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Creating Encrypted DP Pools and Encrypted Volumes . . . . . . . . . A-126
Deleting Encrypted RAID Groups/DP Pools . . . . . . . . . . . . . . . . A-127

Glossary

Index
Welcome to the Hitachi Unified Storage Command Line Interface Reference Guide.

This document describes how to use the Hitachi Unified Storage command line interface software.

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
- Product version
- Document revision level
- Changes in this revision
- Document Organization
- Related documents
- Document conventions
- Convention for storage capacity values
- Accessing product documentation
- Getting help
- Comments
Intended audience

This document is intended for system administrators, Hitachi Data Systems representatives, and authorized service providers who install, configure, and operate Hitachi Unified Storage systems.

This document assumes the following:

- The user has a background in data processing and understands storage systems and their basic functions.
- The user has a background in data processing and understands Microsoft Windows and their basic functions.
- The user has a background in data processing and understands Web browsers and their basic functions.

Product version

This document applies to Hitachi Unified Storage firmware version 0980/A and to HSNM2 version 28.00 or later.

Document revision level

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK-91DF8276-00</td>
<td>March 2012</td>
<td>Initial release</td>
</tr>
<tr>
<td>MK-91DF8276-01</td>
<td>April 2012</td>
<td>Supersedes and replaces revision 00.</td>
</tr>
<tr>
<td>MK-91DF8276-02</td>
<td>May 2012</td>
<td>Supersedes and replaces revision 01.</td>
</tr>
<tr>
<td>MK-91DF8276-03</td>
<td>August 2012</td>
<td>Supersedes and replaces revision 02.</td>
</tr>
<tr>
<td>MK-91DF8276-04</td>
<td>October 2012</td>
<td>Supersedes and replaces revision 03.</td>
</tr>
<tr>
<td>MK-91DF8276-05</td>
<td>November 2012</td>
<td>Supersedes and replaces revision 04.</td>
</tr>
<tr>
<td>MK-91DF8276-06</td>
<td>January 2013</td>
<td>Supersedes and replaces revision 05.</td>
</tr>
<tr>
<td>MK-91DF8276-07</td>
<td>February 2013</td>
<td>Supersedes and replaces revision 06.</td>
</tr>
<tr>
<td>MK-91DF8276-08</td>
<td>May 2013</td>
<td>Supersedes and replaces revision 07.</td>
</tr>
<tr>
<td>MK-91DF8276-09</td>
<td>August 2013</td>
<td>Supersedes and replaces revision 08.</td>
</tr>
<tr>
<td>MK-91DF8276-10</td>
<td>October 2013</td>
<td>Supersedes and replaces revision 09.</td>
</tr>
<tr>
<td>MK-91DF8276-12</td>
<td>January 2014</td>
<td>Supersedes and replaces revision 11.</td>
</tr>
<tr>
<td>MK-91DF8276-13</td>
<td>March 2014</td>
<td>Supersedes and replaces revision 12.</td>
</tr>
<tr>
<td>MK-91DF8276-14</td>
<td>April 2014</td>
<td>Supersedes and replaces revision 13.</td>
</tr>
<tr>
<td>MK-91DF8276-16</td>
<td>December 2014</td>
<td>Supersedes and replaces revision 15.</td>
</tr>
</tbody>
</table>

Changes in this revision

- Under CLI installation caveats (page 2-2), new items:
  - performance issues resulting from configuring a storage system while it runs, and concurrently executing multiple settings.
- tables detail the maximum number of configuration operations the storage system can receive and error messages that result from exceeding the maximum.

- Under Table 3-1 (page 3-3), Table 3-2 (page 3-11), and Table 3-3 (page 3-13), new **auhostlogininfo** command detailed.

- New section, **Referencing the host login information** (page 3-171).

- Under **Windows server** (page 2-5), new host operating system versions for virtual operating systems.

- Under **Linux** (page 2-8), new Red Hat Enterprise Linux versions.

- Under both **Linux** (page 2-8) and **Solaris (SPARC and x86 32 Bits OS)** (page 2-12), new JRE versions.

### Document Organization

Thumbnail descriptions of the chapters are provided in the following table. Click the **chapter title** in the first column to go to that chapter. The first page of every chapter or appendix contains links to the contents.

<table>
<thead>
<tr>
<th>Chapter/Appendix Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chapter 1, Introduction</strong></td>
<td>Describes the general features, functions, and benefits of using Hitachi CLI.</td>
</tr>
<tr>
<td><strong>Chapter 2, Navigator 2 installation</strong></td>
<td>Describes the process of installing Navigator 2 so the CLI is active.</td>
</tr>
<tr>
<td><strong>Chapter 3, CLI command list</strong></td>
<td>Describes each command in the full Navigator 2 command set.</td>
</tr>
<tr>
<td><strong>Chapter 4, HDP CLI operations</strong></td>
<td>Describes CLI tasks of the Hitachi Dynamic Provisioning feature.</td>
</tr>
<tr>
<td><strong>Chapter 5, HDT CLI Operations</strong></td>
<td>Describes CLI tasks of the Hitachi Dynamic Tiering feature.</td>
</tr>
<tr>
<td><strong>Appendix A, CLI-based storage feature tasks</strong></td>
<td>Describes CLI-based storage feature tasks.</td>
</tr>
</tbody>
</table>

**HSNM2 also provides a graphical user interface that lets you perform operations by typing commands from a command line. For information about using the Dynamic Provisioning command line, refer to the **Hitachi Unified Storage Operations Guide**.**

### Related documents

This documentation set consists of the following documents.

**Hitachi Unified Storage Firmware Release Notes**, RN-91DF8304

Contains late-breaking information about the storage system firmware.

**Hitachi Storage Navigator Modular 2 Release Notes**, RN-91DF8305

Contains late-breaking information about the Navigator 2 software.
Read the release notes before installing and using this product. They may contain requirements and restrictions not fully described in this document, along with updates and corrections to this document.

**Hitachi Unified Storage Getting Started Guide**, MK-91DF8303

Describes how to get Hitachi Unified Storage systems up and running in the shortest period of time. For detailed installation and configuration information, refer to the Hitachi Unified Storage Hardware Installation and Configuration Guide.

**Hitachi Unified Storage Hardware Installation and Configuration Guide**, MK-91DF8273

Contains initial site planning and pre-installation information, along with step-by-step procedures for installing and configuring Hitachi Unified Storage systems.

**Hitachi Unified Storage Hardware Service Guide**, MK-91DF8302

Provides removal and replacement procedures for the components in Hitachi Unified Storage systems.

**Hitachi Unified Storage Operations Guide**, MK-91DF8275

Describes the following topics:
- Adopting virtualization with Hitachi Unified Storage systems
- Enforcing security with Account Authentication and Audit Logging.
- Creating DP-VOLs, standard VOLs, Host Groups, provisioning storage, and utilizing spares
- Tuning storage systems by monitoring performance and using cache partitioning
- Monitoring storage systems using email notifications and Hi-Track
- Using SNMP Agent and advanced functions such as data retention and power savings
- Using functions such as data migration, VOL Expansion and VOL Shrink, RAID Group expansion, DP pool expansion, and Mega VOLs

**Hitachi Unified Storage Replication User Guide**, MK-91DF8274

Describes how to use the four types of Hitachi replication software to meet your needs for data recovery:
- ShadowImage In-system Replication
- Copy-on-Write SnapShot
- TrueCopy Remote Replication
- TrueCopy Extended Distance

**Hitachi Unified Storage Command Control Interface Installation and Configuration Guide**, MK-91DF8306

Describes Command Control Interface installation, operation, and troubleshooting.
Hitachi Unified Storage Dynamic Provisioning Configuration Guide, MK-91DF8277

Describes how to use virtual storage capabilities to simplify storage additions and administration.

Hitachi Unified Storage Command Line Interface Reference Guide, MK-91DF8276

Describes how to perform management and replication activities from a command line.— this document

Document conventions

The following typographic conventions are used in this document.

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bold</td>
<td>Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click OK.</td>
</tr>
<tr>
<td>Italic</td>
<td>Indicates a variable, which is a placeholder for actual text provided by you or the system. Example: copy source-file target-file Angled brackets (&lt; &gt;) are also used to indicate variables.</td>
</tr>
<tr>
<td>screen or code</td>
<td>Indicates text that is displayed on screen or entered by you. Example: # pairdisplay -g oradba</td>
</tr>
<tr>
<td>&lt; &gt; angled brackets</td>
<td>Indicates a variable, which is a placeholder for actual text provided by you or the system. Example: # pairdisplay -g &lt;group&gt; Italic font is also used to indicate variables.</td>
</tr>
<tr>
<td>[ ] square brackets</td>
<td>Indicates optional values. Example: [ a</td>
</tr>
<tr>
<td>{ } braces</td>
<td>Indicates required or expected values. Example: { a</td>
</tr>
<tr>
<td></td>
<td>vertical bar</td>
</tr>
<tr>
<td>underline</td>
<td>Indicates the default value. Example: [ a</td>
</tr>
</tbody>
</table>

This document uses the following symbols to draw attention to important safety and operational information.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tip</td>
<td></td>
<td>Tips provide helpful information, guidelines, or suggestions for performing tasks more effectively.</td>
</tr>
<tr>
<td>Note</td>
<td></td>
<td>Notes emphasize or supplement important points of the main text.</td>
</tr>
</tbody>
</table>
The following abbreviations for Hitachi Program Products are used in this document.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ShadowImage</td>
<td>ShadowImage In-system Replication</td>
</tr>
<tr>
<td>SnapShot</td>
<td>Copy-on-Write SnapShot</td>
</tr>
</tbody>
</table>
| TrueCopy     | A term used when the following terms do not need to be distinguished:
  - True Copy
  - True Copy Extended Distance
  - True Copy remote replication |
| TCE          | TrueCopy Extended Distance |
| Volume Migration | Modular Volume Migration |
| Navigator 2  | Hitachi Storage Navigator Modular 2 |
| HSNM2        | Hitachi Storage Navigator Modular 2 |

**Convention for storage capacity values**

Physical storage capacity values (for example, disk drive capacity) are calculated based on the following values:

<table>
<thead>
<tr>
<th>Physical capacity unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 KB</td>
<td>1,000 bytes</td>
</tr>
<tr>
<td>1 MB</td>
<td>1,000 KB or 1,000² bytes</td>
</tr>
<tr>
<td>1 GB</td>
<td>1,000 MB or 1,000³ bytes</td>
</tr>
<tr>
<td>1 TB</td>
<td>1,000 GB or 1,000⁴ bytes</td>
</tr>
<tr>
<td>1 PB</td>
<td>1,000 TB or 1,000⁵ bytes</td>
</tr>
<tr>
<td>1 EB</td>
<td>1,000 PB or 1,000⁶ bytes</td>
</tr>
</tbody>
</table>

Logical storage capacity values (for example, logical device capacity) are calculated based on the following values:

<table>
<thead>
<tr>
<th>Logical capacity unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 block</td>
<td>512 bytes</td>
</tr>
<tr>
<td>1 KB</td>
<td>1,024 (2¹⁰) bytes</td>
</tr>
<tr>
<td>1 MB</td>
<td>1,024 KB or 1024² bytes</td>
</tr>
</tbody>
</table>
Accessing product documentation

The Hitachi Unified Storage user documentation is available on the HDS Support Portal: https://portal.hds.com. Please check this site for the most current documentation, including important updates that may have been made after the release of the product.

Getting help

The Hitachi Data Systems customer support staff is available 24 hours a day, seven days a week. If you need technical support, please log on to the HDS Support Portal for contact information: https://portal.hds.com

Comments

Please send your comments on this document: doc.comments@hds.com. Include the document title, number, and revision, and refer to specific sections and paragraphs whenever possible.

Thank you!
Introduction

This chapter provides information on the supported AMS 2000 Family and SMS 100 storage features available from Hitachi Storage Navigator Modular 2 Graphical User Interface (GUI) and covers the following topics:

- Overview of Storage Navigator Modular 2
- Features
- Software applications and HSNM2 features
Overview of Storage Navigator Modular 2

Storage Navigator Modular 2 is a multi-featured scalable storage management application that is used to configure and manage the storage functions on the Hitachi Simple Modular Storage 100 and other Hitachi arrays. Storage Navigator Modular 2 can be accessed by its graphical user interface (GUI) or by the command line interface (CLI) that this manual describes.

Storage Navigator Modular 2 has two operating modes:

- **Management Mode** contains the user-level storage management functions. This mode is intended only for maintenance technicians or qualified users.

- **Administration Mode** is used to manage user accounts and passwords on older AMS 200/500/1000 systems and not the current HUS systems. This operating mode is accessible only to users with administrator permissions.

Features

Table 1-1 describes the Storage Navigator Modular 2 features.

<table>
<thead>
<tr>
<th>Function Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component status display</td>
<td>Displays the status of a component. For example, a drive or a fan.</td>
</tr>
<tr>
<td>Property display</td>
<td>Displays the status of arrays. For example, a RAID or logical unit.</td>
</tr>
<tr>
<td>Create RAID Groups</td>
<td>Used to add a RAID group. You can set a new RAID group by specifying its disk number, RAID level, and group range for the RAID group to be created. Note that creating a RAID group on a Simple Modular Storage system invalidates your Hitachi warranty and support.</td>
</tr>
<tr>
<td>Delete RAID groups</td>
<td>Deletes a defined RAID group or a specified RAID group. User data is deleted. Deleting a RAID group on a Simple Modular Storage system invalidates your Hitachi warranty and support.</td>
</tr>
<tr>
<td>Create Logical Units</td>
<td>Used to add a logical unit. A new logical unit is added by specifying its capacity.</td>
</tr>
<tr>
<td>Delete Logical Units</td>
<td>Deletes the defined logical unit. User data is deleted.</td>
</tr>
<tr>
<td>Format Logical Units</td>
<td>Required to make a defined logical unit (LU) accessible by the host. Writes null data to the specified logical unit, and deletes user data.</td>
</tr>
<tr>
<td>Parity Correction</td>
<td>Restores the logical unit in which a parity error has occurred.</td>
</tr>
<tr>
<td>Volume Expansion</td>
<td>Unified volumes.</td>
</tr>
<tr>
<td>Setting up a Spare Disk drive</td>
<td>Sets up spare disk drives.</td>
</tr>
<tr>
<td>Function Name</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Differential Management LU                       | Sets up the differential management logical unit. This is only used for replication purposes.  
**Note:** Modifying the differential management logical unit on the Simple Modular Storage system invalidates your Hitachi warranty and support. |
| Command Device                                    | Sets up the command devices. This is only used for replication purposes.                                                                                                                                  |
| Setup and Display Optional Features               | Installs/uninstalls the priced optional features key and sets and displays the enable/disable condition.                                                                                                  |
| Setting the Boot Option                           | Sets up the boot option. The array must be restarted to implement the setting.                                                                                                                               |
| Setup and Display of the iSCSI Information        | Sets and displays IP addresses and security information, etc.                                                                                                                                                |
| System Parameters                                 | Sets up the system parameters.                                                                                                                                                                               |
| Port option                                       | Configures the options on each port used by the array.                                                                                                                                                       |
| Setting the Drive Restoration Option              | Sets automatic or non-automatic start for the following:  
Drive restoration mode  
Start of copy-back  
Start of correction copy  
Time interval restoring processing unit size  
Dynamic sparing mode  
**Note:** The default modes are set for best system performance. Hitachi recommends using other modes only when necessary. |
| On-line Verify Setting                            | Displays the status of the online verification setting (On/Off) and sets the interval. Note that this function can degrade performance when used.  
*Note that modifying the online verification information on the Simple Modular Storage system invalidates your Hitachi warranty and support.* |
| LAN Configuration Information Setting             | Sets the IP address, subnet mask, default gateway address, and the DHCP (Dynamic Host Configuration Protocol) mode.                                                                                         |
| Setup and Display of RTC (real-time clock)        | Sets and displays the date and time.                                                                                                                                                                         |
| Configuration information file output and its setup by use of a file. | Outputs system parameters and RAID group/logical unit configuration information to a file individually. Sets system parameters and RAID group/logical unit configuration information using a file. The array must be restarted to implement the settings. Deletes user data. |
| Microcode (firmware) updating                     | Downloads and updates the array microcode (firmware). You must reboot the array to implement the settings.                                                                                                  |
### Software applications and HSNM2 features

The following table lists the software and storage features that are already installed on the Simple Modular Storage system and is ready for use, and software that is installed but must be enabled with a license key. Contact HDS Technical Support to obtain licenses for the optional software. Some features described in this section may not be available with your product. Contact your sales representative if you have questions on the features your system supports.

#### Table 1-1: Storage Navigator Modular 2 features (Continued)

<table>
<thead>
<tr>
<th>Function Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command Operation Status Display</td>
<td>Outputs the command operation status during a certain period, or a specified period in the text file.</td>
</tr>
<tr>
<td>Report when a failure occurs and controller status display</td>
<td>Checks the array and displays the status. If an error is detected, it is logged and sent by e-mail. A specified application is also started.</td>
</tr>
</tbody>
</table>

#### Table 1-2: Software applications and storage features

<table>
<thead>
<tr>
<th>Functions</th>
<th>Type</th>
<th>Default State at startup</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Installed Software – Licensed and Ready to Use (first release)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audit Logging</td>
<td>Bundled</td>
<td>Disabled</td>
</tr>
<tr>
<td>Copy-on-write Snapshot (dual controller only)</td>
<td>Bundled</td>
<td>Disabled</td>
</tr>
<tr>
<td>LUN Manager</td>
<td>Bundled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Performance Monitor</td>
<td>Bundled</td>
<td>Disabled</td>
</tr>
<tr>
<td>SNMP Support Agent</td>
<td>Bundled</td>
<td>Disabled</td>
</tr>
<tr>
<td><strong>Optional Software – Requires License Key</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ShadowImage (dual controller only)</td>
<td>Optional</td>
<td>Disabled</td>
</tr>
<tr>
<td>TrueCopy Extended Distance (SimpleDR) (dual controller only)</td>
<td>Optional</td>
<td>Disabled</td>
</tr>
<tr>
<td><strong>Features Not Currently Supported on Simple Modular Storage System</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cache Partition Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cache Residency Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Retention Utility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modular Volume Migration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Saving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TrueCopy remote replication (Sync.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The following table lists the available functions for Storage Navigator Modular 2. The functions that are available are determined by whether you are in normal mode or management mode. Normal mode is the default, but you can change it in the startup window before you connect to the array. Except for error monitoring, do not operate Storage Navigator Modular 2 while you are online, or your connection may time out.

**NOTE:** Functions listed as “management mode” are intended only for maintenance technicians or qualified users.

**NOTE:** Some features described in this guide may either require an additional license purchase or may not be available for your system. Contact your sales representative to confirm the storage features that are available with the system version you purchased.

### Table 1-3: Storage Navigator Modular 2 Functions

<table>
<thead>
<tr>
<th>Category</th>
<th>Function Name</th>
<th>Description</th>
<th>Usability During Operations</th>
<th>Normal Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration display</td>
<td>Component status display</td>
<td>Displays the status of a component. For example, a drive or fan.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Property display</td>
<td>Displays the status of array system components. For example, RAIDs or logical units.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RAID group definition</td>
<td>RAID group creation</td>
<td>Used to add a RAID group. You can set a new RAID group by specifying its disk number, RAID level, and group range for the RAID group to be created.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>RAID group deletion</td>
<td>Deletes a defined RAID or a specified RAID group. User data is also deleted.</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Table 1-3: Storage Navigator Modular 2 Functions (Continued)

<table>
<thead>
<tr>
<th>Category</th>
<th>Function Name</th>
<th>Description</th>
<th>Usability During Operations</th>
<th>Normal Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume definition</td>
<td>Volume creation</td>
<td>Used to add a volume. A new volume is added by specifying its capacity.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Volume deletion</td>
<td>Deletes the defined volume. User data is also deleted.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Volume formatting</td>
<td>Required to make a defined volume accessible by the host. Writes null data to the specified volume, and deletes user data.</td>
<td>No /Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Parity correction</td>
<td>Restores the volume where the parity error occurred.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Setting the selection</td>
<td>Setting up spare disk drive</td>
<td>Sets up spare disk drives.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Differential management LU</td>
<td>Sets up the differential management logical unit.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Command device</td>
<td>Sets up the command devices.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Setup and display of the priced</td>
<td>Installs/uninstalls the priced optional features key and sets and displays the enable/disable condition.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>optional features</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Function Name</td>
<td>Description</td>
<td>Usability During Operations</td>
<td>Normal Mode</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Configuration setting</td>
<td>Setting the boot option</td>
<td>Sets up the boot option. The array must be restarted to implement the setting.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Setting and display of the fibre channel information</td>
<td>Sets and displays port addresses and security information, etc.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>System parameter</td>
<td>Sets up system parameters.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Port Option</td>
<td>Sets up port options.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Setting the drive restoration option</td>
<td>Use the default mode (unless it is necessary to use another mode) because you could affect performance. Sets automatic or non-automatic start for the following: Drive restoration mode Start of copy-back Start of correction copy Time interval restoring processing unit size Dynamic sparing mode</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>On-line verify setting</td>
<td>Determines whether the online verify setting is on or off, and sets the interval. Use caution, because performance could be affected.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>LAN configuration information setting</td>
<td>Sets the IP address, subnet mask, default gateway address, and the DHCP mode.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Setup and display of RTC</td>
<td>Sets and displays the date and time.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Configuration information file output and its setup by use of a file.</td>
<td>Outputs system parameters and RAID group/logical unit configuration information to a file individually. Sets system parameters and RAID group/logical unit configuration information using a file. The array must be restarted to implement the settings. Deletes user data.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Table 1-3: Storage Navigator Modular 2 Functions (Continued)**
<table>
<thead>
<tr>
<th>Category</th>
<th>Function Name</th>
<th>Description</th>
<th>Usability During Operations</th>
<th>Normal Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistical information display</td>
<td>Controller use information display</td>
<td>Displays previous statistical information by selecting a related item.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Performance</td>
<td>Command operation status display</td>
<td>Outputs the command operation status during a certain period or a specified period to the file in the text format.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Error monitoring</td>
<td>Report when a failure occurs and controller status displays</td>
<td>Polls the array and displays the status. If an error is detected, it is logged and sent by e-mail. A specified application is started.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Navigator 2 installation

This chapter provides information for installing Navigator 2 and the supported storage features available from Hitachi Storage Navigator Modular 2 on an HUS 100 series storage system. The chapter covers the following topics:

- Connecting Navigator 2 to the host
- System requirements
- IPv6 supported platforms
- Installing Storage Navigator Modular 2
- Updating Storage Navigator Modular 2
Connecting Navigator 2 to the host

You can connect Storage Navigator Modular 2 to a host through a LAN with or without a hub.

