
Error Message Text	ManagementPackRefreshRate value is missing in HiScomConnectorService.exe.config file.
Explanation	ManagementPackRefreshRate value is missing in HiScomConnectorService.exe.config file.
Recommended Action	Open Hitachi MMC Snapin configuration application to verify the settings. Reinstall Hitachi SCOM MP if the error is not resolved. If the error persists, contact the administrator for assistance.

E230A02E

Error Message ID	E230A02E
Error Message Text	Hitachi Storage Management Pack {0} and the connector settings are successfully uninstalled from the Operation Manager running in '\\{1}'
Explanation	
Recommended Action	

I230A01F

Error Message ID	I230A01F
Error Message Text	There is no subsystem configuration.
Explanation	
Recommended Action	Use the Hitachi MMC Snapin configuration application to add subsystems to the Hitachi Connector configuration.

I230A006

Error Message ID	I230A006
Error Message Text	No subsystem is selected.
Explanation	
Recommended Action	Select the subsystem to remove by clicking on the subsystem item in the MMC Snapin window.

E230A04E

Error Message ID	E230A04E
Error Message Text	No subsystem is discovered.

Explanation	
Recommended Action	Use the Hitachi MMC Snapin configuration application to add subsystems to the Hitachi Connector configuration.

I230A009

Error Message ID	I230A009
Error Message Text	Hitachi Connector windows service is going to uninstall management pack {0} version {1}, then install management pack {0} version {2} to Operation Manager \'{3}\'.\n\n Do you want to continue?
Explanation	
Recommended Action	

I230A005

Error Message ID	I230A005
Error Message Text	Are you sure to remove Subsystem {0}?
Explanation	
Recommended Action	

I230A01A

Error Message ID	I230A01A
Error Message Text	Are you sure to uninstall Hitachi storage management pack and the connector settings from Operation Manager running in {0}?
Explanation	
Recommended Action	

I230A017

Error Message ID	I230A071
Error Message Text	Storage Performance Data Collection Service is started.
Explanation	
Recommended Action	

I230A072

Error Message ID	I230A072
Error Message Text	Storage Performance Data Collection Service is stopped.
Explanation	
Recommended Action	

I230A017

Error Message ID	I230A017
Error Message Text	Operation manager {0} is connected.

Explanation	
Recommended Action	

Calling the Hitachi Data Systems Support Center

If you need to call the Hitachi Data Systems Support Center, please provide as much information about the problem as possible, including:

- The circumstances surrounding the error or failure.
- The content of any error message(s) displayed in the window.

The Hitachi Data Systems customer support staff is available 24 hours/day, seven days a week. If you need technical support, please call:

- United States: (800) 446-0744
- Outside the United States: (858) 547-4526

Acronyms, Abbreviation, and Glossary

This chapter defines the special terms, acronyms, and abbreviations used in this document. Click the desired letter below to display the glossary entries that start with that letter.

#	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

A

Administrator Role

Using the configuration GUI with administrative access to the array.

AMS

Hitachi Adaptable Modular Storage

AMS1000

AMS1000 stands for the Adaptable Modular Storage 1000 series.

AMS2000 Family

AMS2000 Family stands for the Adaptable Modular Storage 2000 series.

C

CCI

Command control interface

CLPR

Cache logical partition

CM

Command device

CPU

Central Processing unit

CTL

Subsystem controller

CTL0

Controller 0

CTL1

Controller 1

CU

Control unit

CV

Custom-sized volume

Cyl

Cylinder

Controller

The component in a storage system that manages all storage functions. It is analogous to a computer and contains a processors, I/O devices, RAM, power supplies, cooling fans, and other sub-components as needed to support the operation of the storage system.

Controller IP Address (AMS series only)

An Internet Protocol (IP) address is a numerical label that is uniquely assigned to a controller of Hitachi subsystem.

Controller Port**COW**

Copy-on-write Snapshot

copy-on-write

Point-in-time snapshot copy of any data volume within a

storage system. Copy-on-write snapshots only store changed data blocks, therefore the amount of storage capacity required for each copy is substantially smaller than the source volume.

D

Data Services

Data services consist of data moving, data replication, data archiving and any other functions where data is involved.

Datastore

DKS

Disk controller

DMLU

Differential management logical unit

DNS

Domain name server

DiskShadow (Windows 2008 and later)

DiskShadow.exe is a tool that exposes the functionality offered by the Volume Shadow Copy Service (VSS).

Device Manager

By providing a single console for managing complex storage environments, Hitachi Device Manager software unifies and simplifies storage management and gives you full control of your storage. Featuring both an intuitive graphical user interface (GUI) and a complete command line interface (CLI), Device Manager allows you to centrally manage single or multiple Hitachi storage systems.

E

ESX Host

ESX Host(s) (xxx.xxx.xxx.xxx)

EMT64T

Extended Memory 64 Technology

EV

Enterprise Vault

F

FC

Fiber channel

FTP

File Transfer Protocol

H

Hi-Star

Hierarchical Star Network

Hitachi Content Platform (HCP)

An open highly scalable, intelligent archive that reserves and protects data.

Hitachi Dynamic Provisioning (HDP)

Advanced thin-provisioning software product that provides “Virtual Storage Capacity” to simplify administration and addition of storage, eliminate application service interruptions, and reduce costs.

HDP

Hitachi dynamic provisioning pool

HDP Pool

Consists of one or more dedicated RAID groups. Up to 50 DP pools in the AMS 2100, and 64 DP pools in the AMS2300/2500 are allowed. Each pool requires a unique pool ID.