CLI installation caveats

Review the following installation caveats.

- Some Navigator 2 functions are not available while the array is online with a host.
- When a high I/O load exists, the function available while online might cause a command timeout to the host or a recovering fault in Navigator 2. For best results, execute these functions while offline.
- At least one volume must be configured in the array to make all of the Navigator 2 functions available. If a volume is not defined in the array, some functions cannot execute. Also, not that a volume is the same a logical unit. However, the command response messages displays as a logical unit or LU.
- Navigator 2 can control up to 4,096 array units. Configurations (setting of RAID groups, volumes, etc.) can only be done on one array unit at a time. Error Alert monitoring must be stopped to configure arrays.
- When the host enters the suspension status (low power mode) while Navigator 2 is running, the application might not operate correctly after the host is released from the suspension status.
- Navigator 2 may fail in the following cases:
  - The communication with the connected array fails because of controller blockage, array failure, a disconnected LAN connection, or the array unit receives a Reset/LIP from the host.
• Other applications are working concurrently and memory utilization or the CPU use rate is high.

If Navigator 2 fails, manually terminate it and check the array status and the LAN connection status. Then boot Navigator 2 again. Start Navigator 2 when you finish other applications.

• When Navigator 2 connects to the array via a LAN, it uses the TCP/IP port number 2000. The TCP/IP port number of the array is set to 2000 by default.

Table 2-1 lists restrictions for Navigator 2 if it is used in combination with other programs for one storage system:

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Concurrent Use Supported</th>
<th>Concurrent Use Not Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hitachi Storage Navigator Modular 2</td>
<td>• SNMP Function</td>
<td>• Navigator 2</td>
</tr>
<tr>
<td></td>
<td>• Disk Array with Built In Web Server Function</td>
<td>• Storage Navigator Modular for Web</td>
</tr>
<tr>
<td>Storage Navigator Modular for Web</td>
<td>• SNMP Function</td>
<td>• Navigator 2</td>
</tr>
<tr>
<td></td>
<td>• Disk Array Built In Web Server Function</td>
<td>• Storage navigator Modular for Web</td>
</tr>
<tr>
<td>SNMP Function</td>
<td>Navigator 2</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Storage Navigator Modular for Web</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>SNMP Function</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Disk Array Built In Web Server Function</td>
<td>N/A</td>
</tr>
</tbody>
</table>

You can have two concurrent instances of Navigator 2, provided that they are not connected to the same array. If one instance terminates forcibly, that may affect the other instance.

Additionally, if one Navigator 2 instance terminates forcibly while using two Navigator 2 products simultaneously, another Navigator 2 instance may terminate abnormally. If this occurs, operate the instance that has abnormally terminated again.

If you run a combination of programs in which concurrent use is not allowed, when a program with a usage restriction placed on it has started, run another program with that combination after terminating the running program.

To operate other features, refer to the chapters that cover them.

• When connecting the array with Navigator 2 over a LAN, the array may not be able to connect because a time-out of the data transfer occurs. This depends on the LAN environment. When Navigator 2 cannot be connected with the array, verify that the connection is correct using the ping command.
If a response to the `ping` command is normal, the LAN environment may affect the data transfer. The length of data to be transferred can be changed with the "lanconf.inf" file in the directory in which Navigator 2 is installed. The default setting is "32768." Change the setting to "16384" or "8192", in this order or to a multiple of 1024, and then retry. The new setting becomes effective from the next operation. A restart of Navigator 2 is not required. Operation of Navigator 2 may take some time, depending on the setting. If the connection cannot be made regardless of the setting change, review the LAN environment.

- If you execute the command during the firmware update or controller recovery, the LAN becomes unusable and the operation may fail. In this case, run it again after completing the update or controller maintenance.
- If an array failure is detected, contact Hitachi Customer Engineering.
- Do not use the reserved words prescribed for each OS and device names that indicate the input/output destinations as a filename when a file outputs. Windows includes "con," "pm," "aux," and others. Unix includes "/dev," and others. For example, when you specify the string "con" as an output name, an error message displays.
- When a command executes through utilization of a network with telnet, etc., a window may be closed by pressing the Enter key, depending on the alive time of the window. Set the alive time to be more than 10 minutes.
- When operating the command that indicates the Account Authentication’s function is valid, it terminates abnormally if it does not respond with the confirmation message within the session timeout limit (20 minutes) before executing the command. When the confirmation message displays, check the content and respond to that message. If it terminates abnormally by the session timeout limit, log in again and reissue the command.
- When connecting to Navigator 2 using IPv6 if the temporary address of IPv6 is set to the Enabled state in the installed computer and many temporary addresses are registered, the processing time becomes long. Check the temporary addresses and if many are set, disable them.
- The IPv6 multicast of the link local scope is used for the array search by the IPv6 address. When performing the array search, set up the array and the computer in which Navigator is installed in the same link.
- While executing the command, if you stop it by pressing Ctrl + C and then start immediately, an error may occur. After stopping the command by executing Ctrl + C, execute the command again in a few minutes.
- In the configuration of connecting a DBF to Unit#0, if you execute the following commands by using a Navigator version of less than V25.50, the string "CLI Program Error" displays and the program improperly terminates. Use a Navigator version of V25.50 or greater.
  - `audrive`
  - `auhdrump`
  - `aurgadd`
• aurgexp
• auspare
• auconstitute

While executing commands that perform setting or referencing operations, storage system performance for the host I/O may decrease. Also, if you execute multiple operations at the same time, performance may decrease more. Hitachi recommends executing five or less operations simultaneously. When using the 9500V, execute two or less.

• The setting/reference operations that one storage system can simultaneously receive from Navigator 2 can be up to specific thresholds. The following table details these values.

<table>
<thead>
<tr>
<th>Revisions of the Array Unit and the Firmware</th>
<th>Maximum Simultaneous Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUS 100 0980/A or later</td>
<td>50</td>
</tr>
<tr>
<td>HUS 100 Less than 0980/A</td>
<td>5</td>
</tr>
<tr>
<td>AMS 2000 08C5/A or later</td>
<td>50</td>
</tr>
<tr>
<td>AMS 2000 Less than 08C5/A</td>
<td>5</td>
</tr>
<tr>
<td>SMS All revisions</td>
<td>5</td>
</tr>
<tr>
<td>AMS/WMS All revisions</td>
<td>5</td>
</tr>
<tr>
<td>9500V All revisions</td>
<td>2</td>
</tr>
</tbody>
</table>

If you try to execute the maximum number of operations that can be received at once for one storage system, the following errors may occur:

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Error Code</th>
<th>Message Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMEA000006</td>
<td>0x00060000</td>
<td>Failed to connect with the subsystem. Confirm the subsystem status and the LAN environment, and then try again.</td>
</tr>
<tr>
<td>DMEA000007</td>
<td>0x00070000</td>
<td>An invalid response was received from the subsystem. Confirm the subsystem status and the LAN environment, and then try again.</td>
</tr>
<tr>
<td>DMEA000008</td>
<td>0x0001002</td>
<td>Failed to transfer data. Confirm the subsystem status and the LAN environment, and then try again.</td>
</tr>
</tbody>
</table>

**System requirements**

This section describes system requirements for your CLI environment.

**Windows server**

CPU: Pentium®
Memory: 256 MB minimum
Disk capacity: 2.0 GB minimum
Network adapter
Virtual memory: 128 MB

The following table shows the supported Windows.

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Service Pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows XP (x86)</td>
<td>SP2, SP3</td>
</tr>
<tr>
<td>Windows Server 2003 (x86)</td>
<td>SP1, SP2</td>
</tr>
<tr>
<td>Windows Server 2003 R2 (x86)</td>
<td>Non SP, SP2</td>
</tr>
<tr>
<td>Windows Server 2003 R2 (x65)</td>
<td>Non SP, SP2</td>
</tr>
<tr>
<td>Windows Vista (x86)</td>
<td>SP1</td>
</tr>
<tr>
<td>Windows Server 2008 (x86)</td>
<td>Non SP, SP2</td>
</tr>
<tr>
<td>Windows Server 2008 (x64)</td>
<td>Non SP, SP2</td>
</tr>
<tr>
<td>Windows 7 (x86)</td>
<td>Non SP, SP1</td>
</tr>
<tr>
<td>Windows 7 (x64)</td>
<td>Non SP, SP1</td>
</tr>
<tr>
<td>Windows Server 2008 R2 (x64)</td>
<td>Non SP, SP1</td>
</tr>
<tr>
<td>Windows Server 2012 (x64)</td>
<td>Non SP</td>
</tr>
<tr>
<td>Windows 8 (x86)</td>
<td>Without SP</td>
</tr>
<tr>
<td>Windows 8 (x64)</td>
<td>Without SP</td>
</tr>
</tbody>
</table>

The following table shows the supported host operating system. The guest operating system supported by the host operating system is the operating system supported by the host operating system and the server.

<table>
<thead>
<tr>
<th>Host Operating System</th>
<th>Guest Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMware ESX 3.0.x</td>
<td>Windows XP</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2003 R2</td>
</tr>
<tr>
<td>VMware ESXi 4.1</td>
<td>Windows Server 2008 SP2 (x64)</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2008 R2 (x64)</td>
</tr>
<tr>
<td>VMware EXSi 5.0</td>
<td>Windows Server 2008 R2 (SP1)(x64)</td>
</tr>
<tr>
<td>Windows Server 2008 R2 (x64) (Hyper-V2)</td>
<td>Windows Server 2008 R2 (x64)</td>
</tr>
<tr>
<td>Windows Server 2012 (x64) (Hyper-V3)</td>
<td>Windows Server 2012 (x64)</td>
</tr>
<tr>
<td>VMware 5.1 update1</td>
<td>Windows Server 2008 R2 (SP1)</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2012</td>
</tr>
<tr>
<td>VMware 5.5</td>
<td>Windows Server 2012</td>
</tr>
<tr>
<td>VMware 5.5 update 1</td>
<td>Windows Server 2012</td>
</tr>
<tr>
<td>VMware 5.5 update 2</td>
<td>Windows Server 2012</td>
</tr>
</tbody>
</table>

**Solaris™ (SPARC)**

Solaris 8, 9, 10
CPU: UltraSPARC or higher
Memory: 256 MB minimum
Virtual Memory: 128 MB or higher
Disk capacity: 110 MB maximum
Network adapter

**Solaris™ (x86, 32 Bits OS))**

Solaris 10
CPU Pentium
Memory: 256 MB minimum
Virtual Memory: 128 MB or higher
Disk capacity: product version 100 MB maximum
Network adapter

**HP-UX**

HP-UX 11.0, 11i, 11i v2.0, 11i v3.0
CPU: PA8000 or higher (HP-UX 11i v2.0 operates in Itanium® 2 environment)
Memory: 256 MB minimum
Disk capacity: 110 MB minimum
Network adapter

**AIX**

AIX 5.1, 5.2, 6.1, or 7.1
CPU: PowerPC/RS64 II or higher
Memory: 256 MB minimum
Disk capacity: 128 MB minimum
Network adapter
Premise program: IBM XL C/C++ Enterprise Edition V8.0 for AIX, Runtime Environment and Utilities. Moreover, the libc version must be the following or more.
AIX 5.1: bos.rte.libc 5.1.0.62 (APARIY58419)
AIX 5.2: box.rte.libc 5.2.0.41 (APARIY58421)
AIX 5.3: box.rte.libc 5.3.0.3 (APARIY59143)
Linux

- Red Hat Enterprise Linux 4 Update 1
- Red Hat Enterprise Linux 4 Update 5
- Red Hat Enterprise Linux 5.5 (excluding SELinux)
- Red Hat Enterprise Linux 5.5 (excluding SELinux)
- Red Hat Enterprise Linux 5.6, (x86, x64, excluding SELinux)
- Red Hat Enterprise Linux 6.1 (x86) (excluding SELinux)
- Red Hat Enterprise Linux 6.1 (x64) (excluding SELinux). Premise patch: glibc-2.12-1.25.el6.i686.rpm or its inheritor nss-softokn-freebl-3.12.9-3.el6.i686.rpm or its inheritor


- Red Hat Enterprise Linux 6.2 (x86) (excluding SELinux)
- Red Hat Enterprise Linux 6.2 (x64) (excluding SELinux). Premise patch: glibc-2.12-1.47.el6.i686.rpm or its inheritor nss-softokn-freebl-3.12.9-11.el6.i686.rpm or its inheritor. Not supported update from Red Hat Enterprise Linux AS 4.0 to update. Supported only x86 environment.


- Red Hat Enterprise Linux 6.3 (x86) (excluding SELinux)
- Red Hat Enterprise Linux 6.3 (x64) (excluding SELinux)


- Red Hat Enterprise Linux 6.4 (x86) (excluding SELinux)
- Red Hat Enterprise Linux 6.4 (x64) (excluding SELinux)


- Red Hat Enterprise Linux 7.0 (x64) (excluding SELinux)

| NOTE: | Premise patch: glibc-2.17-55.el7.i686.rpm or its inheritor, nss-softokn-freebl-3.15.4-2.e17.i686.rpm or its inheritor. |

- CPU: Pentium-II, III, IV (233 MHz or more is recommended)
- Memory: 256 MB
- Virtual memory: 128 MB
- Disk capacity: 120 MB
- Network adapter
Supported Linux versions for Virtual OS

The following table shows the supported Linux version for each version of a virtual operating system.

<table>
<thead>
<tr>
<th>Host Operating System</th>
<th>Guest Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMware EXSi 5.0 u1</td>
<td>Red Hat Enterprise Linux 5.5 (x64)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.5 (x86)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.8 (x64)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.8 (x86)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6.2 (x64)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6.2 (x86)</td>
</tr>
<tr>
<td>VMware ESXi 5.0 u2</td>
<td>Red Hat Enterprise Linux 5.5 (x64)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.5 (x86)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.8 (x64)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.8 (x86)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6.2 (x64)</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6.2 (x86)</td>
</tr>
<tr>
<td>VMware ESXi 5.1 u1</td>
<td>Red Hat Enterprise Linux 6.4 (x64)</td>
</tr>
</tbody>
</table>

Operating environments of the guest operating system are the same as normal operating environments.

LAN Connection

Connect one of the LAN cables to the LAN port of the controller #0 or controller #1 of the array.

Connect the other of the LAN cables to the LAN-HUB prepared by a customer or the LAN port of the host for controlling the array.

The LAN port supports the function (Auto MDI/MDX) to automatically distinguish the LAN cable type (straight or cross). Therefore, you can connect it with the straight cable when connecting to the LAN-HUB and directly connecting to the host for controlling the array.

Port Number of TCP/IP

When connecting the array and a LAN, Navigator 2 uses the normal port number of 2000 and uses the secure port number of 28355.
## IPv6 supported platforms

Table 2-2 shows the IPv6 supported platforms.

### Table 2-2: IPv6 Supported Platforms

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Operating System</th>
<th>Service Pack</th>
<th>IPv6 Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUN</td>
<td>Solaris 8 (SPARC)</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Solaris 9 (SPARC)</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Solaris 10 (SPARC)</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Solaris 10 (x86)</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Solaris 10 (x64)</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td>Microsoft</td>
<td>Windows Server 2003 (x86)</td>
<td>SP1</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2003 (x86)</td>
<td>SP2</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2003 R2 (x86)</td>
<td>Without SP, With SP2</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2003 R2 (x64)</td>
<td>Without SP</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Windows Vista (x86)</td>
<td>SP1</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2008 (x86)</td>
<td>SP1, SP2</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2008 (x64)</td>
<td>SP1, SP2</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2008 R2 (x64)</td>
<td>SP, With SP1</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2012 (x64)</td>
<td>Without SP</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Windows 7 (x86)</td>
<td>Without SP, With SP1</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Windows 7 (x64)</td>
<td>Without SP, With SP1</td>
<td>Supported</td>
</tr>
<tr>
<td>Red Hat</td>
<td>Red Hat Enterprise Linux 4.0 Update1</td>
<td>-</td>
<td>Address searching function is not supported on the server.</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 4.0 Update5</td>
<td>-</td>
<td>Address searching function is not supported on the server.</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.3</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.4</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.5</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.6</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.7 (x86)</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.7 (x64)</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.8 (x86)</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5.8 (x64)</td>
<td>-</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6.1 (x86)</td>
<td>-</td>
<td>Supported</td>
</tr>
</tbody>
</table>
### Table 2-2: IPv6 Supported Platforms

<table>
<thead>
<tr>
<th>Platform</th>
<th>Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat Enterprise Linux 6.1 (x64)</td>
<td>Supported</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6.2 (x86)</td>
<td>Supported</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux 6.2 (x64)</td>
<td>Supported</td>
</tr>
</tbody>
</table>
 Installing Storage Navigator Modular 2

This section provides instructions for installing Storage Navigator Modular 2 in Windows, Solaris, Red Hat Linux, HP-UX, AIX, IRIX and how to change the registration information on the array. After Storage Navigator Modular 2 registers the array, the registration information cannot be overridden.

To update Storage Navigator Modular 2, you must remove it and install a new version. When you install a new version of Storage Navigator Modular 2, you must specify the error monitoring options again.

When registering an array into Storage Navigator Modular 2, use the auunitadd command to specify the unit name. Specify only the unit name with this command.

 Windows

Run HSNM2-xxxx-W-CLI.exe in the hsnm_win directory of the DVD-R that was provided. By default, the files are installed in \Program Files\Storage Navigator Modular 2 CLI\.

Run startsnmen.bat. This is a Windows batch file used to start Storage Navigator Modular 2. The following environment parameters must be set correctly in startsnmen.bat:

  set STONAVM_HOME=.
  set LANG=en

Use the set command to verify the correct setting of the environment parameters on the workstation.

A prompt window appears and Storage Navigator Modular 2 commands can be executed from this window.

 **NOTE:** If you do not use the default path when executing commands, you must setup an environment variable for the path you are using. STONAVM_HOME points to the home directory of your installation so it can find the bin directory and the command files. Make sure this variable is set correctly in the startup file (startsnmen.bat). If you do not set the LANG variable in the startsnmen.bat file, then the CLI commands use English as the default language.

For example, if Storage Navigator Modular 2 has been installed in C:\Storage Navigator Modular 2 CLI:

  set STONAVM_HOME=C:\Storage Navigator Modular 2 CLI
  set LANG=en
  command.com

**Solaris (SPARC and x86 32 Bits OS)**

1. Start the SUN® server/workstation.
2. Create a new directory (e.g., /usr/stonavm).
3. Copy the HSNM2-xxxx-S-CLI.tar file (for SPARC) or the HSNM2-xxxx-S-P-CLI.tar file (for x86 32 bits OS) from the snm_sol_CLI directory in the DVD-R, to the directory created in the hard disk.

4. The HSNM2-xxxx-S-CLI.tar file is a Tar format file, and you must expand it (if the directory described below is present, create another directory).

For example:

\[ \text{tar xvf HSNM2-xxxx-S-CLI.tar} \]

When setting /usr/stonavm in the installation directory, the following file structure is developed.

\[
\begin{align*}
\text{/usr/stonavm/} & : \text{Command and message files of Storage Navigator Modular 2} \\
\text{/lib/} & : \text{Common library used when running Storage Navigator Modular 2}
\end{align*}
\]

5. Add a path in the common library with the LD_LIBRARY_PATH environment variable. For example, when setting DFHOME as the installation directory:

If the LD_LIBRARY_PATH environment variable is not defined (using C shell commands):

\[ \% \text{setenv } \text{LD_LIBRARY_PATH} \ $(\text{DFHOME})/\text{lib} \]

If the LD_LIBRARY_PATH environment variable is defined (using C shell commands):

\[ \% \text{setenv } \text{LD_LIBRARY_PATH} \ "\text{LD_LIBRARY_PATH}:$(\text{DFHOME})/\text{lib}" \]

6. In the STONAVM_HOME environment variable, set up a path to the directory where Storage Navigator Modular 2 is installed. For example, when setting DFHOME as the installation directory (using C shell commands):

\[ \% \text{setenv } \text{STONAVM_HOME} \ $(\text{DFHOME}) \]

7. Define statements 5 and 6 in the initial setting file (for C shell: .login) of the login shell.

8. Log in again.

**Red Hat Linux**

1. Create a new directory (e.g., /usr/stonavm).

2. Copy the HSNM2-xxxx-L-CLI.tar file from the snm_linux directory in the DVD-R, to the directory created in the hard disk.

3. The HSNM2-xxxx-L-CLI.tar file is a Tar format file, and you must expand it (if the directory described below is present, create another directory).

For example:

\[ \text{tar xvf HSNM2-xxxx-L-CLI.tar} \]

When setting /usr/stonavm as the installation directory, the following file structure is developed.
4. Add a path in the common library to the LD_LIBRARY_PATH environment variable.
   If the LD_LIBRARY_PATH environment variable is not defined (using C shell commands):
   ```
   % setenv LD_LIBRARY_PATH ${DFHOME}/lib
   ```
   If the LD_LIBRARY_PATH environment variable is defined (this example uses C shell commands):
   ```
   % setenv LD_LIBRARY_PATH $LD_LIBRARY_PATH:${DFHOME}/lib
   ```
5. In the STONAVM_HOME environment variable, set up a path to the directory where Storage Navigator Modular 2 is installed. For example, when setting DFHOME as the installation directory (using C shell commands):
   ```
   % setenv STONAVM_HOME ${DFHOME}
   ```
6. Define statements 4 and 5 in the initial setting file (for C shell: .login) of the login shell.
   Log in again.

### Setting Linux Kernel Parameters

When installing Hitachi Storage Navigator Modular 2 to Linux, you must set the Linux kernel parameters to required values. If you do not set the Linux kernel parameters, the HSNM2 installer terminates abnormally. When the application has already been installed and used in an environment that contains the Hitachi Storage Command Suite Common Component, you do not need to set the Linux kernel parameters.

To set the Linux kernel parameters:
1. Back up the existing kernel parameters setting files
   ```
   /etc/sysctl.conf
   /etc/security/limits.conf
   ```
2. Open the kernel parameters setting file (/etc/sysctl.conf) with a text editor and change the contents referring to the following conventions, requirements, and methods.
   - The parameters are specified using the syntax:
     ```
     [name_of_parameter]=[value]
     ```
   - Four values, each separated by a space are specified in the file kernel.sem.
   - The parameter must not exceed the maximum value that the operating system specifies.
   - You can check the value by issuing the following command:
     ```
     cat /proc/sys/kernel/shmmax
     ```
This command checks the values contained in the kernel.shmmax file.

- The following table details recommended values and calculation methods for each parameter.

**Table 2-3: Linux Kernel Recommended Values and Calculation Methods**

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Recommended Value</th>
<th>Calculation Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Navigator 2</td>
<td>Database</td>
</tr>
<tr>
<td>kernel.shmmax</td>
<td>11666432</td>
<td>2000000000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The maximum value in current and two recommended value.</td>
</tr>
<tr>
<td>kernel.shmall</td>
<td>26214400</td>
<td>26214400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The total value of the current value and the recommended value.</td>
</tr>
<tr>
<td>kernel.shmmaxi</td>
<td>0</td>
<td>2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The larger value in following:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The total value of the current and Navigator 2 recommended value.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The database recommended value.</td>
</tr>
<tr>
<td>kernel.threads-max</td>
<td>184</td>
<td>576</td>
</tr>
<tr>
<td>kernel.msgmni</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>kernel.sem(Second parameters)</td>
<td>80</td>
<td>7200</td>
</tr>
<tr>
<td>kernel.sem (Fourth parameters)</td>
<td>9</td>
<td>1024</td>
</tr>
<tr>
<td>fs.file-max</td>
<td>53898</td>
<td>53898</td>
</tr>
</tbody>
</table>

3. Using a standard text editor, open the kernel parameters setting file:

- For Red Hat Enterprise Linux 5.x and 6.x: /etc/security/limits.conf
- For Red Hat Enterprise Linux 5.x: the `nofile` and `nproc` parameters are in the limits.conf file. The `nproc` parameters are in the 90-nproc.conf file.

The parameters are specified using the following syntax:

```
[domain][type][parameter_name][value]
```

The domains are specified for “*”. The types are specified for both “soft” and “hard” values. The soft value must exceed the hard value. Then, the parameter must not exceed the maximum value the operating system specifies.
1. Start the HP server/workstation.
2. Create a new directory (e.g., /usr/stonavm).
3. Copy the HSNM2-xxxx-H-CLI.tar file from the snm_hpux directory in the DVD-R, to the directory created in the hard disk.
4. The HSNM2-xxxx-H-CLI.tar file is a Tar format file, and you must expand it (if the directory described below is present, create another directory). For example:
   ```
   tar xvf HSNM2-xxxx-H-CLI.tar
   ```
5. When setting /usr/stonavm as the installation directory, the following file structure is developed.
   ```
   /usr/stonavm/    : Command and message files of Storage Navigator Modular 2
   /lib/            : Common library used when running Storage Navigator Modular 2
   ```
6. Add a path in the common library to the SHLIB_PATH environment variable. For example, when setting DFHOME as the installation directory:
   - If the SHLIB_PATH environment variable is not defined (using C shell commands):
     ```
     % setenv  SHLIB_PATH  ${DFHOME}/lib
     ```
   - If the SHLIB_PATH environment variable is defined (using C shell commands):
     ```
     % setenv  SHLIB_PATH  $SHLIB_PATH:${DFHOME}/lib
     ```
7. In the STONAVM_HOME environment variable, set up a path to the directory where Storage Navigator Modular 2 is installed. For example, when setting DFHOME as the installation directory (using C shell commands):
   ```
   % setenv  STONAVM_HOME  $(DFHOME)
   ```
8. Define statements 5 and 6 in the initial setting file (for C shell: .login) of the login shell.
9. Log in again.

### HP-UX

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Recommended Value</th>
<th>Calculation Method</th>
</tr>
</thead>
</table>
| nofile        | 572 1344          | The larger value in the following:  
  - The total value of the current and Navigator 2 recommended values.  
  - The database recommended value. |
| nproc         | 165 512           |                    |

Parameter Name | Recommended Value | Calculation Method |
--- | --- | --- |
nofile | 572 1344 | The larger value in the following:  
  - The total value of the current and Navigator 2 recommended values.  
  - The database recommended value. |
| nproc | 165 512 |  

**AIX**

1. Start the IBM server/workstation.
2. Create a new directory (e.g., `/usr/stonavm`).
3. Copy the `HSNM2-xxxx-A-CLI.tar` file from the `snm_aix` directory in the DVD-R, to the directory created in the hard disk.
4. The `HSNM2-xxxx-A-CLI.tar` file is a Tar format file, and you must expand it (if the directory described below is present, create another directory). For example:

   ```bash
tar xvf HSNM2-xxxx-A-CLI.tar
```

   When setting `/usr/stonavm` as the installation directory, the following file structure is developed.

   ```
   /usr/stonavm/ : Command and message files of Storage Navigator Modular 2
   /lib/ : Common library used when running Storage Navigator Modular 2
   ```

5. Add a path in the common library to the LIBPATH environment variable. For example, when setting `DFHOME` as the installation directory:

   If the LIBPATH environment variable is not defined (using C shell commands):

   ```bash
   % setenv LIBPATH $(DFHOME)/lib
   ```

   If the LIBPATH environment variable is defined (using C shell commands):

   ```bash
   % setenv LIBPATH $LIBPATH:${DFHOME}/lib
   ```

6. In the `STONAVM_HOME` environment variable, set up a path to the directory where Storage Navigator Modular Storage Navigator Modular 2 is installed. For example, when setting `DFHOME` as the installation directory (using C shell commands):

   ```bash
   % setenv STONAVM_HOME ${DFHOME}
   ```

7. Define statements 5 and 6 in the initial setting file (for C shell: `.login`) of the login shell.

8. Log in again.

**IRIX**

1. Start the SGI server/workstation.
2. Create a new directory (e.g., `/usr/stonavm`).
3. Copy the `HSNM2-xxxx-I-CLI.tar` file from the `snm_irix` directory in the DVD-R, to the directory created in the hard disk.
4. The `HSNM2-xxxx-I-CLI.tar` file is a Tar format file, and you must expand it (if the directory described below is present, create another directory). For example:
When setting /usr/stonavm as the installation directory, the following file structure is developed.

```
/usr/stonavm/ : Command and message files of Storage Navigator Modular 2
/lib/       : Common library used when running Storage Navigator Modular 2
```

5. Add a path in the common library to the LD_LIBRARY_PATH environment variable.

If the LD_LIBRARY_PATH environment variable is not defined (using C shell commands):

```
% setenv LD_LIBRARY_PATH $DFHOME/lib
```

If the LD_LIBRARY_PATH environment variable is defined (using C shell commands):

```
% setenv LD_LIBRARY_PATH $LD_LIBRARY_PATH:$DFHOME/lib
```

6. In the STONAVM_HOME environment variable, set up a path to the directory where Storage Navigator Modular Storage Navigator Modular 2 is installed. For example, when setting DFHOME as the installation directory (using C shell commands):

```
% setenv STONAVM_HOME $DFHOME
```

Define statements 5 and 6 in the initial setting file (for C shell: .login) of the login shell.

7. Log in again.

**Updating Storage Navigator Modular 2**

This section provides instructions for updating Storage Navigator Modular on the following systems:

- Windows
- Solaris
- Red Hat Linux
- HP-UX
- AIX
- IRIX

**NOTE:** After updating Storage Navigator Modular Storage Navigator Modular 2, close it and then restart it.

**Windows**

Run HSNM2-xxxxx-W-CLI.exe in the snm_win_CLI directory of the DVD-R that was provided.
Solaris (SPARC and x86 32 Bits OS)

1. Copy the HSNM2-xxxx-S-CLI.tar file or the HSNM2-xxxx-S-P-CL.tar file (for x86 32 bits OS) from the snm_sol_CLI directory in the DVD-R, to the directory created in the hard disk.

2. The HSNM2-xxxx-S-CLI.tar file is a Tar format file, and you must expand it. For example:

   tar xvf HSNM2-xxxx-S-CLI.tar

Red Hat Linux

1. Copy the HSNM2-xxxx-L-CLI.tar file from the snm_linux_CLI directory in the DVD-R, to directory created in the hard disk.

2. The HSNM2-xxxx-L-CLI.tar file is a Tar format file, and you must expand it. For example:

   tar xvf HSNM2-xxxx-L-CLI.tar

HP-UX

1. Copy the HSNM2-xxxx-H-CLI.tar file from the snm_hpux_CLI directory in the DVD-R, to directory created in the hard disk.

2. The HSNM2-xxxx-H-CLI.tar file is a Tar format file, and you must expand it. For example:

   tar xvf HSNM2-xxxx-H-CLI.tar

AIX


2. Run the slibclean command. If you do not have root permission for this command, delete the library file libdau.a.

3. The HSNM2-xxxx-A-CLI.tar file is a Tar format file, and you must expand it. For example:

   tar xvf HSNM2-xxxx-A-CLI.tar

IRIX

1. Copy the HSNM2-xxxx-I-CLI.tar file from the snm_irix_CLI directory in the DVD-R, to directory created in the hard disk.

2. The HSNM2-xxxx-I-CLI.tar file is a Tar format file, and you must expand it. For example:

   tar xvf HSNM2-xxxx-I-CLI.tar

Uninstalling

This section provides instructions for uninstalling Storage Navigator ModularStorage Navigator Modular 2 on the following systems: Windows, Solaris, IRIX, HP-UX, AIX, and Red Hat Linux.
**Windows**

1. Delete the Storage Navigator Modular program using the Add and Delete Application icon in the Control Panel. Because the folders created by the installation are deleted, move the necessary files before uninstalling.

**Solaris, IRIX, HP-UX, AIX, and Red Hat Linux**

1. Delete the directory and all the files that were created in the hard disk for when Storage Navigator Modular was installed.
2. Delete the statement path to the common library, from the contents of the environment variable.
3. Delete the reference to the STONAVM_HOME environment variable.

**NOTE:** Functions listed as “management mode” are intended only for maintenance technicians or qualified users.
This chapter lists the supported CLI commands and covers the following topics:

- Overview
- Command format and command types
- Commands for registering an array
- Setting a password in administration mode
- Displaying array status
- RAID/volume commands
- System parameters
- Setting up configuration
- File output of configuration and configuration setting by file
- Host groups information
- Target information
- NNC parameters
- Monitoring errors
- Tuning parameters
- Miscellaneous commands
Overview

This chapter describes the Storage Navigator Modular 2 commands. All commands can be used as the standard commands.

When using an administration command, a password must be specified. This password is for the workstation where the commands are executed, and is stored in a password file on this workstation. The administration commands that require passwords have an O under the Password column, and are optional. The commands that can be used online have an O under the Online use column.

Additionally, when the optional Password Protection function is installed on the array, some commands require a user ID and password. The commands that require a login have an O under the Login column.

NOTE: Unless you are monitoring errors, do not work online, because your connection may time out.

CAUTION! The Storage Navigator Modular 2 CLI is intended for users who have significant storage management expertise and previous experience using a CLI to manage storage. Improper CLI use can damage the software installed on the Simple Modular Storage 100 (SMS) or Adaptable Modular Storage (AMS) systems and will void the Hitachi warranty and support. Do not create, delete or modify and RAID Group settings, and do not modify the existing Differential Management Logical Unit on the Simple Modular Storage 100 system. Please consult your reseller before using the CLI.
### Table 3-1: Storage Navigator 2 CLI commands

<table>
<thead>
<tr>
<th>Classification</th>
<th>Function</th>
<th>Command</th>
<th>Online Use</th>
<th>Password</th>
<th>Login</th>
</tr>
</thead>
<tbody>
<tr>
<td>Array registration</td>
<td>Displaying the Registration Information</td>
<td>auunitref</td>
<td>O</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Automatic Registering</td>
<td>auunitaddauto</td>
<td>O</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Registering</td>
<td>auunitadd</td>
<td>O</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Changing Registration</td>
<td>auunitchg</td>
<td>O</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deleting the Registration</td>
<td>auunitdel</td>
<td>O</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Setting a Password in</td>
<td>aupasswd</td>
<td>O</td>
<td>O</td>
<td>x</td>
</tr>
<tr>
<td>Array management by user ID</td>
<td>Administration Mode</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Password Protection Feature)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Setting user ID</td>
<td>auuidadd</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>Changing user ID</td>
<td>auuidchg</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>Deleting user ID</td>
<td>auuiddel</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>Changing password</td>
<td>aupwdchg</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>Logging into array unit</td>
<td>aulogin</td>
<td>O</td>
<td>O</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Logging out from array unit</td>
<td>aulogout</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>Checking login</td>
<td>auchkuid</td>
<td>O</td>
<td>x</td>
<td>O</td>
</tr>
</tbody>
</table>
Table 3-1: Storage Navigator 2 CLI commands (Continued)

<table>
<thead>
<tr>
<th>Classification</th>
<th>Function</th>
<th>Command</th>
<th>Online Use</th>
<th>Pass word</th>
<th>Login</th>
</tr>
</thead>
<tbody>
<tr>
<td>Array status</td>
<td>Displaying a Firmware Revision</td>
<td>aurev</td>
<td>O</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Displaying Drive Configuration Information</td>
<td>audrive</td>
<td>O</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>See section Displaying the cache configuration information on page 3-37 for an example of displayed output for the drive information of an array unit HUS 130. Example</td>
<td>aucache</td>
<td>O</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Displaying the Cache Configuration Information (See Note 2.)</td>
<td>ausupply</td>
<td>O</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>SAS (SFF) 10000rpm SEAGATE DKS5C-J600SS 5C00 6WN01SLP 0 1 600GB SAS(SFF) 10000rpm SEAGATE DKS5C-J600SS 5C00 6WN02TK4 : :</td>
<td>auparts</td>
<td>O</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Displaying the Status of Power Supply/Fan/Battery/Loop/ENC (See Note 2.)</td>
<td>aupartsopt</td>
<td>O</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Displaying the Status of Controller/Cache/Power Supply/Fan/Battery/Loop/ENC/NNC Parts (See Note 2.)</td>
<td>aucrlan</td>
<td>O</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Displaying the Information Messages</td>
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### Table 3-1: Storage Navigator 2 CLI commands (Continued)

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<th>Pass word</th>
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<td>Displaying command help</td>
<td>auman</td>
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</tbody>
</table>

**NOTE:** Changed settings do not become effective until the array is restarted. However, when connecting the AMS200/500/1000, SMS100, or, AMS2100/2300/2500 restarting is not required. The `auparts` command includes the function of the aucache and ausupply commands. The aucache and ausupply commands cannot be used by the 9580V, SMS100, AMS2100/2300/2500. Importing the boot options is not effective until the array is restarted. Some free-basis options do not function until the array is restarted. Set items do not become effective until the array unit is restarted. However, when connecting the 9500V, SMS100, AMS2100/2300/2500, restarting is not necessary.

If the reference (`-refer`) is specified by the option, the commands can be executed without logging in.

**Examples of output for selected commands**

This section contains output for selected commands. Output sections will be selectively added upon each new revision of HSNM2.

**Example of auiscsi output**

The following example displays the iSCSI port information by issuing the `auiscsi` command of an array unit hus110a1.

```
% auiscsi -unit hus110a1 -refer
Port 0A
  Port Number : 3260
  Keep Alive Timer[sec.]: 60
  MTU : 1500
  Transfer Rate : 1Gbps
  Link Status : Link Up
  Ether Address : 00:01:02:03:04:05
  IPv4
    IPv4 Address : 100.101.102.103
    IPv4 Subnet Mask : 255.255.255.0
```
Example of audrive output

The following example displays the drive information of an array unit HUS 130.

```bash
% audrive -unit hus130 -vendor
Unit No HDU Capacity Drive Type Rotational Speed Vendor ID Product ID Revision Serial No.
0 0 600GB SAS (SFF) 1000rpm Seagate DKS5C-J600SS 5C00 6WN01SLP
0 1 600GB SAS(SFF) 1000rpm SEAGATE DKS5C-J600SS 5C00 6WN02T4
```

The following table details all Storage Navigator Modular 2 commands by equipment type for all platforms (the 9500V, AMS/WMS, SMS, AMS 2000, and the HUS 100).

Example of auportop output

The following examples displays the port option of an array unit ams2300a1.

### Table 3-2: Storage Navigator Modular 2 commands per equipment type (all platforms)

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<thead>
<tr>
<th>Command</th>
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<th>SMS</th>
<th>AMS 2000</th>
<th>HUS 100</th>
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### Table 3-2: Storage Navigator Modular 2 commands per equipment type (all platforms)

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3-12 CLI command list

Hitachi Unified Storage Command Line Interface Reference Guide
Table 3-2: Storage Navigator Modular 2 commands per equipment type
(all platforms)

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<th>Command</th>
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<th>AMS/WMS</th>
<th>SMS</th>
<th>AMS 2000</th>
<th>HUS 100</th>
<th>Command</th>
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Table 3-2 contains a list of Storage Navigator Modular 2 commands per equipment type for all platforms.

Table 3-3: Master list of Storage Navigator Modular 2 commands for the HUS

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<td>-----------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>auparts</td>
<td>Displaying the Status of Controller/Cache/Power</td>
</tr>
<tr>
<td>auformat</td>
<td>Formatting the LU</td>
</tr>
<tr>
<td>auformatst</td>
<td>Displaying the Progress of LU Formatting</td>
</tr>
<tr>
<td>auquickfmtopt</td>
<td>Referencing/Setting the Quick Format Option</td>
</tr>
<tr>
<td>auluchgsize</td>
<td>Changing the LU Size</td>
</tr>
<tr>
<td>auludel</td>
<td>Deleting the LU</td>
</tr>
<tr>
<td>auinfomsg</td>
<td>Displaying the Information Messages</td>
</tr>
<tr>
<td>auunitinfo</td>
<td>Displaying the Equipment Information</td>
</tr>
<tr>
<td>aurgregf</td>
<td>Referencing a RAID Group</td>
</tr>
<tr>
<td>aurgadd</td>
<td>Setting Up a RAID Group</td>
</tr>
<tr>
<td>aupartsopt</td>
<td>Referencing the parts option.</td>
</tr>
<tr>
<td>aurgexp</td>
<td>Expanding a RAID Group</td>
</tr>
<tr>
<td>aurgdel</td>
<td>Deleting the RAID Group</td>
</tr>
<tr>
<td>auluref</td>
<td>Referencing an LU</td>
</tr>
<tr>
<td>auluadd</td>
<td>Setting Up an LU</td>
</tr>
<tr>
<td>aulucorrect</td>
<td>Referencing/Starting/Skipping/Canceling the Parity Correction Online</td>
</tr>
<tr>
<td>aumapguard</td>
<td>Referencing/Setting the Mapping Guard Information</td>
</tr>
<tr>
<td>aulucachept</td>
<td>Referencing/Setting LU Cache Partition</td>
</tr>
<tr>
<td>ausystemparam</td>
<td>Referencing/Setting System Parameters</td>
</tr>
<tr>
<td>aurtc</td>
<td>Referencing/Setting the RTC</td>
</tr>
<tr>
<td>auportop</td>
<td>Referencing/Setting the Port Option and Controller Identifier</td>
</tr>
<tr>
<td>aubootopt</td>
<td>Referencing/Setting the Boot Option</td>
</tr>
<tr>
<td>autimezone</td>
<td>Referencing/Setting Time Zone</td>
</tr>
<tr>
<td>aumaintelan</td>
<td>Referencing/Setting the IP Address of Maintenance Port</td>
</tr>
<tr>
<td>auonlan</td>
<td>Referencing/Setting LAN Information Online</td>
</tr>
<tr>
<td>aufibre1</td>
<td>Referencing/Setting the Fibre Channel Information</td>
</tr>
<tr>
<td>auspare</td>
<td>Referencing/Setting the Spare HDU</td>
</tr>
<tr>
<td>auopt</td>
<td>Referencing/Setting the Fee-Basis Option</td>
</tr>
<tr>
<td>audrecopt</td>
<td>Referencing/Setting the Drive Restoration Control</td>
</tr>
<tr>
<td><strong>Information</strong></td>
<td></td>
</tr>
<tr>
<td>auonlineverify</td>
<td>Referencing/Setting the Online Verify Information</td>
</tr>
<tr>
<td>Command</td>
<td>Function</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>aucmddev</td>
<td>Referencing/Setting the Command Device Information</td>
</tr>
<tr>
<td>aureboot</td>
<td>Rebooting</td>
</tr>
<tr>
<td>audmlu</td>
<td>Referencing/Setting the DM-LU Information</td>
</tr>
<tr>
<td>auriscsi</td>
<td>Referencing/Setting the iSCSI Port Information</td>
</tr>
<tr>
<td>ausns</td>
<td>Referencing/Setting the iSNS Information</td>
</tr>
<tr>
<td>auchapuser</td>
<td>Referencing/Setting the CHAP User Information</td>
</tr>
<tr>
<td>auping</td>
<td>Referencing/Sending Ping</td>
</tr>
<tr>
<td>auconstitute</td>
<td>Import/Export the System Constituent Information</td>
</tr>
<tr>
<td>aupowersave</td>
<td>Referencing the Power Saving Information/Spinning down/Spinning up</td>
</tr>
<tr>
<td>auadditionalunit</td>
<td>Referencing/Addition Start of Additional Unit</td>
</tr>
<tr>
<td>aulocatede</td>
<td>Referencing/Setting the LED Information</td>
</tr>
<tr>
<td>auemailalert</td>
<td>Referencing/Setting E-Mail Alert Information</td>
</tr>
<tr>
<td>aulanport</td>
<td>Referencing/Setting LAN Port Information</td>
</tr>
<tr>
<td>ausslopt</td>
<td>Setting the SSL Option</td>
</tr>
<tr>
<td>auloginfo</td>
<td>Referencing/Setting/Resetting the Log Information</td>
</tr>
<tr>
<td>auups</td>
<td>Referencing/Setting the UPS Information</td>
</tr>
<tr>
<td>auhostresp</td>
<td>Referencing/Setting the Host Response</td>
</tr>
<tr>
<td>ausdendurance</td>
<td>Referencing/Setting the SSD Endurance Information</td>
</tr>
<tr>
<td>auconfigreport</td>
<td>Outputting the RAID group/LU Information to File</td>
</tr>
<tr>
<td>aupartinterface</td>
<td>Adding/Removing the I/F Module/Interface Board</td>
</tr>
<tr>
<td>auhwwwn</td>
<td>Referencing/Setting Host Information</td>
</tr>
<tr>
<td>auhgopt</td>
<td>Referencing/Setting Host Group Options</td>
</tr>
<tr>
<td>auhmap</td>
<td>Referencing/Setting Mapping Information</td>
</tr>
<tr>
<td>auhgdef</td>
<td>Referencing/Registration/Changing/Deleting Host Group</td>
</tr>
<tr>
<td>autargetdef</td>
<td>Referencing/Setting iSCSI Target Information</td>
</tr>
<tr>
<td>autargetini</td>
<td>Referencing/Setting the Initiator Information</td>
</tr>
<tr>
<td>autargetopt</td>
<td>Referencing/Setting iSCSI Target Options</td>
</tr>
<tr>
<td>autargetmap</td>
<td>Referencing/Setting iSCSI Target Mapping Information</td>
</tr>
<tr>
<td>aumicro</td>
<td>Downloading/Updating Firmware</td>
</tr>
<tr>
<td>auperform</td>
<td>Outputting Performance Information File</td>
</tr>
<tr>
<td>aupfmstatiscfg</td>
<td>Referencing/Setting the Collection State of Performance Statistics Information</td>
</tr>
<tr>
<td>Command</td>
<td>Function</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Information</strong></td>
<td></td>
</tr>
<tr>
<td>auextprog</td>
<td>Setting the Starting of Application</td>
</tr>
<tr>
<td>auerroralert</td>
<td>Monitoring Errors</td>
</tr>
<tr>
<td>auerralertopt</td>
<td>Referencing/Setting the Monitoring Error Options</td>
</tr>
<tr>
<td>ausystuning</td>
<td>Referencing/Setting System Tuning Parameters</td>
</tr>
<tr>
<td>autuningmultistream</td>
<td>Referencing/Setting Multi Stream Tuning Parameters</td>
</tr>
<tr>
<td>autuningluown</td>
<td>Referencing/Setting LU Ownership Tuning Parameters</td>
</tr>
<tr>
<td>auman</td>
<td>Referencing the Manual of CLI Commands</td>
</tr>
<tr>
<td>auuidadd</td>
<td>Setting the User ID</td>
</tr>
<tr>
<td>auuidchg</td>
<td>Changing the User ID</td>
</tr>
<tr>
<td>auuiddel</td>
<td>Deleting the User ID</td>
</tr>
<tr>
<td>aupwdchg</td>
<td>Changing the Password</td>
</tr>
<tr>
<td>aulogin</td>
<td>Logging In and Forcibly Logging In to the Array Unit</td>
</tr>
<tr>
<td>aulogout</td>
<td>Logging Out from the Array Unit</td>
</tr>
<tr>
<td>auchkuid</td>
<td>Confirming the Login</td>
</tr>
<tr>
<td>ausnmp</td>
<td>Setting the SNMP Environment Information and Outputting Its File</td>
</tr>
<tr>
<td>aumluref</td>
<td>Referencing the Unified LU</td>
</tr>
<tr>
<td>aulumrg</td>
<td>Unifying LUs</td>
</tr>
<tr>
<td>aumludiv</td>
<td>Separating LU</td>
</tr>
<tr>
<td>aucachept</td>
<td>Referencing/Setting Cache Partition</td>
</tr>
<tr>
<td>auturbolu</td>
<td>Setting the Cache Residency LU</td>
</tr>
<tr>
<td>auluguard</td>
<td>Referencing/Setting the access level of LU and expiration lock</td>
</tr>
<tr>
<td>aureplicationvvol</td>
<td>Referencing/Setting SnapShot Logical Unit</td>
</tr>
<tr>
<td>aurmtxpath</td>
<td>Referencing/Setting the Remote Path Information</td>
</tr>
<tr>
<td>autruecycleopt</td>
<td>Referencing/Setting TrueCopy Option</td>
</tr>
<tr>
<td>aureplicationlocal</td>
<td>Local Pair Operation</td>
</tr>
<tr>
<td>aureplicationremote</td>
<td>Remote Pair Operation</td>
</tr>
<tr>
<td>aureplicationmon</td>
<td>Pair Status Monitoring</td>
</tr>
<tr>
<td>auauditlog</td>
<td>Referencing/Setting the Audit Log Information and Export/Initialize the Internal Log</td>
</tr>
<tr>
<td>aumvolmigration</td>
<td>Referencing/Setting the Reserve LU Information and Referencing/Creating/Changing/Canceling/Splitting the Volume Migration Pair</td>
</tr>
<tr>
<td>auaccount</td>
<td>Referencing/Setting the Account Information</td>
</tr>
</tbody>
</table>
Notes at the time of functional operation