HDP Optimization

An HDP pool can be optimized by rebalancing each HDP-VOL’s allocated pool capacity evenly across each of the RAID groups. This is particularly effective after adding a RAID group to the HDP pool.

HDP Pool Capacity

Amount of total capacity assigned to a given HDP pool.

HDP Pool Capacity Threshold

Initial warning levels of high pool utilizations upon early

(default 40%) and depletion (50%) conditions.

HDP Pool Consumed Capacity

Amount of pool capacity already consumed.

HDP RAID Group

One or more physical RAID Groups that belong to the same HDP pool.

HDP-VOL

A virtual LU that consumes and maps storage space for areas of the LU that have had data written to them. In HDP, it is required to associate the HDP-VOL with a HDP pool. The HDP-VOL needs to specify a HDP pool ID, HDP-VOL logical capacity, and HDP-VOL number. Many HDP-VOLs can be defined for on HDP pool. A given HDP-VOL cannot be defined to multiple DP pools.

HDvM

Hitachi HiCommand Device Manager

Hitachi Tiered Provisioning

New to VSP arrays, allows automated provisioning of HDP pools and volumes based on device performance characteristics.

Host Group

A group of hosts of the same operating system platform.

Host Group Number**Host Name****HTTP**

HyperText Transfer Protocol

HUS

Hitachi Unified Storage

I**IBM**

International Business Machines Corporation

IP

Internet Protocol

IP Address

An Internet Protocol (IP) address is a numerical label that is uniquely assigned to a device.

IETF

Internet Engineering Task Force

J

JRE

Java Runtime Environment

JVM

Java Virtual Machine

L

LDEV

Logical device

Logical Volume (LV)

LU

Logical unit (LU): A logical volume that is configured for use by open-systems hosts (for example, OPEN-V).

LUN

Logical unit number

LU Path

Logical unit (LU) path: The path between an open-systems host and a logical unit.

LU Size

Logical unit (LU) size: The size of the logical unit.

LVI

Logical volume image

M

Management

Management includes discovery, initialization, configuration, provisioning, health and performance monitoring, alarms and alerts, and other system management functions.

MP

Management pack

O

OS

Operating system

Over Provisioning Threshold

Threshold value for DP pool over-provision warning (default 100%) and limit (default 130%).

P

Parity Group

A parity group, also called an array group, is a group of hard disk drives (HDDs) that form the basic unit of storage for RAID subsystems. All HDDs in a parity group must have the same physical capacity.

PG

Parity group

Plug-in

A plug-in is a software application that acts as an interface between a data protection application (DPA), for example a Symantec NetBackup application and a Hitachi

P-Vol

Primary volume

Q

Quick Resynch

A resynchronizing operation wherein the pair status becomes *Paired Internally Synchronizing*.

Quick Split

Splitting a pair whose status is *Synchronizing* or *Paired Internally Synchronizing*.

R

RAID

Redundant array of inexpensive disks

RAID Group

A redundant array of inexpensive drives (RAID) that have the same capacity and are treated as one group for data storage and recovery. A RAID group contains both user data and parity information, which allows the user data to be accessed in the event that one or more of the drives within the RAID group are not available. The RAID level of a RAID group determines the number of data drives and parity drives and how the data is "striped" across the drives. For RAID1, user data is duplicated within the RAID group, so there is no parity data for RAID1 RAID groups.

A RAID group can also be called an array group or a parity group.

RAM

Random access memory

Raw Capacity

RCU

Remote control unit

RG

RAID group

RFC

Request for comment

Rijndel

A cryptography algorithm that comprises the advanced encryption standard that consists of three block cipher AES-128, AES-192 and AES-256.

RMI

Remote method invocation

S

SAN

Storage area network

SAS

Serial-attached SCSI

SATA

Serial Advanced Technology Attachment

SCSI

Small computer system interface

SI

ShadowImage in-system replication

SIM

Service information message

SMS

Hitachi Simple Modular Storage

SNMP

Simple Network Management Protocol

SN

Serial number

SNM2

Storage Navigator Modular 2 (for DF arrays only)

SPARC

Scalable processor architecture

SSL

Secure docket layer

Storage

Storage array or device

Storage includes both block and file storage and a form factor that scales from a single node appliance to large scalable multi-node configurations.

Storage Serial No.

Storage Type

S-VOL

Secondary volume

SVP

Service processor

T**TCP/IP**

Transmission Control Protocol/Internet Protocol

Total Capacity

The aggregate amount of storage space in a data storage system.

TransID**U****UDP**

User Datagram Protocol

URL

Uniform resource locator

USP

Universal Storage Platform

User Account

Uniquely identify a user for authentication and authorization to the subsystem. A user uses his user account to authenticate to the subsystem. The subsystem uses the user account to determine the access rights for the login user.

V**Vshadow (Windows 2003)**

A command-line tool that you can use to create and manage volume shadow copies.

VSP

Virtual Storage Platform

VSS Hardware Provider

A hardware-based provider service that intercepts and processes requests for creating point-in-time copies of data through the Microsoft Volume Shadow Copy Service (VSS).

VSS

Volume Shadow Copy Service

V-VOL

Virtual volume

VOL

Volume

Volume Group**W****WMS**

Hitachi Workgroup Modular Storage

WWN

A World Wide Name (WWN) is a unique identifier which identifies a particular Fibre Channel, Advanced Technology Attachment (ATA) or Serial Attached SCSI (SAS) target. Each WWN is an 8 byte number derived from an IEEE OUI and vendor-supplied information.

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