The following sections describe aspects of operation with logical units.

Logical units formatting

Restrictions apply to the total size of logical units that can be formatted at the same time. If the possible formatting size is exceeded, the storage system firmware does not execute the formatting and error messages display. Also, if the logical units expand, the expanded logical unit size automatically formats and becomes the restriction target of the size that can be formatted at the same time.

The possible formatting size differs, depending on the storage system type. Format the total size of the logical units by the recommended batch formatting size or less as shown in the table below.

<table>
<thead>
<tr>
<th>AMS</th>
<th>Recommended Batch Formatting Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500</td>
<td>359 TB (449 GB x 800)</td>
</tr>
<tr>
<td></td>
<td>308 TB (193 GB x 1,600)</td>
</tr>
<tr>
<td></td>
<td>208 TB (65 GB x 3,200)</td>
</tr>
<tr>
<td>2300</td>
<td>287 TB (449 GB x 640)</td>
</tr>
<tr>
<td></td>
<td>247 TB (193 GB x 1,280)</td>
</tr>
<tr>
<td></td>
<td>166 TB (65 GB x 2,560)</td>
</tr>
<tr>
<td>2100</td>
<td>179 TB (449 GB x 400)</td>
</tr>
<tr>
<td></td>
<td>154 TB (193 GB x 800)</td>
</tr>
<tr>
<td></td>
<td>104 TB (65 GB x 1,600)</td>
</tr>
</tbody>
</table>

The formatting executes in the following three operations. However, it has no effect on the DP volumes using the Dynamic Provisioning function.
The restrictions of the possible formatting size become the size of totaling three operations. Perform it so that the total of each operation becomes the recommended batch formatting size or less.

When the above-mentioned operation executes and the restrictions of the possible formatting size are exceeded, the following messages display:

<table>
<thead>
<tr>
<th>Operation</th>
<th>Formatting Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical units creation (format is specified).</td>
<td>DMED100005: The quick format size is over maximum value. Please retry after that specified quick format size is decreased or that the current executed quick format is finished.</td>
</tr>
<tr>
<td>Logical units format</td>
<td>DMED0E0023: The quick format size is over maximum value. Please retry after that specified quick format size is decreased or the current executed quick format is finished.</td>
</tr>
<tr>
<td>Logical units expansion.</td>
<td>DMED0E0023: The quick format size is over maximum value. Please retry after that specified quick format size is decreased or the current executed quick format is finished.</td>
</tr>
</tbody>
</table>

### Logical units creation (format is specified)

If the logical units creation (format is specified) becomes an error, the logical units are created, but the formatting is not expected and the Status that displaying the `auluref` command executing becomes `Unformat`. After checking that the Status of logical units which are already executing the other formatting or expansion of the other logical units becomes Normal, execute only the formatting for the logical units which performed the creation of logical units.

### Logical units format

If the formatting of logical units becomes an error, the formatting is not executed and the Status that displays the `auluref` command executing is still kept as before the execution. After checking that the Status of logical units which are already executing the other formatting or expansion, the other logical units become Normal, execute the formatting again.

### Logical units expansion

If the expansion of logical units becomes an error, the expansion is not executed and the Status that displays the `auluref` command executing remains in the same state that it did before the execution.
After checking that the **Status** of logical units which are already executing the other formatting or expansion, and the other logical units go into a **Normal** state, execute the expansion again.

**Importing the constitute information**

When importing the constitute information (`auconstitute` command) of DP pools or logical units, even if the Full Capacity Mode is set to Enabled, it is created as if the Full Capacity Mode is in a Disabled state. Set the Full Capacity Mode to Enabled again after the DP pool with the relevant DP-VOLs has completed.

**Mapping Mode**

If you change the mapping mode from Enabled to Disabled, all the configured mapping information is initialized. If you want to set the mode to Enabled, set the mapping information again.

**Command specifications**

When changing the TCP/IP port number of the array unit when the SMS 100, AMS200/500/1000, WMS100, AMS 2100/2300/2500, array unit with the firmware version of 0726/E or later (9500V with firmware version x65B/H or later) is connected from a LAN, register the changed port number as **df-damp-snm port number/TCP** in the services file of the OS on which Storage Navigator Modular 2 is installed before starting Storage Navigator Modular. If it is not registered, the array unit may not be able to be connected to the LAN.

**Command format and command types**

The command format of Storage Navigator Modular is specified with a command name and succeeding options as shown below. When specifying multiple options, the order in which options are specified does not matter. In addition, options may be omitted depending the type of commands. The following example details Storage Navigator Modular 2 CLI command format.

```
Command Option1 Option2 Option3 ....
```

Storage Navigator Modular 2 commands are classified mainly into **standard** and **administrator** commands. The following describes specifications of each type of command. When operating the SMS100 or AMS2000 (DF800), the setting of the management commands is not required because all commands can be used as the standard commands.
Standard commands

The standard commands are used for displaying information. The following syntax example shows the Standard Command Format in instances of a normal termination.

% Command  Option1  Option2 Option3
Result
%

The following syntax example shows the Standard Command Format in instances where an error is detected.

% Command  Option1  Option2 Option3
Error message
%

Administration commands

The administration commands are used when operating the 9500V and AMS200/500/1000, WMS100 and setting up a configuration for the array. Taking into consideration the integrity and security of data, this command prompts you to enter a password and is executed if the password is authenticated. When the option -refer is specified (for example, in the command aufibre1), a password is not required.

Command Option1 Option2 Option3 .... Password: (Enter an already-set password) %5-4 an%Command Option1 Option2 Option3 .... Password: (Enter an already-set password) Are you executing? (y/n [n]) %d 5-5 show the formats for the administration command. When performing operations associated with data configurations, such as the deletion of a RAID or logical unit, these commands prompt you to confirm whether or not to execute the function after entering a password (se%Command Option1 Option2 Option3 .... Password: (Enter an already-set password) Are you executing? (y/n [n]) %e 5-5).

The following example shows format 1 of an administration command.

Command  Option1  Option2 Option3 .... Password: (Enter an already-set password)
%

The following example shows format 2 of an administration command.

%Command  Option1  Option2 Option3 .... Password: (Enter an already-set password)
Are you executing? (y/n [n])
%

Displaying command syntax

When you want to reference the syntax of a command, specify the -help option in the command. The Usage information appears, as shown in the example.
The descriptions that appear under Usage are the same as those described in the Format of each command. The following example displays command syntax command list.

% auunitadd -help
Hitachi Storage Navigator Modular 2
Version xx.xx
Copyright (C) 2005, 2011, Hitachi, Ltd.

Usage:
9500V, AMS, WMS, SMS, AMS2000, HUS

Single system
auunitadd [-unit unit_name] [-group group_name]
 [ -RS232C | -LAN ]
 -ctl0 device | address [-ignore ]
 [ -communicationtype nonsecure | secure | securepriority ]

Dual system
auunitadd [-unit unit_name] [-group group_name]
 [ -RS232C | -LAN ]
 [ -ctl0 device | address ] [-ctl1 device | address ]
 [ -ignore ]
 [ -communicationtype nonsecure | secure | securepriority ]

% 

To view the entire list of supported commands by storage system type, execute the auhelp.bat file.

**Command help**

When using the `auman` command, commentaries of each command described in this manual display.

The `auman` format is shown in the following example:

**Command name**

`auman` Referencing the CLI Commands

**Format**

9500V, AMS, WMS, SMS, AMS2000, HUS
auman [-en] [-jp] command_name

**Description**

This command references the CLI commands.
Options

-en | -jp

Specify the locale for displaying the manual.
-en: Displays the manual in English.
- jp: Displays the manual in Japanese.

command_name

Specify the command name that the manual will be displayed.

This is an example for the auunitref command help.

% auman --en auunitref
Copyright (C) 2005, 2011, Hitachi, Ltd.

Command name
auunitref  Displaying the Registration Information

Format
9500V, AMS, WMS, SMS, AMS2000, HUS
auunitref [ -unit unit_name ]

Description
This command displays the registration information of an array unit that
is registered in the Navigator.
Omitting the array unit name displays a list of information registered
in the Navigator.
Specifying an array unit name displays information about the specified
array unit.

Options
-unit unit_name
Specify the name of an array unit whose registration
information is to be referred.
Specify the name in less than or equal to 64 characters using
alphanumeric characters, special symbols "-(minus)",
"_ (underline)", ". (period)", "@", or " (space)".
Space in front and in the rear of the character string is
removed.

% To view the entire list of supported commands by storage system
type, execute the auhelp.bat file.

Setting the TCP/IP port number

This example is used for editing the services file in Windows 2000.
1. Set the port number between 1024 and 49151.

NOTE: When the TCP/IP port number is set out of a range of 1024 to
49151 and the number is already used in the management ports, it may be
forcibly changed to 1024 in some cases.
2. Add the port number to be used by Storage Navigator Modular 2. Refer to the following example, and then overwrite and save it. When adding the port number to the last line, start a new line.

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This file contains port numbers for well-known services defined by IANA
#
# Format:
#
# <service name>  <port number>/<protocol>  [aliases...]   [#<comment>]
#

echo                7/tcp
echo                7/udp

... knetd            2053/tcp                           #Kerberos de-multiplexor
man              9535/tcp                           #Remote Man Server
df-damp-snm      23456/tcp
```

### Commands for registering an array

This section covers the following commands related to registering arrays:

- Displaying the registration information on page 3-24
- Automatic registering on page 3-25
- Registering on page 3-27
- Changing registration information on page 3-30
- Deleting the registration information on page 3-32
Displaying the registration information

Command name

auunitref

Format

9500V, AMS, WMS, SMS, AMS2000, HUS
auunitref [-unit unit_name]

Description

This command displays the registration information of an array that is registered in Storage Navigator Modular 2. Omitting the array name displays a list of information registered in Storage Navigator Modular 2. Specifying an array name displays information about the specified array.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
</tbody>
</table>

This example displays all the registered information.

% auunitref

Name                                                             Group
Type    Construction Connection Type Error Monitoring Communication Type IP Ad
dress/Host Name/Device Name

sms100

SMS100  Dual         TCP/IP(LAN)     Enable           Non-secure         192.168.3.100
192.168.3.101

ams500

AMS500  Dual         TCP/IP(LAN)     Enable           Non-secure         192.168.3.102
AMS2300_85000045_IPv6
AMS2300 Single TCP/IP(LAN)     Enable           Non-secure fe80: 192.168.3.103
:020a:ef:ff67:6ee8 8

%
This example displays the registration information for a specified array.

```
% auunitref -unit sms100

Name                                                             Group
    Type    Construction Connection Type Error Monitoring Communication Type IP Ad
dress/Host Name/Device Name
sms100
SMS100  Dual         TCP/IP(LAN)     Enable           Non-secure         192.1
68.3.100 192.168.3.101
%
```

**Automatic registering**

**Command name**

```
auunitaddauto
```

**Format**

```
9500V, AMS, WMS, SMS, AMS2000, HUS
   When searching the disk array units of IPv4.
auunitaddauto -ip from_address to_address
           [-communicationtype nonSecure | secure | securepriority ]
SMS, AMS2000, HUS
   When searching the disk array units of IPv6.
auunitaddauto -ipv6
           [-communicationtype nonSecure | secure | securepriority ]
   When searching the disk array units of IPv4 and IPv6.
auunitaddauto -ip from_address to_address -ipv6
           [-communicationtype nonSecure | secure | securepriority ]
```

**Description**

This command searches for arrays connected via the TCP/IP, within the specified IP address, and registers the ones that are found. When the search is completed, select the arrays that you want to register by specifying their numbers from the list. When you specify more than one number, insert a space between the numbers. When you specify a range of numbers, insert a hyphen between the numbers. 4096 array units can be registered at maximum.

The name to be registered is given as the array model name_serial number (for example, if an SMS array model name is SMS100 and the serial number is 81010123, the name will be registered is SMS100_81010123.)

The name to be registered IPv6 address is given as “the unit model name_serial number”. (For example, when the unit type is AMS2300, the serial number is 85010123 and IPv6, the name to be registered is “AMS2300_85010123_IPv6”.)
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-ip from_address to_address</td>
<td>Specify an IPv4 address of the disk array unit to be searched.</td>
</tr>
<tr>
<td></td>
<td>• from_address: Start IPv4 address</td>
</tr>
<tr>
<td></td>
<td>• to_address : End IPv4 address</td>
</tr>
<tr>
<td></td>
<td>• Only an address of the fourth byte is effective.</td>
</tr>
<tr>
<td></td>
<td>• Specify addresses of the first to third bytes as the same ones as the beginning address.</td>
</tr>
<tr>
<td>-communicationtype</td>
<td>Specify the communication type.</td>
</tr>
<tr>
<td>nonsecure</td>
<td>secure</td>
</tr>
<tr>
<td>searches disk array units using secure port.</td>
<td></td>
</tr>
<tr>
<td>searches disk array units using secure port or non-secure port in secure port priority.</td>
<td></td>
</tr>
<tr>
<td>-ipv6</td>
<td>Search array unit of IPv6.</td>
</tr>
</tbody>
</table>

This example is for registered arrays whose IP addresses are between 192.168.1.1 and 192.168.1.255.

```
% auunitaddauto –ip 192.168.1.1 192.168.1.255
Searching... 192.168.1.255                        Detected Count : 2
The subsystem of the following was discovered.
No.  Name                   Type    Construction Serial No.   Communication Type
1  AMS500_75001000        AMS500  Dual         75001000     Non-secure
   IP Address(CTL0) : 192.168.1.250
   IP Address(CTL1) : 192.168.1.251
2  SMS100_81001000        SMS100  Single       81001000     Non-secure
   IP Address(CTL0) : 192.168.1.252
When you register the two or more numbers, partition the numbers, which are give n in the list, with the space(s). When you register all subsystems, input 'all'.
Input 'q', then break.
The number of the subsystem to register. (number/all/q [all]): 1 2
AMS500_75001000 has been registered.
SMS100_81001000 has been registered.
The subsystems have been registered successfully.
%
```

This example is for registered arrays whose IP addresses are IPv6.

```
% auunitaddauto –ipv6
Searching... (1/1) fe80::20a:e4ff:fe67:6ee8                  Detected Count : 1
The subsystem of the following was discovered.
No.  Name                  Type    Construction Serial No.   Communication Type
1  AMS500_85000045_IPv6  AMS500  Single       85000045     Non-secure
   IP Address(CTL0) : fe80::20a:e4ff:fe67:6ee8
   IP Address(CTL1) :
When you register the two or more numbers, partition the numbers, which are give n in the list, with the space(s). When you register all subsystems, input 'all'.
Input 'q', then break.
The number of the subsystem to register. (number/all/q [all]): 1
AMS500_85000045_IPv6 has been registered.
The subsystems have been registered successfully.
%
```
Registering

Command name

auunitadd

Format

9500V

Single system
auunitadd [-unit unit_name] [-group group_name]
-RS232C | -LAN
-ctl0 device | address [-ignore]

Dual system
auunitadd [-unit unit_name] [-group group_name]
-ctl0 device | address [-ctl1 device | address]
-ignore

AMS, WMS

Single system
auunitadd [-unit unit_name] [-group group_name]
-ctl0 address
-ignore

Dual system
auunitadd [-unit unit_name] [-group group_name]
-ctl0 address [-ctl1 address]
-ignore

SMS, AMS2000, HUS

Single system
auunitadd [-unit unit_name] [-group group_name]
-LAN
-ctl0 address [-ignore]
-communicationtype nonsecure | secure | securepriority

Dual system
auunitadd [-unit unit_name] [-group group_name]
-LAN
-ctl0 address [-ctl1 address]
-ignore
-communicationtype nonsecure | secure | securepriority
Description

This command registers an array with Storage Navigator Modular 2. 4096 array units can be registered at maximum. Registration information consists of an array name, a group name, a connection interface, and a communication type.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-group group_name</td>
<td>Specify the name of a group in which multiple array units are managed all together. If this option is omitted, array units are not managed in a group all together. The maximum number of groups registered is 200. Specify the name in less than or equal to 16 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, or &quot;_ (underline)&quot;.</td>
</tr>
<tr>
<td>-RS232C</td>
<td>-LAN</td>
</tr>
<tr>
<td>-ctl0 device</td>
<td>address</td>
</tr>
<tr>
<td>-ignore</td>
<td>An array unit is not monitored for errors. If omitted this option, an array unit registered is monitored for errors.</td>
</tr>
<tr>
<td>-communicationtype nonsecure</td>
<td>secure</td>
</tr>
<tr>
<td></td>
<td>nonsecure: Non-secure port</td>
</tr>
<tr>
<td></td>
<td>secure: Secure port</td>
</tr>
<tr>
<td></td>
<td>securepriority: Secure port</td>
</tr>
<tr>
<td></td>
<td>When the secure port can not be used, the non-secure port is used.</td>
</tr>
</tbody>
</table>

-
This example registers a SMS100 with a dual system configuration and a LAN connection interface with an array name of sms100a1.

% auunitadd -unit sms100a1 -LAN -ctl0 192.168.1.102 –ctl1 192.168.1.103  
Unit sms100a1 has been registered.

%  

This example registers an AMS2300 with an IPv6 configuration and a LAN connection interface with an array name of ams2300a1.

% auunitadd -unit ams2300a1 -LAN -ctl0 fe80::20a:e4ff:fe67:6ee8  
Unit ams2300a1 has been registered.

%
Changing registration information

Command name

auunitchg

Format

9500V
auunitchg -unit unit_name
 [ -newunit unit_name ] [ -group group_name ]
 [ -RS232C | -LAN ]
 [ -ctl0 device | address ] [ -ctl1 device | address ]
 [ -watch | -ignore ]
 [ -f ]

iMS, WMS
auunitchg -unit unit_name
 [ -newunit unit_name ] [ -group group_name ]
 [ -LAN ]
 [ -ctl0 address ] [ -ctl1 address ]
 [ -watch | -ignore ]
 [ -f ]

SMS, AMS2000, HUS
auunitchg -unit unit_name
 [ -newunit unit_name ] [ -group group_name ]
 [ -LAN ]
 [ -ctl0 address ] [ -ctl1 address ]
 [ -watch | -ignore ]
 [ -f ]

 [ -communicationtype nonsecure | secure ]
 [ -f ]

Description

This command changes the registration information (array name, group name, connection interface, and communication type) of a registered array. However, omitted items will not be changed.
## Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-newunit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-group group_name</td>
<td>Specify the group name to change. Specify the name in less than or equal to 16 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, or &quot;_ (underline)&quot;).</td>
</tr>
<tr>
<td>-RS232C</td>
<td>-LAN</td>
</tr>
<tr>
<td>ctl0 device</td>
<td>address</td>
</tr>
<tr>
<td>-ctl1 device</td>
<td>address</td>
</tr>
<tr>
<td>-watch</td>
<td>Specify that an array unit is monitored for errors.</td>
</tr>
<tr>
<td>-ignore</td>
<td>Specify that an array unit is not monitored for errors.</td>
</tr>
<tr>
<td>-communicationtype</td>
<td>Specify the communication type. If omitted this option, non-secure port is used.</td>
</tr>
<tr>
<td>nonsecure</td>
<td>secure</td>
</tr>
<tr>
<td>-f</td>
<td>The confirmation message at command execution is omitted.</td>
</tr>
</tbody>
</table>

## Examples

The following example shows the procedure for changing registration information. The user executes the reference command to display the registration information of an array sms100a1, then executes the auunitchg command to change the information. After changing the information, the user executes the reference command again to check whether the changes have been made.

```
% auunitref -unit sms100a1
Name                  Group
Type                  Construction Connection Type Error Monitoring Communication Type IP Ad
```
If a specified array is not yet registered, the following message is displayed.

% auunitchg -unit 9500b1
DMEA001003: The specified subsystem name is not registered.
%

Deleting the registration information

Command name

auunitdel

Format

9500V, AMS, WMS, SMS, AMS2000
auunitdel -unit unit_name ... [ -f ]

Description

This command deletes the registration information of a registered array.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;&quot;, @&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
</tbody>
</table>

Single specification | Specifying a single array unit name. Example: -unit ams2000a1
Multiple specification | Specifying multiple array unit names. Example: -unit ams2000a1 ams2000
-f | The confirmation message at command execution is omitted.

Examples

The following example deletes registration information of registered array 9500a1.

```
% auunitdel -unit 9500a1
Are you sure you want to delete the specified subsystem? [y/n [n]]: y
The 9500a1 has been deleted.
```

The following example checks the information registered about an array that has been deleted.

```
% auunitdel -unit 9500a1
DMEA001003: The specified subsystem name is not registered.
%```
Displaying array status

This section covers the following commands related to array status:

- Displaying a firmware revision on page 3-35
- Displaying drive configuration information on page 3-35
- Displaying the cache configuration information on page 3-37
- Displaying the status of power supply/fan/battery/loop/ENC on page 3-39
- Displaying the status of component parts on page 3-40
- Referencing the parts options on page 3-47
- Displaying the current IP address on page 3-48
- Displaying the information messages on page 3-49
- Referencing/setting the equipment ID or controller ID on page 3-50
- Displaying the equipment information on page 3-51
Displaying a firmware revision

Command name

aurev

Format

9500V  
aurev  -unit unit_name

Description

This command displays the firmware revision of a specified unit.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
</tbody>
</table>

Example

The following example displays the firmware revision of an array 9500a1.

```
% aurev -unit 9500a1
Serial Number : nnnnnnnn
Firmware Revision : 0650nn (CTL0) 0650nn (CTL1)
%
```

Displaying drive configuration information

Command name

audrive

Format

9500V, AMS, WMS, SMS, AMS2000, HUS  
audrive  -unit unit_name -status [ -uno unit_no -hno hdu_no ]  
audrive  -unit unit_name -vender

Description

This command displays the status and type of drives in a specified array.

If a hard disk on which data restoration is in progress is specified, the process of restoring is displayed.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-status</td>
<td>-vendor</td>
</tr>
<tr>
<td>-uno unit_no</td>
<td>Specify the unit number of the top drive in a RAID group.</td>
</tr>
<tr>
<td>-hno hdu_no</td>
<td>Displays the operating status of the drive at a specified position</td>
</tr>
</tbody>
</table>

Examples

The following example displays the status of drives in an array 9500a1.

```
% audrive -unit 9500a1 -status Unit No. HDU No. Type Physics Status
0    0  Data    Mounted  Normal
0    1  Data    Mounted  Normal
.
0    13 Spare  Mounted  Standby
1    0  Undefined  Mounted  Out of RG
1    1  Undefined  Mounted  Out of RG
.
1    14  Undefined  Mounted  Out of RG
.
%
```

The following example displays the drive information of an array 9500a1.

```
% audrive -unit 9500a1 -vendor Unit No. HDU No. Vendor  Product  Revision  Capacity  Serial No. Type
0    0  HITACHI  DK32DJ-2FC  K5K5  72GB  30xxxxxx FC
0    1  HITACHI  DK32DJ-2FC  K5K5  72GB  30xxxxxx FC
.
0    13 HITACHI  DK32DJ-2FC  K5K5  72GB  30xxxxxx FC:
1    0  HITACHI  HDS722525VLSA80  xxxx  250GB  C6Cxxxxxx SATA
1    1  HITACHI  HDS722525VLSA80  xxxx  250GB  C6Cxxxxxx SATA
.
%
```
The following example displays the drive information of an array ams500a1.

% audrive  -unit ams500a1  -vendor
Unit HDU Capacity Drive Type Vendor ID Product ID Revision Serial No.
0  0  146GB  FC  SEAGATE DKS2C-J146FC  4Cxx  3Hyxxxxx
0  1  146GB  FC  SEAGATE DKS2C-J146FC  4Cxx  3Hyxxxxx
::
1  0  HITACHI HDS722525VLSA80 xxxx  250GB  A60A  C6Cxxxxxx SATA
1  1  HITACHI HDS722525VLSA80 xxxx  250GB  A60A  C6Cxxxxxx SATA
%

The following example displays the drive information of an array sms100a1.

% audrive  -unit sms100a1  -vendor
Unit HDU Capacity Drive Type Rotational Speed Vendor ID Product ID Revision Serial No.
0  0  146GB  SAS 15000rpm HITACHI HUS151414VL S300 4444 HGST140A
0  1  146GB  SAS 15000rpm HITACHI HUS151414VL S300 4444 HGST140B
::
%

The following example displays the drive information of an array unit HUS 130.

% audrive  -unit hus130 -vendor
Unit HDU Capacity Drive Type Rotational Speed Vendor ID Product ID Revision Serial No.
0  0  600GB SAS(SFF) 10000rpm SEAGATE DKS5C-J600SS 5C00 6WN01SLP
0  1  600GB SAS(SFF) 10000rpm SEAGATE DKS5C-J600SS 5C00 6WN02TK4
::
%

Displaying the cache configuration information

Command name

aucache

Format

9500V
aucache -unit unit_name

Description

This command displays the status and the capacity of cache memory.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, “_ (underline)”, “. (period)”, “@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
</tbody>
</table>

Example

The following example displays the cache memory configuration information of an array 9500a1:

```
% aucache -unit 9500a1
CTL   Slot   Status      Size(MB)
0      0   Normal           512
0      1   Normal           512
1      0   Normal           512
1      1   Normal           512
%
```
Displaying the status of power supply/fan/battery/loop/ENC

Command name

ausupply

Format

9500V
ausupply -unit unit_name

Description

This command displays the status of AC power supplies, fans, batteries, battery backup circuits, loop, and ENC. Please use the auparts command, when you display the status of Power Supply/Fan/Battery/Loop/ENC to 9500V(9580V)/AMS/WMS/AMS2000/HUS.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
</tbody>
</table>

Example

This example displays the status of power supplies, batteries, fans, backup circuits, loop, and ENC of an array 9500a1.

```bash
% ausupply -unit 9500a1
AC PS Information
  Unit  AC   Status
  0  0    Normal
  0  1    Normal
  ...
  13  1    Nothing

FAN Information
  Unit  FAN  Status
  0  0    Normal
  0  1    Normal
  ...
  13  1    Nothing

Battery Information
  No.    Status
  0      Normal

Battery Backup Information
  No.    Status
  0      Normal
  1      Normal

Loop Information
  Path  Loop  Status
  0  0    Normal
  ...
  1  1    Normal
```
Displaying the status of component parts

Command name

auparts

Format

9500V, AMS, WMS, SMS, AMS2000

auparts -unit unit_name

Description

This command displays the status of the controller, cache, AC power supplies, fans, batteries, battery backup circuits, loop, ENC, interface board, host connectors, and unit type. When NNC is connected, the status of the NNC components (NNC, NNC Base, DIMM, PS, fan, Extension Slot and host connector) are also displayed.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)”, &quot;_ (underline)”, &quot;. (period)”, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
</tbody>
</table>

Examples

This example displays the status of individual parts of an array unit hus150, which installs a DC power supply.

% auparts -unit hus150
Controller
CTL Status
0 Normal
1 Normal
Cache
CTL Slot Capacity(MB) Status
0 0 1024 Normal
0 1 --- Detached
1 1 8192 Normal
I/F Module
CTL Slot Type Status
0 A Management Module(LAN) Normal
0 B Management Module(UPS+Remote) Normal
0 C I/O Module(Drive) Normal
This example displays the status of controller, cache, AC power supplies, fans, batteries, battery backup circuits, loop, and ENC of a 9500h array.

% auparts -unit 9500h
Controller Information
  CTL Status
    0 Normal
    1 Normal

Cache Information
  CTL Slot Status Size(MB)
    0 0 Normal 1024
AC PS Information
Unit AC Status
CTU 0 Normal
CTU 1 Normal
0 0 Normal
0 1 Normal

FAN Information
Unit FAN Status
CTU 0 Normal
CTU 1 Normal
0 0 Normal
0 1 Normal

Battery Information
No. Status
0 Normal
1 Normal

Battery Backup Information
No. Status
0 Normal
1 Normal

Loop Information
Path Loop Status
0 0 Normal
0 1 Normal

ENC Information
Unit ENC Type Status
0 0 SENC Normal
0 1 SENC Normal

Unit Information
Unit Type
0 FC
1 AT

% This example displays the status of controller, cache, AC power supplies, fans, batteries, battery backup circuits, loop, ENC, and NNC type1 components of an array ams500 individually.

% auparts -unit ams500
Controller
CTL Status
0 Normal
1 Normal

Cache
CTL Slot Capacity(MB) Status
0 0 1024 Normal
0 1 --- Nothing
1 0 1024 Normal
1 1 --- Nothing

Battery Backup
CTL Status
0 Normal
1 Normal

Battery
Battery Status
0 Normal
1 Normal

Fan
Unit Fan Status
0 0 Normal
0 1 Normal

AC
This example displays the status of controller, cache, AC power supplies, fans, batteries, battery backup circuits, loop, ENC, and NNC type2 components of an array ams500m.

% auparts -unit ams500m

Controller
CTL Status
0 Normal
1 Normal

Cache
CTL Slot Capacity(MB) Status
0 0 1024 Normal
0 1 --- Nothing
1 0 1024 Normal
1 1 --- Nothing

Battery Backup
CTL Status
0 Normal
1 Normal

Battery
Battery Status
0 Normal
1 Normal

Fan
Unit Fan Status
0 0 Normal
0 1 Normal
### AC

<table>
<thead>
<tr>
<th>Unit</th>
<th>AC</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Normal</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>Normal</td>
</tr>
</tbody>
</table>

### ENC

<table>
<thead>
<tr>
<th>Unit</th>
<th>ENC</th>
<th>Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop</td>
<td>Loop</td>
<td>Status</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Normal</td>
<td></td>
</tr>
</tbody>
</table>

### NNC

<table>
<thead>
<tr>
<th>NNC</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>Normal</td>
</tr>
</tbody>
</table>

### NNC0

<table>
<thead>
<tr>
<th>Status</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>NNC Base</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIMM</td>
<td></td>
</tr>
<tr>
<td>A0</td>
<td>Normal</td>
</tr>
<tr>
<td>B0</td>
<td>Normal</td>
</tr>
<tr>
<td>C0</td>
<td>Normal</td>
</tr>
<tr>
<td>D0</td>
<td>Normal</td>
</tr>
<tr>
<td>PS</td>
<td>Normal</td>
</tr>
<tr>
<td>0</td>
<td>Normal</td>
</tr>
<tr>
<td>1</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>Normal</td>
</tr>
</tbody>
</table>

### Fan

| 0 | Normal |
| 1 | Normal |
| 2 | Normal |

### Extension Slot

3 | Normal |

### NNC2

<table>
<thead>
<tr>
<th>Status</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>NNC Base</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIMM</td>
<td></td>
</tr>
<tr>
<td>A0</td>
<td>Normal</td>
</tr>
<tr>
<td>B0</td>
<td>Normal</td>
</tr>
<tr>
<td>C0</td>
<td>Normal</td>
</tr>
<tr>
<td>D0</td>
<td>Normal</td>
</tr>
<tr>
<td>PS</td>
<td>Normal</td>
</tr>
<tr>
<td>0</td>
<td>Normal</td>
</tr>
<tr>
<td>1</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>Normal</td>
</tr>
</tbody>
</table>

### Extension Slot

3 | Normal |

### Extension Card

<table>
<thead>
<tr>
<th>Status</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>NNC</th>
<th>Extension Slot</th>
<th>Extension Card</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>PCI-Express Card</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>PCI-Express Card</td>
<td>Normal</td>
</tr>
</tbody>
</table>

This example displays the status of an array sms100.

```% auparts -unit sms100
Original Array
Status : Warning
Repair Slot 1 : Empty
Repair Slot 2 : Empty
%```
This example displays the status of an array ams2300m.

% auparts -unit ams2300m

### Controller
- CTL Status
  - 0 Normal
  - 1 Normal

### Cache
- CTL Slot Capacity(MB) Status
  - 0 0 2048 Normal
  - 0 1 2048 Normal
  - 1 0 2048 Normal
  - 1 1 2048 Normal

### Interface Board
- CTL Interface Board Type Status
  - 0 0 Fibre Channel Normal
  - 1 0 Fibre Channel Normal

### Battery
- Battery Status
  - 0 Normal

### Additional Battery
- Battery Status

### Host Connector
- Port Status
  - 0A Normal
  - 0B Normal
  - 0C Normal
  - 0A Normal
  - 1A Normal
  - 1B Normal
  - 1C Normal
  - 1D Normal

### Fan
- Unit Fan Status

### AC
- Unit AC Status
  - 0 0 Normal
  - 0 1 Normal
  - 1 0 Normal
  - 1 1 Normal

### ENC
- Unit ENC Type Status
  - 1 0 ENC Normal
  - 1 1 ENC Normal

### Unit
- Unit Type Serial Number
  - 0 Standard 85010053
  - 1 Standard 00000101
This example displays the status of an array ams2500h.

```
% auparts -unit ams2500h
Controller
CTL Status
  0  Normal
  1  Normal

Cache
  CTL Slot Capacity(MB) Status
  0  0  4096  Normal
  0  1  2048  Normal
  0  2  2048  Normal
  0  3  2048  Normal
  1  0  4096  Normal
  1  1  2048  Normal
  1  2  2048  Normal
  1  3  2048  Normal

Interface Board
  CTL Interface Board Type Status
  0  0  Fibre Channel Normal
  0  1  Fibre Channel Normal
  1  0  Fibre Channel Normal
  1  1  Fibre Channel Normal

Battery
  Battery Status
  0  Normal
  1  Normal
  2  Normal
  3  Normal

Additional Battery
  Battery Status
  0  Normal
  1  Normal

Host Connector
  Port Status
  0A  Normal
  0B  Normal
  ... 
  1A  Normal
  1B  Normal
  ... 

Fan
  Unit Fan Status
  CTU  0  Normal
  CTU  1  Normal
  CTU  2  Normal
  CTU  3  Normal
  0  0  Normal
  0  1  Normal
  ... 

AC
  Unit AC Status
  CTU  0  Normal
  CTU  1  Normal
  0  0  Normal
  0  1  Normal
  ... 

ENC
  Unit ENC Type Status
  1  0  ENC Normal
  1  1  ENC Normal
  ... 

Unit
  Unit Type Serial Number
  CTU --- 87000045
  0  Standard 000000101
  1  Standard 000000102
```
This example displays the status of parts of an array unit HUS 130 individually.

% auparts -unit HUS130

Controller
CTL Status
0 Normal
1 Normal

Cache
CTL Slot Capacity(MB) Status
0 0 4096 Normal
1 0 4096 Normal

Interface Board
CTL Interface Board Type Status
0 0 Fibre Channel Normal
1 0 Fibre Channel Normal

Battery
Battery Status
0 Normal
1 Normal

Host Connector
Port Status
0A Normal
0B Normal

Fan
Unit Fan Status
0 0 Normal
0 1 Normal

AC PS
Unit AC PS Status
0 0 Normal
0 1 Normal

ENC
Unit ENC Type Status
0 0 ENC Normal
0 1 ENC Normal

Unit
Unit Type Serial Number
0 StandardS 90000026
1 StandardS 00000101

Referencing the parts options

Command name

aupartsopt

Format

AMS2000, HUS 100
aupartsopt -unit unit_name -refer
Description

This command references the parts options.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the parts options.</td>
</tr>
</tbody>
</table>

Example

The following example displays the parts options of an array ams2300.

```
% aupartsopt -unit ams2300 -refer
Air Filters
  Air Filter Timer : Disable
  Expiration Time(hours) : 8800
  Running Time(houre) : 100
%
```

Displaying the current IP address

Command name

aucrlan

Format

```
9500V
  aucrlan -unit unit_name
```

Description

This command displays the enabled LAN information of the array.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;, (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
</tbody>
</table>

The following example displays the enabled LAN information of an array 9500a1.
Displaying the information messages

Command name

auinfomsg

Format

9500V, AMS, WMS, SMS, AMS2000, HUS
auinfomsg -unit unit_name

Description

This command displays the Information Messages of the specified array.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;&quot;, &quot;_ (underline)&quot;&quot;, &quot; (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
</tbody>
</table>

Example

The following example obtains and displays the information messages on an array 9500a1.
Referencing/setting the equipment ID or controller ID

Command name

auunitid

Format

```
9500V

auunitid  -unit unit_name  -refer
auunitid  -unit unit_name  -set
          [ -EquipmentID string ]
          [ -ControllerIDFlag ctl_no enable | disable ]
          [ -ControllerID ctl_no string ]
```

Description

This command references or sets the equipment or controller ID.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the equipment ID or the controller ID.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the equipment ID or the controller ID.</td>
</tr>
<tr>
<td>-EquipmentID string</td>
<td>Sets the equipment ID.</td>
</tr>
<tr>
<td>-ControllerIDFlag ctl_no enable</td>
<td>Specify whether to set the controller ID flag effective or ineffective.</td>
</tr>
<tr>
<td>-ControllerID ctl_no string</td>
<td>Specify the controller ID.</td>
</tr>
</tbody>
</table>

Example

The following example displays the controller ID flag and controller ID of an array 9500a1.

```%
% auunitid -unit 9500a1 -refer
Password: nnnn
Equipment ID
nnnn
CTL0
ControllerIdentifier = disable(DF600-00 C0)
CTL1
ControllerIdentifier = disable(DF600-00 C1)
%
```

Displaying the equipment information

Command name

```
auunitinfo
```

Format

```
AMS, WMS, SMS, AMS2000, HUS
auunitinfo -unit unit_name
```

Description

This command displays the equipment type, serial number, firmware revision, and LAN information of the array.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
</tbody>
</table>

Examples

The following example displays the equipment information of an array ams500a1.

```
% auunitinfo -unit ams500a1
Array Unit Type       : AMS500
Construction          : Dual
Serial Number         : 75010026
Firmware Revision     : 0771/A-M
CTL  IP Address       Subnet Mask        Default Gateway
0  192.168.0.1        255.255.255.0      192.168.0.100
1  192.168.0.2        255.255.255.0      192.168.0.100
%
```

The following example displays the equipment information of an array sms100.

```
% auunitinfo -unit sms100
Array Unit Type       : 0100
Construction          : Dual
Serial Number         : 81012345
Array ID              : 81012345
Firmware Revision(CTL0) : 1860/A-A
Firmware Revision(CTL1) : 1860/A-A
CTL0
 IPv4
 IPv4 Address         : 172.16.11.230
 IPv4 Subnet Mask      : 255.255.255.0
 IPv4 Default Gateway  : 172.16.11.1
 IPv6
 IPv6 Address         : fe80::200:87ff:fec6:46e7
 Subnet Prefix Length  : 64
 IPv6 Default Gateway  : fe80::20
CTL1
 IPv4
 IPv4 Address         : 172.16.11.231
 IPv4 Subnet Mask      : 255.255.255.0
 IPv4 Default Gateway  : 172.16.11.1
 IPv6
 IPv6 Address         : fe80::200:87ff:fec6:46e9
 Subnet Prefix Length  : 64
 IPv6 Default Gateway  : fe80::20
%
```
RAID/volume commands

This section covers the following commands related to RAID groups and logical units:

- Referencing a RAID Group on page 3-54
- Setting up a RAID Group on page 3-56
- Expanding a RAID Group on page 3-59
- Deleting the RAID Group on page 3-61
- Referencing a volume on page 3-63
- Setting up a volume on page 3-65
- Formatting the volume on page 3-70
- Displaying the progress of volume formatting on page 3-72
- Referencing/setting the quick format option on page 3-73
- Expanding a volume on page 3-75
- Deleting the volume on page 3-76
- Changing the default controller of a volume on page 3-78
- Referencing the unified volume on page 3-79
- Unifying volumes on page 3-79
- Separating volumes on page 3-80
- Invalidating a volume on page 3-81
- Reassigning a volume on page 3-82
- Restoring a volume on page 3-83
- Referencing/starting/skipping/canceling parity correction online on page 3-84
- Referencing/setting the mapping guard information on page 3-87
- Referencing/setting volume cache partition on page 3-89
- Changing the volume size on page 3-90
Referencing a RAID Group

Command name

aurgref

Format

9500
aurgref -unit unit_name [ -m | -g ]

AMS, WMS
aurgref -unit unit_name [ -m | -g ] [ -detail rg_no ]

SMS, AMS2000, HUS
aurgref -unit unit_name [ -m | -g | -t | -auto ] [ -detail rg_no ]

Description

This command displays a list of definition of the RAID groups set to the array.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-m</td>
<td>Specify the RAID groups in MBytes.</td>
</tr>
<tr>
<td>-g</td>
<td>Specify the RAID groups in GBytes.</td>
</tr>
<tr>
<td>-t</td>
<td>Specify the RAID groups in TBytes.</td>
</tr>
<tr>
<td>-auto</td>
<td>If the capacity is 1 TByte or more, it is displayed in TByte. If 1 GB or more and less than 1 TB, it is displayed in GByte. If less than 1 GByte, it is displayed in GByte.</td>
</tr>
<tr>
<td>-detail rg_no</td>
<td>Specify the RAID group number to be detail displayed.</td>
</tr>
</tbody>
</table>

Examples

The following example displays the definition of the RAID group of an array 9500a1.

% aurgref -unit 9500a1 -g
RAID  RAID  Start Location  Number of HDU  Number of parity groups  parity group  parity group  Free Capacity
 0 5 0 5 5 1 214.6 FC
%

The following example displays the definition of the RAID group of an array ams500a1.

% aurgref -unit ams500a1 -g
RAID  RAID  Parity Groups    Total Capacity  Free Capacity
 0 5( 3D+1P) 1 FC 400.3 400.3(100.0%)
The following example displays the definition of the RAID group of an array unit hus150a1.

```
% aurgref -unit hus150a1 -auto
RAID Group: Expanding(10%) 38(Reconst(HDU:2, LU:1))
% aurgref -unit hus150a1 -g -detail 7
RAID Group: 7
RAID Level: 5(3D+1P)
Parity Groups: 1
Type: SAS
Total Capacity: 400.3 Gbyte
Free Capacity: 400.3 Gbyte (100.0%)
Drive Configuration
Parity Group Unit HDU Capacity
0 0 0 146GB
0 0 1 146GB
0 0 2 146GB
0 0 3 146GB
Assignment Information
No. Capacity[Gbyte] Assignment Status
0 0.0 LUN0
1 0.0 LUN1
2 0.0 LUN2
3 0.0 LUN3
4 0.0 LUN4
5 400.3 Free
% aurgref -unit hus150a1 -t
RAID Group: 1
RAID Level: 5(4D+1P)
Parity Groups: 1
Type: SAS
Total Capacity: 533.8 Gbyte
Free Capacity: 533.8 Gbyte (100.0%)
Priority: RAID Group Expansion
Status: Waiting Expansion(75)(94%)
Reconstruction Progress: N/A
Defined LU Count: 10
Drive Configuration
Parity Group Unit HDU Capacity
0 0 0 146GB
0 0 1 146GB
0 0 2 146GB
% aurgref -unit hus150a1 -auto
RAID Group: 2
RAID Level: 1(1D+1D)
Total Capacity: 100 TB
Free Capacity: 0.0 MB (0.0%)
Priority: RAID Group Expansion
Status: Normal
```

The following example displays in detail the definition of the RAID group 7 of an array ams500a1.

```
% aurgref -unit ams500a1 -g -detail 7
RAID Group: 7
RAID Level: 5(3D+1P)
Parity Groups: 1
Type: FC
Total Capacity: 400.3 Gbyte
Free Capacity: 400.3 Gbyte (100.0%)
Drive Configuration
Parity Group Unit HDU Capacity
0 0 0 146GB
0 0 1 146GB
0 0 2 146GB
0 0 3 146GB
Assignment Information
No. Capacity[Gbyte] Assignment Status
0 0.0 LUN0
1 0.0 LUN1
2 0.0 LUN2
3 0.0 LUN3
4 0.0 LUN4
5 400.3 Free
% aurgref -unit ams500a1 -t
RAID Group: 1
RAID Level: 5(3D+1P)
Parity Groups: 1
Type: SAS
Total Capacity: 400.3 GB
Free Capacity: 400.3 GB (100.0%)
Priority: RAID Group Expansion
Status: Waiting Expansion(75)(94%)
Reconstruction Progress: N/A
Defined LU Count: 10
Drive Configuration
Parity Group Unit HDU Capacity
0 0 0 146GB
0 0 1 146GB
0 0 2 146GB
% aurgref -unit ams500a1 -auto
RAID Group: 2
RAID Level: 1(1D+1D)
Total Capacity: 100 TB
Free Capacity: 0.0 MB (0.0%)
Priority: RAID Group Expansion
Status: Normal
```

The following example displays the definition of the RAID group of an array sms100.

```
% aurgref -unit sms100 -t
RAID Group: 1
RAID Level: 5(3D+1P)
Parity Groups: 1
Type: SAS
Total Capacity: 1.3 TB
Free Capacity: 1.3 TB (100.0%)
Priority: RAID Group Expansion
Status: Normal
```

The following example displays in detail the definition of the RAID group 1 of an array ams2300a1.

```
% aurgref -unit ams2300a1 -g -detail 1
RAID Group: 1
RAID Level: 5(3D+1P)
Parity Groups: 1
Type: SAS
Total Capacity: 400.3 GB
Free Capacity: 400.3 GB (100.0%)
Priority: RAID Group Expansion
Status: Waiting Expansion(75)(94%)
Reconstruction Progress: N/A
Defined LU Count: 10
Drive Configuration
Parity Group Unit HDU Capacity
0 0 0 146GB
0 0 1 146GB
0 0 2 146GB
```
The following example displays in detail the definition of the RAID group 1 of an array unit hus150a1.

```
% aurgref -unit hus150a1 -detail 1
RAID Group : 1
RAID Level              : 5(4D+1P)
Parity Groups           : 1
Type                    : SAS
Rotational Speed        : Mixed
Total Capacity          : 268435456 blocks
Free Capacity           : 268435456 blocks (100.0%)
Priority                : RAID Group Expansion
Status                  : Regression/Waiting expansion(1)(2%)
Reconstruction Progress : 38%(Reconstruction(HDU:2, LU:1))
Defined LU Count : 2
```

```
Drive Configuration
Parity Group Unit  HDU  Capacity       Speed
0     0      7   600GB       10000rpm
0     0      8  600GB       10000rpm
0     0      9  600GB       10000rpm
0     0   10  600GB       15000rpm
0     0   11  600GB       15000rpm
```

```
Assignment Information
No.        Capacity        Assignment Status
2   274877906944 blocks  Free
```

---

**Setting up a RAID Group**

**CAUTION! Creating RAID groups on the Simple Modular Storage 100 system invalidates your Hitachi warranty and support. Please consult your reseller before using the CLI.**

**Command name**

aurgadd

**Format**

```
aurgadd -unit unit_name -rg rg_no
        -RAID0 | -RAID1 | -RAID5 | -RAID10
        -uno unit_no -hno hdu_no -hnum hdu_num -pnum pty_num

AMS, WMS
aurgadd -unit unit_name -rg rg_no
        -RAID0 | -RAID1 | -RAID5 | -RAID10 | -RAID6
        -drive auto
        -hnum hdu_num
        -pnum pty_num
        -drvcapa 36 | 72 | 146 | 250 | 300 | 400 | 500 | 750 | 1000

aurgadd -unit unit_name -rg rg_no
        -RAID0 | -RAID1 | -RAID5 | -RAID10 | -RAID6
        -drive unit_no:hdu_no ...
        -pnum pty_num

aurgadd -unit unit_name -availablelist -type FC | SATA

AMS2000
aurgadd -unit unit_name -rg rg_no
        -RAID0 | -RAID1 | -RAID5 | -RAID10 | -RAID6
```

---

3-56 CLI command list
-drive auto
-htnum hdu_num
-pnum pty_num
-drvcapa 100 | 146 | 200 | 300 | 400 | 450 | 500 | 600 | 750 | 1000 | 2000 | 3000
-type SAS | SSD | SAS7K | SAS_SED | SAS_SFF

aurgadd -unit unit_name -rg rg_no
-RAID0 | -RAID1 | -RAID5 | -RAID10 | -RAID6
-drive unit_no.hdu_no ...
-pnum pty_num

aurgadd -unit unit_name -availablelist -type SAS | SSD | SAS7K | SAS_SED | SAS_SFF
[-drvcapa 100 | 146 | 200 | 300 | 400 | 450 | 500 | 600 | 750 | 1000 | 2000 | 3000]

HUS100
aurgadd -unit unit_name -rg rg_no
-RAID0 | -RAID1 | -RAID5 | -RAID10 | -RAID6
-drive auto
-htnum hdu_num
-pnum pty_num
-drvcapa 200 | 300 | 400 | 600 | 800 | 900 | 1200 | 2000 | 3000 | 4000
-type SAS | SAS:10K | SAS:15K | SAS7K | SSD

aurgadd -unit unit_name -rg rg_no
-RAID0 | -RAID1 | -RAID5 | -RAID10 | -RAID6
-drive unit_no.hdu_no ...
-pnum pty_num

aurgadd -unit unit_name -availablelist
-type SAS | SAS:10K | SAS:15K | SAS7K | SSD
[-drvcapa 200 | 300 | 400 | 600 | 800 | 900 | 1200 | 2000 | 3000 | 4000]

**Description**

This command sets up a RAID in a specified array.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-rg rg_no</td>
<td>Specify the RAID group number.</td>
</tr>
<tr>
<td>-RAID0</td>
<td>-RAID1</td>
</tr>
<tr>
<td>-hnum hdu_num</td>
<td>Specify the number of HDUs in the parity group of the RAID group.</td>
</tr>
<tr>
<td>-pnum pty_num</td>
<td>Specify the number of parity groups of the RAID group.</td>
</tr>
<tr>
<td>-uno unit_no</td>
<td>Specify the Unit number of the top drive in a RAID group.</td>
</tr>
<tr>
<td>-drive auto</td>
<td>unit_no.hdu_no</td>
</tr>
<tr>
<td></td>
<td>• auto: The Unit number and HDU numbers are set automatically.</td>
</tr>
<tr>
<td></td>
<td>• unit_no.hdu_no: Specify the Unit number and HDU number punctuating them with a period. When doing that, enter the Unit number and HDU number using numerals or hyphen(s) (-).</td>
</tr>
<tr>
<td></td>
<td>• Example: -drive 0.1 2.3 3.1</td>
</tr>
<tr>
<td></td>
<td>• Example: -drive 1.0-2.2 2.8</td>
</tr>
<tr>
<td>-type FC</td>
<td>SATA</td>
</tr>
<tr>
<td>-type SAS</td>
<td>SATA</td>
</tr>
<tr>
<td>-drvcapa 36</td>
<td>72</td>
</tr>
<tr>
<td>-availablelist</td>
<td>The drives list in which the RAID group can be set is displayed.</td>
</tr>
</tbody>
</table>

Examples

The following example sets up a RAID of an array ams500a1. Set a RAID number to 10, RAID level to RAID 5, number of hard disk units (HDUs) in the parity group to 5, number of parity groups to 1, drive capacity to 146 GB, drive type to FC, and drive selection to auto.

```
% aurgadd -unit ams500a1 -rg 10 -RAID5 -hnum 5 -pnum 1 -drvcapa 146 -type FC -drive auto
Password:
The drive will be selected automatically.
Are you sure you want to add a RAID group? (y/n [n]): y
The RAID Group has been set successfully.
%```

3-58 CLI command list
The following example sets up a RAID group of an array ams500a1. Set a RAID group number to 11, RAID level to RAID 5, number of parity groups to 1, and drive type to FC. The drive to be used displays the drive list that can be used.

% aurgadd -unit ams500a1 -availablelist -type FC
Password:
Available Drives
Drive Type : FC
Unit HDU  Capacity
 0  7   146GB
 0  8   146GB
 0  9   146GB
 1  0   146GB
 1  1   146GB
 1  2   146GB
 1  3   146GB
 1  4   146GB
%
% aurgadd -unit ams500a1 -rg 11 -RAID5 -pnum 1 -drive 0.7 0.8 0.9
Password:
Are you sure you want to add a RAID group? (y/n [n]): y
The RAID Group has been set successfully.
%

The following example sets up a RAID group of an array unit hus150a1. Set a RAID group number to 10, RAID level to RAID 5, number of HDUs in the parity group to 5, number of parity groups to 1, drive capacity to 600 GB, drive type to SAS, drive rotational speed to 1,0000, and drive selection to auto.

% aurgadd -unit hus150a1 -rg 10 -RAID5 -drive auto -hnum 5 -pnum 1 -drvcapa 600 -type SAS:10K
The drive will be selected automatically.
Are you sure you want to set a RAID group? [y/n [n]: y
The RAID Group has been set successfully.

Expanding a RAID Group

Command name

aurgexp

Format

9500V
aurgexp -unit unit_name -rg rg_no -pnum pty_num

AMS2000, HUS
aurgexp -unit unit_name -rg rg_no -drive unit_no.hdu_no ...
aurgexp -unit unit_name -chg -priority host | expansion
aurgexp -unit unit_name -cancel -rg rg_no
aurgexp -unit unit_name -availablelist -rg rg_no

Description

This command expands the defined size of a RAID.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus), “_ (underline), “. (period), “@”, or “ (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-rg rg_no</td>
<td>Specify the RAID group number of a RAID group which is to be expanded.</td>
</tr>
<tr>
<td>-pnum pty_num</td>
<td>Specify the number of parity groups after expansion.</td>
</tr>
<tr>
<td>-drive unit_no.hdu_no ...</td>
<td>Specify the Unit number and HDU number punctuating them with a period to be expanded. Single or multiple drive numbers can be specified.</td>
</tr>
<tr>
<td>-chg</td>
<td>Changes the priority of RAID group expansion.</td>
</tr>
<tr>
<td>-cancel</td>
<td>Cancels the RAID group expansion.</td>
</tr>
<tr>
<td>-availablelist</td>
<td>A list of drives, each of which is eligible for a expanding HDU is displayed.</td>
</tr>
<tr>
<td>-priority host</td>
<td>Specify the priority. The default value is Host access.</td>
</tr>
<tr>
<td>expansion</td>
<td>expansion : RAID group expansion</td>
</tr>
</tbody>
</table>

Examples

The following example expands the number of parity groups of RAID 0 (from 1 to 3), whose number has been set in an array 9500a1.

```
% aurgref -unit 9500a1
RAID  RAID  Start Location     Number of HDU   Number of    Free Capacity
      Group Level [Unit No. HDU No.] in parity group parity group       [block]
0      5        0       5                 5            1      10000000
%
% aurgexp -unit 9500a1 -rg 0 -pnum 3
Password:
%
% aurgref -unit 9500a1
RAID  RAID  Start Location     Number of HDU   Number of    Free Capacity
      Group Level [Unit No. HDU No.] in parity group parity group       [block]
0      5        0       5                 5            3      30000000
%
```

The following example expands the RAID group 1 adding two drives which number has been set in an array ams2300a1. The drive to be used displays the drive list that can be used and chooses it from them.
% aurgexp -unit ams2300a1 -availablelist -rg 1
Available Drives
Unit HDU Capacity Drive Type Rotational Speed Status
 1 12 146GB SAS 15000rpm Out of RG
 1 13 146GB SAS 15000rpm Out of RG
%
% aurgexp -unit ams2300a1 -rg 1 -drive 1.12 1.13
Are you sure you want to expand the RAID group? (y/n [n]): y
The capacity of the expanded RAID group will be 876.0GB.
Are you sure you want to expand the RAID group? (y/n [n]): y
The host access will be decreased while expanding the RAID group.

Are you sure you want to expand the RAID group? (y/n [n]): y
The RAID group expanding has been started.
%
The following example changes the priority mode to an array unit
ams2300a1.

% aurgexp -unit ams2300a1 -chg –priority expansion
Are you sure you want to change the priority of the RAID group expansion? (y/n [n]): y
If you change the priority to the RAID group expansion, the host access will be decreased.

The access processing performance from the host deteriorates while changing the
RAID group expansion.
Are you sure you want to change the priority of the RAID group expansion? (y/n [n]): y
The priority of the RAID group expansion has been changed successfully.
%
Deleting the RAID Group

CAUTION! Deleting RAID groups on the Simple Modular Storage 100
system invalidates your Hitachi warranty and support. Please consult
your reseller before using the CLI.

Command name

aurgdel

Format

9500V
aurgdel -unit unit_name -rg rg_no [-f]
AMS, WMS, AMS2000, HUS
aurgdel -unit unit_name -rg rg_no ... [-f]
9500V, AMS, WMS, AMS2000, HUS
aurgdel -unit unit_name -ALL [-f]

Description

This command deletes the specified RAID group or deletes all RAID
groups in an array.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, “_ (underline)”, “.” (period), “@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-rg rg_no ...</td>
<td>Specify the RAID group number of a RAID group which is to be deleted. For AMS, WMS, SMS and AMS2000, multiple RAID group number can be specified. The RAID groups are deleted in order that you specify them.</td>
</tr>
<tr>
<td>-ALL</td>
<td>Deletes all RAID groups.</td>
</tr>
<tr>
<td>-f</td>
<td>Omits the confirmation message when the command is executed.</td>
</tr>
</tbody>
</table>

Example

The following shows an example of deleting RAID groups 1, 2, and 5 that are defined in an array ams500a1.

```bash
% aurgdel -unit ams500a1 -rg 1 2 5
Password:
The specified RAID group(s) will be deleted.
Logical units exit in the RAID group. This operation will destroy RAID groups, logical units, and the data in those logical units.
Are you sure you want to delete the RAID group(s)? (y/n [n]): y
If you delete the RAID groups, logical units will be deleted. You will not be able to recover your data. Please make sure to perform backup of all important data before this RAID group delete operation.
When you delete your RAID group, the data becomes unusable. Systems or applications that use this subsystem will terminate abnormally. Please make sure to stop host access to the subsystem before performing this RAID group delete operation. Are you sure you want to delete the RAID group(s)? (y/n [n]): y
The specified RAID group(s) will be deleted.
The RAID group 1 has been deleted.
The RAID group 2 has been deleted.
The RAID group 5 has been deleted.
The RAID group(s) have been deleted successfully.
%```
Referencing a volume

Command name

auluref

Format

9500V
auluref -unit unit_name [ -m | -g ] [ -last | -lu lun ... ]

AMS, WMS
auluref -unit unit_name [ -m | -g ] [ -lu lun ... ]

SMS, AMS2000, HUS
When referencing LU information
auluref -unit unit_name [ -m | -g ] [ -lu lun ... ] [ -nosublu ] [ -totalsize ]

When referencing path information of LU
auluref -unit unit_name -pathinfo [ -lu lun ... ]

Description

This command displays already-defined LU information (capacity, RAID group No. of a RAID group or DP pool No. to which it belongs, its RAID level, status, and number of paths).
## Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>-unit unit_name</strong></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td><strong>-m</strong></td>
<td>Specify the volume in MBytes.</td>
</tr>
<tr>
<td><strong>-g</strong></td>
<td>Specify the volume in GBytes.</td>
</tr>
<tr>
<td><strong>-t</strong></td>
<td>Specify the volume in TBytes.</td>
</tr>
<tr>
<td><strong>-auto</strong></td>
<td>If the capacity is 1 TByte or more, it is displayed in TByte. If 1 GB or more and less than 1 TB, it is displayed in GByte. If less than 1 GByte, it is displayed in GByte.</td>
</tr>
<tr>
<td><strong>-last</strong></td>
<td>References the last defined LU.</td>
</tr>
</tbody>
</table>
| **-lu lun ...** | Specify an LU number to reference the LU information. If omitted, all LU information that is already defined will be displayed. Single or multiple LU numbers can be specified.  
  - Single specification: Specifying a single LU number.  
    Example: -lu 3  
  - Multiple specification: Specifying multiple LU numbers.  
    Example: -lu 0 1 2 3 4 5 8 -lu 0-5 8 |

## Examples

The following example displays information about logical unit 0 in an array 9500a1.

```plaintext
% auluref -unit 9500a1 -lu 0 -m  
<table>
<thead>
<tr>
<th>Capacity</th>
<th>RAID</th>
<th>RAID</th>
<th>LU [Mbyte]</th>
<th>C-CTL</th>
<th>D-CTL</th>
<th>Group Level</th>
<th>Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>35.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5 FC</td>
<td>FC</td>
<td>Normal</td>
</tr>
</tbody>
</table>
%
```

The following example displays information about all logical units in an array ams500a1.

```plaintext
% auluref -unit ams500a1 -m  
<table>
<thead>
<tr>
<th>Capacity</th>
<th>RAID</th>
<th>RAID</th>
<th>LU [Mbyte]</th>
<th>C-CTL</th>
<th>D-CTL</th>
<th>Group Level</th>
<th>Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>35.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5( 3D+1P) FC</td>
<td>FC</td>
<td>Normal</td>
</tr>
<tr>
<td>1</td>
<td>35.0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>5( 3D+1P) FC</td>
<td>FC</td>
<td>Normal</td>
</tr>
</tbody>
</table>
%
```

The following example displays information about all logical units in an array sms100a1.

```plaintext
% auluref -unit sms100a1 -m  
<table>
<thead>
<tr>
<th>Stripe</th>
<th>RAID</th>
<th>DP</th>
<th>RAID</th>
<th>LU</th>
<th>Capacity</th>
<th>Size</th>
<th>Group</th>
<th>Pool</th>
<th>Level</th>
<th>Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RAID</td>
<td>RAID</td>
<td>LU</td>
<td>Capacity</td>
<td>Size</td>
<td>Group</td>
<td>Pool</td>
<td>Level</td>
<td>Type</td>
<td>Status</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>31.9 MB</td>
<td>256KB</td>
<td>0</td>
<td>N/A</td>
<td>6( 9D+2P)</td>
<td>SAS</td>
<td>Normal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>31.9 MB</td>
<td>256KB</td>
<td>0</td>
<td>N/A</td>
<td>6( 9D+2P)</td>
<td>SAS</td>
<td>Normal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
%
```

The following example displays information about all logical units in an array ams2300a1.
The following example displays information about all logical units in an array ams2300a1.

```
% auluref -unit ams2300a1 –g
```

The following example displays details about path information of LU 0 in an array unit hus150a1.

```
% auluref -unit hus150a1 -g
```

Setting up a volume

Command name

auluadd

Format

9500V
Dual System
auluadd -unit unit_name [ -lu lun ] -rg rg_no -size num[ m | g ] | rest
[ -ctl0 | -ctl1 ]
Single System
auluadd -unit unit_name [ -lu lun ] -rg rg_no -size num[ m | g ] | rest

AMS, WMS
Dual System
auluadd -unit unit_name [ -lu lun ] -rg rg_no -size num[ m | g ] | rest
[ -ctl0 | -ctl1 ]
[ -stripesize 64 | 256 | 512 ]
[ -cachept pt_no ]
[ -paircachept pt_no | auto ]
[ -createarea area_no ]
Single System
auluadd -unit unit_name [ -lu lun ] -rg rg_no -size num[ m | g ] | rest
[ -stripesize 64 | 256 | 512 ]
[ -cachept pt_no ]
[ -createarea area_no ]

SMS
When the area is selected automatically.
When creating the logical unit in the maximum free area.
auluadd -unit unit_name
[ -lu lun ] -rg rg_no -size num[ m | g | t ] | rest
[ -stripesize 64 | 256 | 512 ]
[ -noluformat ]

When creating the logical unit using the free area in ascending order.
auluadd -unit unit_name –head
[ -lu lun ] -rg rg_no -size num[ m | g | t ]
[ -stripesize 64 | 256 | 512 ]
[ -arealu lun ]
[ -noluformat ]
When creating the logical unit in the first free area.
   auluadd -unit unit_name –head
   [-lu lun] -rg rg_no -size rest
   [-stripesize 64 | 256 | 512]
   [-noluformat]

When the area is selected manually.
When creating the logical unit in one free area.
   auluadd -unit unit_name
   [-lu lun] -rg rg_no -size num[ m | g | t] rest
   [-stripesize 64 | 256 | 512]
   -createarea area_no
   [-noluformat]

When creating the logical unit in two or more free areas.
   auluadd -unit unit_name
   [-lu lun] -rg rg_no -size num[ m | g | t]
   [-stripesize 64 | 256 | 512]
   -createarea area_no ...
   [-arealu lun]
   [-noluformat]

When creating the logical unit using all free areas of RAID Group.
   auluadd -unit unit_name
   [-lu lun] -rg rg_no -size rgrest
   [-stripesize 64 | 256 | 512]
   [-arealu lun]
   [-noluformat]

AMS2000, HUS
When the area is selected automatically.
When creating the logical unit in the maximum free area.
   auluadd -unit unit_name
   [-lu lun] -rg rg_no
   -size num[ m | g | t] rest
   [-stripesize 64 | 256 | 512]
   [-cachept pt_no]
   [-paircachept pt_no | auto]
   [-noluformat]

When creating the logical unit using the free area in ascending order.
   auluadd -unit unit_name –head
   [-lu lun] -rg rg_no -size num[ m | g | t]
   [-stripesize 64 | 256 | 512]
   [-cachept pt_no]
   [-paircachept pt_no | auto]
   [-arealu lun]
   [-noluformat]

When creating the logical unit in the first free area.
   auluadd -unit unit_name –head
   [-lu lun] -rg rg_no -size rest
   [-stripesize 64 | 256 | 512]
   [-cachept pt_no]
   [-paircachept pt_no | auto]
   [-noluformat]

When the area is selected manually.
When creating the logical unit in one free area.
   auluadd -unit unit_name
   [-lu lun] -rg rg_no -size num[ m | g | t] rest
   [-stripesize 64 | 256 | 512]
   [-cachept pt_no]
   [-paircachept pt_no | auto]
   -createarea area_no
   [-noluformat]

When creating the logical unit in two or more free areas.
   auluadd -unit unit_name
   [-lu lun] -rg rg_no -size num[ m | g | t]
   [-stripesize 64 | 256 | 512]
   [-cachept pt_no]
   [-paircachept pt_no | auto]
   -createarea area_no ...
   [-arealu lun]
   [-noluformat]

When creating the logical unit using all free areas of RAID Group.
   auluadd -unit unit_name
When creating the logical unit in DP pool.

`auluadd -unit unit_name -lu lun -dppoolno pool_no -size num[m | g | t]`

HUS

When creating the logical unit in DP pool of enabled tier mode.

`auluadd -unit unit_name -lu lun -dppoolno pool_no -size num[m | g | t]`

AMS, WMS, SMS, AMS2000, HUS

`auluadd -unit unit_name --availablelist -rg rg_no`
**Description**

This command sets up a logical unit.

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td><code>-lu lun</code></td>
<td>Specify the volume number of a volume to be added. If omitted, the Navigator will automatically apply an LU number.</td>
</tr>
<tr>
<td><code>-rg rg_no</code></td>
<td>Specify the RAID group number of a RAID group which an LU is to be added.</td>
</tr>
<tr>
<td>`-size num[m</td>
<td>g</td>
</tr>
<tr>
<td>`-ctl0</td>
<td>-ctl1`</td>
</tr>
<tr>
<td>`-stripesize 64</td>
<td>256</td>
</tr>
<tr>
<td><code>-cachept pt_no</code></td>
<td>Specify the cache partition. If omitted this option, the Navigator will automatically assign the partition 0 or 1.</td>
</tr>
<tr>
<td>`-paircachept pt_no</td>
<td>auto`</td>
</tr>
<tr>
<td><code>-createarea area_no ..</code></td>
<td>Specify the free area number of the RAID group in which the LU is to be set. Specify the number of the list displayed by the -availablelis option for the area number. Single or multiple free area numbers can be specified.</td>
</tr>
</tbody>
</table>

**Example:**
- `-createarea 3`
- `-createarea 0 1 2 3 4 5 8-createarea 0-5 8`
The following example adds logical unit 100 to RAID 10 in an array with a dual system configuration, whose name is ams500a1. The capacity is 80 GB, the default controller is 0, and the cache partition is partition 0. The domain number of the RAID to be set logical unit displays the free domain number of the RAID list that can be used.

```bash
% auluadd -unit ams500a1 -availablelist -rg 10
Password:
Available Areas
  RAID Group : 10
    No. Capacity
      0   400.3 GByte
      1   300.0 GByte
      2   100.0 Gbyte
%
% auluadd -unit ams500a1 -lu 100 -size 80g -ctl0 -rg 10 -cachept 0 -createarea 1
Password:
Are you sure you want to set the logical unit?
(y/n [n]): y
The logical unit has been set successfully.
%
```

The following example adds logical unit 200 to RAID 0 in an array with a dual system configuration, whose name is sms100a1. The capacity is 80 GB.

```bash
% auluadd -unit sms100a1 -lu 200 -rg 0 -size 80g
Are you sure you want to set the logical unit?
(y/n [n]): y
The logical unit has been set successfully.
The format was started.
%
```
The following example adds logical unit 15 to RAID group 1 in an array with a dual system configuration, whose name is ams2300a1. The capacity is 5 TB. The domain number of the RAID group to be set logical unit displays the free domain number of the RAID group list that can be used and chooses it from them.

\% auluadd -unit ams2300a1 -availablelist -rg 1

Available Areas
RAID Group : 1
No. Capacity
0 128.0 TB
\%

\% auluadd -unit ams2300a1 -lu 15 -size 5t -rg 1 -createarea 0
Are you sure you want to set the logical unit?
(y/n [n]): y
The logical unit has been set successfully.
The format was started.
\%

**Formatting the volume**

**Command name**

auformat

**Format**

9500V
auformat -unit unit_name -online | -offline | -N | -I | -Im | -quick
-lu lun ... [ -f ]

AMS, WMS, SMS, AMS2000, HUS
auformat -unit unit_name -lu lun ... [ -f ]

**Description**

This command formats a specified logical unit. If multiple logical units are specified, logical units are formatted in the ascending order of LUNs.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;,&quot; , or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-online</td>
<td>Specify the formatting method.</td>
</tr>
<tr>
<td>-offline</td>
<td>Specify the formatting method.</td>
</tr>
<tr>
<td>-N</td>
<td>Formats in Normal mode per LU. Formatting is executed from the current controller which controls the LU. When registering the unit information, the current controller of which controls the LU that is to be formatted must be registered.</td>
</tr>
<tr>
<td>-online</td>
<td>Formats in Immediate mode per volume. Formatting is executed from the current controller which controls the volume. It can format during the read/write command execution from a host. When registering the unit information, the current controller that controls the volume to be formatted must be registered.</td>
</tr>
<tr>
<td>-offline</td>
<td>Formats in Immediate mode per volume. Formatting is executed from the current controller which controls the LU. It can format during the read/write command execution from a host. When registering the unit information, the current controller that controls the LU to be formatted must be registered.</td>
</tr>
<tr>
<td>-quick</td>
<td>Formats up to six volumes concurrently in the quick mode. The read/write commands from a host are accepted during the format execution. The command execution from a host is lower than the format with '-offline' or '-Im option. When formatting in quick mode, set the priority mode by auquickfmttop command.</td>
</tr>
<tr>
<td>-lu lun ...</td>
<td>Specify the LU number, which is to be formatted. Single or multiple LU numbers can be specified. Single specification : Specifying a single LU number. Multiple specification: Specifying multiple LU numbers.</td>
</tr>
<tr>
<td>-f</td>
<td>Omits the confirmation message when the command is executed.</td>
</tr>
</tbody>
</table>

Examples

This example formats logical unit 0 to 10 in an array is 9500a1 in quick mode.

```
% auformat -unit 9500a1 -quick -lu 0-10
Password: 
The logical unit(s) will be formatted.
The logical unit(s) have already been formatted.
Are you sure you want to format the logical unit(s)? [y/n [n]]: y
If you format the logical unit(s), you will not be able to recover your data. Pl
```
ease make sure to perform backup of all important data before this operation. When you format your logical unit, the data becomes unusable. Systems or applications that use this subsystem will terminate abnormally. Please make sure to stop host access to the subsystem before performing this operation.

Are you sure you want to format the logical unit(s)? (y/n [n]): y
The logical unit(s) will be formatted.
Are you sure you want to execute? (y/n [n]): y
The format was started.
%

This example formats logical unit 255 in an array ams500a1.

% auformat -unit ams500a1 -lu 255
Password:
Are you sure you want to format the logical unit(s)? (y/n [n]): y
The format was started.
%

Displaying the progress of volume formatting

Command name

auformatst

Format

9500V, AMS, WMS, SMS, AMS2000, HUS
auformatst -unit unit_name -lu lun

Description

This command displays the progress of formatting logical units which was specified to format in immediate and quick mode.

When a specified logical unit is formatting, the progress of formatting is displayed in percentage. When the logical unit is not formatting, such as immediately after a logical unit has been setup or its size has been expanded, or when the formatting has been completed, the following progress is displayed:

“100%” when the logical unit is in normal status.
“0%” when the logical unit is in a status other than above.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-lu lun</td>
<td>Specify the LU number, which its progress is to be checked.</td>
</tr>
</tbody>
</table>

Example

The following example confirms the progress after specifying to format logical unit 4 in an array 9500a1 in immediate mode.
Referencing/setting the quick format option

Command name

auquickfmtopt

Format

9500V, AMS, WMS, SMS, AMS2000, HUS
auquickfmtopt -unit unit_name –refer

9500V, AMS, WMS
auquickfmtopt -unit unit_name –set
[ -priority normal | host | format ]
[ -formatdata default | 0 ]

SMS, AMS2000, HUS100
auquickfmtopt -unit unit_name –set
[ -priority normal | host | format ]
[ -formatdata default | nonzero | 0 ]

HUS100
auquickfmtopt -unit unit_name –set
[ -priority normal | host | format ]
[ -formatdata default | nonzero | 0 | FF ]

Description

This command references or sets the quick format option.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the quick format option.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the quick format option.</td>
</tr>
</tbody>
</table>
| -priority normal | host | format | Specify a priority mode.  
|                          | normal: normal mode  
|                          | host : host priority mode  
|                          | format: format priority mode                                               |
| -formatdata default | 0 | Specify a format data.  
|                          | default: default data  
|                          | 0 : 0 data                                                                 |

Examples

The following example displays the quick format option of an array 9500a1.

```
% auquickfmtopt -unit 9500a1 -refer
Priority Mode : Normal
Format Data   : Default
%
```

The following example sets the quick format option to an array 9500a1, then displays the information.

```
% auquickfmtopt -unit 9500a1 -set -priority host
Password: Are you sure you want to set the quick format option?
[y/n [n]]: y
The quick format option has been set successfully.
% 
% auquickfmtopt -unit 9500a1 -refer
Priority Mode : Host
Format Data   : Default
%
```

The following example sets the quick format data to an array 9500a1.

```
% auquickfmtopt -unit 9500a1 -set -formatdata 0
Password: Are you sure you want to set the quick format option?
[y/n [n]]: y
The quick format option has been set successfully.
% 
```

The following example sets the quick format priority mode and quick format data to an array 9500a1.

```
% auquickfmtopt -unit 9500a1 -set -priority host -formatdata 0
Password: Are you sure you want to set the quick format option?
[y/n [n]]: y
The quick format option has been set successfully.
% 
```
The following example sets the quick format option to an array ams500a1.

```shell
% auquickfmtopt -unit ams500a1 -set -priority format
Password:
Are you sure you want to set the format option?
(y/n [n]): y
This setting of the format priority mode may affect the host access. In some cases, performance deterioration or time-out occurs.
Do you want to continue processing? (y/n [n]): y
The format option has been set successfully.
```

The following example sets the quick format option to an array ams500a1.

```shell
% auquickfmtopt -unit ams500a1 -set -priority host
Password:
Are you sure you want to set the format option?
(y/n [n]): y
The format option has been set successfully.
```

The following example sets the quick format option to an array hus110a1.

```shell
% auquickfmtopt -unit hus110a1 -refer
Priority Mode: Normal
Format Data: Non-Zero Data
```

---

**Expanding a volume**

**Command name**

`auluexp`

**Format**

```
9500V
auluexp -unit unit_name -lu lun -incr num [ m | g ] rest
```

**Description**

This command expands the size of a logical unit. Note that only the last logical unit in each RAID can be expanded.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td><code>-lu lun</code></td>
<td>Specify the LU number of an LU which its size is to be expanded.</td>
</tr>
<tr>
<td>`-incr num[m</td>
<td>g</td>
</tr>
<tr>
<td></td>
<td>• When specifying it in MB, add &quot;m&quot; or &quot;M&quot; to the command option.</td>
</tr>
<tr>
<td></td>
<td>• When specifying it in GB, add &quot;g&quot; or &quot;G&quot; to the command option.</td>
</tr>
<tr>
<td></td>
<td>• If &quot;rest&quot; is specified for the increment, all remaining capacity of the RAID group to which LU belongs is assigned.</td>
</tr>
<tr>
<td></td>
<td>• If &quot;rest&quot; is specified for the increment, all remaining capacity of the RAID group to which LU belongs is assigned.</td>
</tr>
</tbody>
</table>

Examples

The following example expands the capacity of logical unit 3 in an array 9500a1 by an increment of 3,072 blocks.

```
% auluexp -unit 9500a1 -lu 3 -incr 3072
Password:
%
```

The following example assigns to logical unit 3 in an array 9500a1, all the remaining capacity of the RAID to which this logical unit belongs.

```
% auluexp -unit 9500a1 -lu 3 -incr rest
Password:
%
```

Deleting the volume

Command name

`auludel`

Format

```
9500V
auludel -unit unit_name -last [-f]
AMS, WMS, SMS, AMS2000, HUS
auludel -unit unit_name -lu lun ... [-f]
```
Description

This command deletes the specified logical unit.
For 9500V, deletes the last defined logical unit.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus), &quot;_ (underline), &quot;. (period), &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-lu lun ...</td>
<td>Specify the LU number which is to be deleted. The LUs are deleted in order that you specify them. Single or multiple LU numbers can be specified. Single specification : Specifying a single LU number. Example: -lu 3 Multiple specification: Specifying multiple LU numbers. Example: -lu 0 1 2 3 4 5 8 -lu 0-5 8</td>
</tr>
<tr>
<td>-f</td>
<td>Omits the confirmation message when the command is executed.</td>
</tr>
</tbody>
</table>

Examples

The following example deletes the last logical unit in an array 9500a1.

```
% auludel -unit 9500a1 -last
Password:
The last defined logical unit xxx will be deleted.
The last defined logical unit xxx has been formatted.
Are you sure you want to delete logical unit xxx? (y/n [n]): y
If you delete the logical unit, you will not be able to recover your data. Please make sure to perform backup of all important data before this operation. When you delete your logical unit, the data becomes unusable. Systems or applications that use this subsystem will terminate abnormally. Please make sure to stop host access to the subsystem before performing this operation. Are you sure you want to delete the logical unit? (y/n [n]): y The last defined logical unit xxx has been deleted.
%
```

The following example deletes the logical unit 10, 11, and 12 in an array ams500a1.

```
% auludel -unit ams500a1 -lu 10 11 12
Password:
The specified logical unit(s) will be deleted.
The specified logical unit(s) have already been formatted.
Are you sure you want to delete the specified logical unit(s)? (y/n [n]): y
If you delete the logical unit(s), you will not be able to recover your data. Please make sure to perform backup of all important data before this operation. When you delete your logical unit, the data becomes unusable. Systems or applications that use this subsystem will terminate abnormally. Please make sure to stop host access to the subsystem before performing this operation. Are you sure you want to delete the logical unit(s)? (y/n [n]): y The specified logical unit(s) will be deleted.
Are you sure you want to execute? (y/n [n]): y The logical unit 10 has been deleted.
```
The logical unit 11 has been deleted.
The logical unit 12 has been deleted.
The logical unit(s) have been deleted successfully.
%

## Changing the default controller of a volume

### Command name

auluchg

### Format

```
9500V, AMS, WMS
auluchg  -unit unit_name -lu lun
```

### Description

This command changes the default controller of a connected logical unit to another controller.

### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-lu lun</td>
<td>Specify the LU number of an LU whose default controller is to be changed.</td>
</tr>
</tbody>
</table>

### Example

The following example changes the default controller connected to logical unit 2 in an array 9500a1.

```bash
% auluchg -unit 9500a1 -lu 2
Password:
Are you sure you want to change the default controller in charge of LU? (y/n [n]) : y
The default controller in charge of LU has been set successfully.
%
```
Referencing the unified volume

Command name

auluref

Format

9500V, AMS, WMS
   auluref -unit unit_name [ -m | -g ]
SMS, AMS2000, HUS
   auluref -unit unit_name [ -m | -g | -t | -auto ]

Description

This command refers the status of the unified LU.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-m</td>
<td>-g</td>
</tr>
<tr>
<td></td>
<td>-m : MB</td>
</tr>
<tr>
<td></td>
<td>-g : GB</td>
</tr>
<tr>
<td></td>
<td>-t : TB</td>
</tr>
<tr>
<td></td>
<td>-auto: If the capacity is 1 TB or more, it is displayed in TB. If 1 GB or more and less than 1 TB, it is displayed in GB. If less than 1 GB, it is displayed in GB.</td>
</tr>
</tbody>
</table>

Example

In the following example, the unified LU is LU 1, the SubLU is LU 3, and the capacity is shown in the unit of MB in an array sms100a1.

```
% auluref --unit sms100a1 -m
LU     Capacity  Status
1      1057.0 MB Normal
       Sub LU
3
%
```

Unifying volumes

Command name

aulumrg
### Format

9500V, AMS, WMS, SMS, AMS2000 HUS
aulumrg  -unit unit_name -lu main_lu sub_lu

AMS, WMS, SMS, AMS2000, HUS
aulumrg  -unit unit_name -availablelist [-lu main_lu ]

### Description

This command unifies the logical units.

### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols ”- (minus)”, ”_ (underline)”, ”. (period)”, ”@”, or ” (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-lu main_lu sub_lu</td>
<td>Specify the LU numbers to be unified.</td>
</tr>
<tr>
<td>-availablelist</td>
<td>A list of LU numbers, each of which is eligible for the unifying LU is displayed. When -lu option is specified, the Sub LU list is displayed.</td>
</tr>
<tr>
<td>-lu main_lu</td>
<td>Specify the Main LU number.</td>
</tr>
</tbody>
</table>

### Example

The following example unifies a logical unit with the logical unit 10.

```
% aulumrg –unit sms100a1 –availablelist –lu 10
Available Logical Units
  LUN  Capacity RAID Group RAID Level  Type Status
  0  100.0 MB  0  6( 9D+2P)  SAS  Normal
  1  100.0 MB  0  6( 9D+2P)  SAS  Normal
  40 100.0 MB  0  6( 9D+2P)  SAS  Regression
%
% aulumrg –unit sms100a1 –lu 10 1
The capacity of the unified logical unit will be 15.0GBs.
If the RAID level or the HDU combination of the unifying LUs does not match, the performance may be degraded.
And the existing user data in the additional LUs will be destroyed.
Are you sure you want to unify the LUs? (y/n [n]): y
The logical units have been unified successfully.
%
```

### Separating volumes

#### Command name

auludiv

#### Format

9500V, AMS, WMS, SMS, AMS2000, HUS
auludiv -unit unit_name -lu main_lu all | last
Description

This command separates the unified LU.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-lu main_lu all</td>
<td>last Specify the LU number to be separated. main_lu: Specify the LU number. all : Separates all the internal unified LUs. last : Separates the internal LU which has been unified last.</td>
</tr>
</tbody>
</table>

Example

In the following example, the logical unit 2 separates from the unified LU.

% aumludiv –unit sms100a1 –lu 2 last
Are you sure you want to separate the last LU from the unified LU? (y/n [n]): y
The logical units have been separated successfully.
%

Invalidating a volume

Command name

auluinvalidate

Format

9500V
auluinvalidate -unit unit_name -lu lun

Description

This command invalidates the LU. The invalidated LU cannot be used by a host. However, its data can be restored through restoration of the LU, and the invalidated LU can be reused when the LU is reassigned.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, “_ (underline)”, “. (period)”, “@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-lu lun</td>
<td>Specify a number of the LU to be invalidated.</td>
</tr>
</tbody>
</table>

Example

In the following example, the logical unit 2 is invalidated with array 9500.

```
% auluinvalidate -unit 9500 -lu 2
Password: 
This logical unit has already been formatted. Are you sure you want to invalidate logical unit 2? (y/n [n]): y
The setting ended normally.
%
```

Reassigning a volume

Command name

aulureallocate

Format

```
9500V
aulureallocate -unit unit_name -lu lun
-size num[ m | g ] | all [-nlu new_lun ]
```

Description

This command makes the invalidated LU usable by assigning a part or all of its area. When a part of the LU is assigned, the rest of the area is set as a new LU. The new LU is placed in a state in which it is invalidated. Both logical units are unformatted after the reassignment is executed.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-lu lun</td>
<td>Specify a number of the LU to be reassigned.</td>
</tr>
<tr>
<td>-size num[m</td>
<td>g]</td>
</tr>
<tr>
<td>-nlu new_lun</td>
<td>Specify a number of the LU to be generated through an assignment of the residual capacity after the reassignment is executed. When the specification of an LU number is omitted, Navigator determines the number as the least one of numbers of unused LUs automatically. When the -size is specified as &quot;all&quot;, however, this option cannot be specified.</td>
</tr>
</tbody>
</table>

Example

In the following example, the logical unit 2 is reallocated with array 9500.

```bash
% aulureallocate -unit 9500 -lu 2 -size 100m -nlu 10
Password:
Are you sure you want to reallocate logical unit 2?
New logical unit 10 is created in remained area. (y/n [n]): y
After it performs; the reallocated area cannot be brought back to the original logical unit any more.
Do you want to continue processing? (y/n [n]): y
The setting ended normally.
%
```

Restoring a volume

Command name

aulurestoration

Format

9500V
aulurestoration -unit unit_name -lu lun

Description

This command restores the invalidated LU as it was before.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, “_ (underline)”, “. (period)”, “@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-lu lun</td>
<td>Specify a number of the LU to be restored.</td>
</tr>
</tbody>
</table>

Example

In the following example, the invalidated LU 2 is restored with array 9500.

```
% aulurestoration -unit 9500 -lu 2
Password:
Are you sure you want to restore logical unit 2? (y/n [n]): y
The setting ended normally.
%
```

Referencing/starting/skipping/canceling parity correction online

Command name

aulucorrect

Format

- 9500V
- AMS, WMS, SMS, AMS2000, HUS

aulucorrect -unit unit_name -refer
- [-status [ uncorrected ] [ aborted ] [ correcting ] [ waiting ] [ skipped ] ]
- [-status [ uncorrected ] [ aborted ] [ correcting ] [ waiting ] [ skipped ] [ uncorre_drvidetach ] [ waiting_drvidreconst ] ]

aulucorrect -unit unit_name -start [-luorder lun ... ]
aulucorrect -unit unit_name -skip [ -lu lun ... ]
aulucorrect -unit unit_name -cancel -lu lun ...  
aulucorrect -unit unit_name -lucorrectlist

Description

This command refers to a status of LU correction by means of parity, starts, skips, cancel, or display list for recovery.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot; (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References a status of the LU correction by means of parity.</td>
</tr>
</tbody>
</table>
| -status [ uncorrected ] [ aborted ] [ correcting ] [ waiting ] [ skipped ] [ uncorre_drvdetach ] [ waiting_drvreconst ] | Specify a status of an LU you want to refer to. When the specification is omitted, all the statuses are displayed. One or more of the statuses can be specified. 
uncorrected : Uncorrected 
aborted : Correction Aborted 
correcting : Parity Correcting 
waiting : Waiting Parity Correction 
skipped: Correction Skipped 
uncorre_drvdetach: Uncorrected and Drive Detached 
waiting_drvreconst: Waiting Drive Reconstruction |
| -start | This option starts correction of the LU(s) by means of parity. When at least one LU, for which the correction has not been made, exists besides the specified LU(s), a confirmation message is displayed. The correction is made for the specified LU(s) in order of the specification, and then for the remaining LU(s) for which the correction has not been made. When the specification of LU(s) is omitted, the correction is made for all LUs for which the correction has not been made. |
### Examples

The following example displays the parity correction statuses of an array ams500.

```shell
% aulucorrect -unit ams500 -refer
Password:
Uncorrected
  LUN 1
Correction Aborted
  LUN
Correction Skipped
  LUN
Parity Correcting
  LUN  Progress
```

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-skip</td>
<td>This option skips correction of the LU(s) by means of parity. When at least one LU, for which the correction has not been made, exists besides the specified LU(s), a confirmation message is displayed. The correction is made for the specified LU(s), and then for the remaining LU(s) for which the correction has not been made. When the specification of LU(s) is omitted, the correction is made for all LUs for which the correction has not been made.</td>
</tr>
<tr>
<td>-cancel</td>
<td>This option cancels correction of an LU by means of parity. Execution is impossible when LU for which the correction has not been made exists.</td>
</tr>
</tbody>
</table>
| -luorder `lun`  | Specify number(s) of LU(s) for each of which the correction by means of parity is to be started, in order of making correction. One or more LU number(s) can be specified.  
                    Single specification : Specify a single LU number.  
                    Example: -luorder 3  
                    Multiple specification: Specify multiple LU numbers.  
                    Example: -luorder 0 1 2 3 4 5 8  
                    -luorder 0-5 8                                      |
| -lu `lun`       | Specify number(s) of LU(s) for which correction by means of parity is to be skipped or aborted. One or more LU number(s) can be specified.  
                    Single specification : Specify a single LU number.  
                    Example: -lu 3  
                    Multiple specification: Specify multiple LU numbers.  
                    Example: -lu 0 1 2 3 4 5 8  
                    -lu 0-5 8                                           |
| -lucorrectlist  | This option displays the list of LU which needs parity correction.  
                    The state of LU which needs parity correction is as follows:  
                    • Uncorrected  
                    • Uncorrected and Drive Detached                       |
The following example starts the parity correction of an array 9500.

```bash
% aulucorrect -unit 9500 -start
Password:
There are no uncorrected logical units.
%
```

**Referencing/setting the mapping guard information**

**Command name**

`aumapguard`

**Format**

```
9500V, AMS, WMS, SMS, AMS2000, HUS
aumapguard -unit unit_name -refer [-lu lun ...]
aumapguard -unit unit_name -set -lu lun ... -guard enable | disable
```

**Description**

This command references or sets the mapping guard information.

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, _ (underline)”, . (period)”, ”@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the mapping guard information.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the mapping guard information.</td>
</tr>
</tbody>
</table>
**Option** | **Description**
---|---
-**lu lun ...** | Specify the LU numbers to reference or set the mapping guard information. When doing that, enter the LU number using numerals or a hyphen(s) (-). Single or multiple LU numbers can be specified. When the -refer option is specified: If the specification is omitted, all the mapping guard information is displayed.  
  - Single specification: Specifying a single LU number.  
  - Example: -lu 3  
  - Multiple specification: Specifying multiple LU numbers.  
  - Example: -lu 0 1 2 3 4 5 8  
  - -lu 0-5 8
-**guard enable | disable** | Specify whether to set the mapping guard effective or ineffective.  
  - enable: Enables the mapping guard  
  - disable: Disables the mapping guard
Examples

The following example displays the mapping guard information of an array 9500.

```
% aumapguard -unit 9500 -refer
Password:
LUN  Mapping Guard     Status
  0  Disable           Normal
  1  Disable           Unformat
  2  Enable            Normal
  3  Disable           Undefined
  
%
```

The following example sets the mapping guard information of LU 100 of an array 9500.

```
% aumapguard -unit 9500 -set -lu 100 -guard enable
Password:
Are you sure you want to change the mapping guard? (y/n [n]): y
The mapping guard has been successfully changed.
%
```

Refer to the mapping guard information of ams2300 using Storage Navigator Modular 2 whose version is 10.00 or more. The defined LUN or the LUN whose mapping guard is set to enable is displayed.

```
% aumapguard -unit 9500 -refer
Password:
LUN  Mapping Guard     Status
  0  Disable           Normal
  1  Disable           Normal
  2  Disable           Normal
  100 Enable           Undefined
  200 Disable           Normal
  300 Disable           Normal
  1000 Enable           Undefined

%
```

Referencing/setting volume cache partition

Command name

aulucachept

Format

AMS, WMS, SMS, AMS2000, HUS
aulucachept -unit unit_name -refer [-lu lun ...]

AMS, WMS, AMS2000, HUS
aulucachept -unit unit_name -set -lu lun ... -pt pt_no
aulucachept -unit unit_name -set -lu lun ... -pairpt pt_no | auto

Description

This command references or sets the LU cache partition.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the LU cache partition</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the LU cache partition</td>
</tr>
<tr>
<td>-pt pt_no</td>
<td>Specify the partition. pt_no: Partition number</td>
</tr>
<tr>
<td>-pairpt pt_no</td>
<td>Specify the pair cache partition. pt_no: Pair cache partition number</td>
</tr>
<tr>
<td></td>
<td>auto: The array unit makes the decision automatically.</td>
</tr>
<tr>
<td>-lu lun ...</td>
<td>Specify the LU number, which is to be referenced or to be set. Single or multiple LU numbers can be specified.</td>
</tr>
</tbody>
</table>

Example

The following example displays the logical unit cache partition information of an array ams500a1.

```
% aulucachept -unit ams500a1 -refer
          Cache       Pair Cache       Current Cache
          Partition        Partition        Partition
LUN       Partition        Partition        Partition
0               0               0                   0
...:
%
```

Changing the volume size

Command name

auluchgsize

Format

SMS, AMS2000, HUS
auluchgsize -unit unit_name -lu lun -size num[ m | g | t ]
[-area area_no ...] [-arealu lun ]
auluchgsize -unit unit_name -lu lun -size rest
[-area area_no [-arealu lun ]]
auluchgsize -unit unit_name -lu lun -size rgrest
[-arealu lun ]

AMS2000, HUS
When changing size of the logical unit in DP pool.

**Description**

This command changes the LU size.

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot; ,&quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-lu lun</td>
<td>Specify the number of logical unit which change the size.</td>
</tr>
<tr>
<td>-size num[ m</td>
<td>g</td>
</tr>
<tr>
<td>-area area_no</td>
<td>Specify the free area number of the RAID group in which the LU is to be grown. Specify the number of the list displayed by the -availablelist option of auluadd command for the area number. Single or multiple free area numbers can be specified. Single specification : Specifying a single free area number. Example: -area 3 Multiple specification: Specifying multiple free area numbers. Example: -area 0 1 2 3 4 5 8 -area 0-5 8</td>
</tr>
<tr>
<td>-arealu</td>
<td>Specify the max LU number of the free area. If omitted, the Navigator will automatically apply an LU number.</td>
</tr>
<tr>
<td>-doptimize</td>
<td>Specify when executing the DP optimization after changing capacity.</td>
</tr>
</tbody>
</table>

**Example**

The following example changes the logical unit 0 size of an array ams2300a1.

```bash
% auluchgsize -unit ams2300a1 -lu 0 -size 10g
Are you sure you want to grow the logical unit? (y/n [n]): y
The logical unit has been grown successfully.
%```
% auluchgsize --unit ams2300a1 --lu 0 --size 100g
Are you sure you want to shrink the logical unit?
(y/n [n]): y
If you shrink the logical units, you will not be able to recover your data for the reduction.
Please make sure to perform backup of all important data before this operation.
When you shrink your logical unit, the data becomes unusable. Systems or applications that use this array will terminate abnormally. Please make sure to stop the host access to the array before performing this operation.
Are you sure you want to shrink the logical unit? (y/n [n]): y
The specified logical unit will be shrunk.
Are you sure you want to execute? (y/n [n]): y
The logical unit has been shrunk successfully.
%
System parameters

This section covers the following commands related to system parameters:

• Referencing/setting system parameters on page 3-94
• Referencing/setting system parameters online on page 3-97
• Referencing/setting system parameters on page 3-101
• Referencing/setting the RTC on page 3-107
• Referencing/setting LAN information on page 3-108
• Referencing/setting the port option on page 3-110
• Referencing/setting the boot option on page 3-115
• Referencing/setting the time zone on page 3-117
• Referencing/setting the IP address of the maintenance port on page 3-119
• Referencing/setting LAN information online on page 3-121

NOTE: When the AMS/WMS array connects to the NAS, restarting the array stops the cluster between the NAS units stop along and restarts the array. When restarting the array, stop the cluster between the NAS units, and then restart the array. Thereafter, start the cluster between the NAS units again.

NOTE: If you restart the array after issuing a power down instruction but before the power down with Power Savings enabled completes, the power down may fail because the array receives a command from a host immediately after the array restarts. If power down fails, perform the power down again. Check that the power down instruction has not been issued or has been completed (no RAID in the Power Saving Status of Normal (Command Monitoring) exists) before restarting the array.
Referencing/setting system parameters

Command name

ausystemparam

Format

AMS, WMS, SMS, AMS2000, HUS
ausystemparam -unit unit_name –refer

AMS, WMS
ausystemparam -unit unit_name –set
   [-LuCacheWarning enable | disable]
   [-WriteUniqueResponse enable | disable]
   [-AutoReconstenable | disable]
   [-ForcedWriteThrough enable | disable]
   [-LUChangeDisable enable | disable]
   [-ShadowImageIOSwitch enable | disable]
   [-SyncCacheExec enable | disable]
   [-DriveDetach enable | disable]
   [-ProcessorFailures reset | shutdown]
   [-WebTitle string]
   [-WriteVerifyExecution ctl_no on | off]

SMS, AMS2000, HUS
ausystemparam -unit unit_name –set
   [-LuCacheWarning enable | disable]
   [-WriteUniqueResponse enable | disable]
   [-AutoReconstenable | disable]
   [-ForcedWriteThrough enable | disable]
   [-SyncCacheExec enable | disable]
   [-DriveDetach enable | disable]
   [-ProcessorFailures reset | shutdown]
   [-WebTitle string]
   [-WriteVerifyExecution ctl_no on | off]

Description

This command references the contents of system parameters or set the parameters.
## Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <em>unit_name</em></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the system parameters.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the system parameters.</td>
</tr>
<tr>
<td>-LuCacheWarning enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Reports warning.</td>
</tr>
<tr>
<td></td>
<td>disable: Does not report warning.</td>
</tr>
<tr>
<td>-WriteUniqueResponse enable</td>
<td>disable</td>
</tr>
<tr>
<td>-AutoReconst enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the Auto Reconstruction Mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the Auto Reconstruction Mode.</td>
</tr>
<tr>
<td>-ForcedWriteThrough enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the Forced Write Through Mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the Forced Write Through Mode.</td>
</tr>
<tr>
<td>-LUChangeDisable enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the LU Ownership Change Disable Mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the LU Ownership Change Disable Mode.</td>
</tr>
<tr>
<td>-ShadowImageIOSwitch enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the ShadowImage I/O Switch Mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the ShadowImage I/O Switch Mode.</td>
</tr>
<tr>
<td>-SyncCacheExec enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the Synchronize Cache Execution Mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the Synchronize Cache Execution Mode.</td>
</tr>
<tr>
<td>-DriveDetach enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the drive blockage mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the drive blockage mode.</td>
</tr>
</tbody>
</table>
## Example

The following example displays the system parameters of an array ams500a1.

```bash
% ausystemparam -unit ams500a1 -refer
Password:

---- Common Parameter ----
Options
  Turbo LU Warning = OFF
  Write Unique Response Mode = OFF
  Auto Reconstruction Mode = OFF
  Forced Write Through Mode = OFF
  LU Ownership Change Disable Mode = OFF
  Shadow Image I/O Switch Mode = OFF
  Synchronize Cache Execution Mode = OFF
  Drive Detach Mode = OFF
  Operation if the Processor failures Occurs = Reset the Fault
Web Title
  Web Title = ""
---- CTL0 Parameter ----
  Write & Verify Execution Mode = ON
---- CTL1 Parameter ----
  Write & Verify Execution Mode = ON
%
```

The following example displays the system parameters of an array ams2300a1.

```bash
% ausystemparam -unit ams2300a1 -refer
Password:

---- Common Parameter ----
Options
  Turbo LU Warning = OFF
  Write Unique Response Mode = OFF
  Auto Reconstruction Mode = OFF
  Forced Write Through Mode = OFF
  Shadow Image I/O Switch Mode = OFF
  Synchronize Cache Execution Mode = OFF
  Drive Detach Mode = OFF
  Lower Drive Detach Threshold Mode = OFF
  Operation if the Processor failures Occurs = Reset the Fault
Web Title
  Web Title = ""
---- CTL0 Parameter ----
  Write & Verify Execution Mode = ON
---- CTL1 Parameter ----
  Write & Verify Execution Mode = ON
%
```
Referencing/setting system parameters online

Command name

auonsysprm

Format

9500V
auonsysprm -unit unit_name --refer

auonsysprm -unit unit_name --set

-PROCOM enable | disable ]
-ReportStatus enable | disable ]
-LuCacheWarning enable | disable ]
-NX enable | disable ]
-AutoReconst enable | disable ]
-ForcedWriteThrough enable | disable ]
-LUChanging1 enable | disable ]
-MultiStream enable | disable ]
-MultiStreamWrite enable | disable ]
-MultiStreamRead enable | disable ]
-HiSpeedSeqWrite enable | disable ]
-ShadowImageIOSwitch enable | disable ]
-SyncCacheAllExec enable | disable ]
-SyncCacheInvalid enable | disable ]
-DriveDetach enable | disable ]
-ProcessorFailures reset | shutdown ]
-inquiryCommandQueue on | off ]
-WebTitle string ]
-Rs232cOutflow ctl_no off | normal | hitrack ]
-WriteVerifyExecution ctl_no on | off ]

Description

This command references the contents of system parameters or set the parameters online.
## Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the system parameters.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the system parameters.</td>
</tr>
<tr>
<td>-PROCOM enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the PROCOM mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the PROCOM mode.</td>
</tr>
<tr>
<td>-ReportStatus enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the warning status report.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the warning status report.</td>
</tr>
<tr>
<td>-LuCacheWarning enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Reports warning.</td>
</tr>
<tr>
<td></td>
<td>disable: Does not report warning.</td>
</tr>
<tr>
<td>-NX enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the NX host connection mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the NX host connection mode.</td>
</tr>
<tr>
<td>-AutoReconst enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the auto reconstruction mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the auto reconstruction mode.</td>
</tr>
<tr>
<td>-ForcedWriteThrough enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the forced write through mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the forced write through mode.</td>
</tr>
<tr>
<td>-LUChanging1 enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the Changing Logical Unit Mode 1.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the Changing Logical Unit Mode 1.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td><code>-MultiStream enable</code></td>
<td>Specify whether to set the Multiple Stream Mode effective or ineffective.</td>
</tr>
<tr>
<td><code>-MultiStreamWrite enable</code></td>
<td>Specify whether to set the Multiple Stream Read Mode effective or ineffective.</td>
</tr>
<tr>
<td><code>-MultiStreamRead enable</code></td>
<td>Specify whether to set the Multiple Stream Read Mode effective or ineffective.</td>
</tr>
<tr>
<td><code>-HiSpeedSeqWrite enable</code></td>
<td>Specify whether to set the High-speed Sequential Write Mode effective or ineffective.</td>
</tr>
<tr>
<td><code>-ShadowImageIOSwitch enable</code></td>
<td>Specify whether to set the ShadowImage I/O Switch Mode effective or ineffective.</td>
</tr>
<tr>
<td><code>-SyncCacheAllExec enable</code></td>
<td>Specify whether to set the ShadowImage I/O Switch Mode effective or ineffective.</td>
</tr>
<tr>
<td><code>-SyncCacheInvalid enable</code></td>
<td>Specify whether to set the Synchronize Cache Invalid Mode effective or ineffective.</td>
</tr>
<tr>
<td><code>-DriveDetach enable</code></td>
<td>Specifies whether to set the drive blockage mode effective or ineffective.</td>
</tr>
</tbody>
</table>
The following example displays the system parameters of an array 9500a1.

```
% auonsysprm -unit 9500a1 -refer
Password:

---- Common Parameter ----
Options
  PROCOM mode enable = OFF
  Report status (normal / warning) = OFF
  Turbo LU Warning = OFF
  NX Mode = OFF
  Auto Reconstruction Mode = OFF
  Forced Write Through Mode = OFF
  Changing Logical Unit Mode 1 = OFF
  Multiple Stream Mode = OFF
  Multiple Stream Mode (Write) = OFF
  Multiple Stream Mode (Read) = OFF
  High-speed Sequential Write Mode = OFF
  ShadowImage I/O Switch Mode = OFF
  Synchronize Cache All Execution Mode = OFF
  Synchronize Cache Invalid Mode = OFF
  Drive Detach Mode = OFF
  Operation if the Processor failures Occurs = Reset a Fault
  INQUIRY Information
  Command Queuing = OFF
  Web Title
    Web Title = ""

---- CTL0 Parameter ----
-ProcessorFailures
  reset | shutdown
    Specify action when a processor failure occurs.
    reset : Resets the failure and restarts the controller.
    shutdown: Shuts down the array unit.

- inquiryCommandQueue
  on | off
    Specify execution of command queuing for INQUIRY response information.
    on : Executes command queuing.
    off: Suppresses command queuing.

-WebTitle string
    If the home page of the array unit is displayed with the browser, this option specifies a character string displayed on the title bar of the browser. Enter up to 32 one-byte coded alphanumeric characters or characters (except for the ' (single quotation mark), " (double quotation mark), and \ (backslash) symbols) other than numeric.

-Rs232cOutflow
  ctl_no off | normal | hitrack
    Sets the mode of sending out error information onto RS232C.
  ctl_no : Controller number (0, 1).
    off : Does not send out information.
    normal : Sends out information.
    hitrack: Sends out information in the HITRACK mode.

-WriteVerifyExecution
  ctl_no on | off
    Specify the execution of the write & verify operation.
  ctl_no: Controller number (0, 1).
    on : Executes write & verify operation.
    off : Does not execute write & verify operation.
```
Referencing/setting system parameters

Command name

ausysparam

Format

9500V
ausysparam -unit unit_name --refer
ausysparam -unit unit_name --set
   [-SystemStartup Single | DualIDTake | DualNotIDTake | HotIDTake | HotNotIDTake]
   [-TakingID port_no ctl_no]
   [-DataShare used | notUsed]
   [-DelayPlannedShutdown time]
   [-DriveDetach enable | disable]
   [-PROCOM enable | disable]
   [-ReportStatus enable | disable]
   [-LuCacheWarning enable | disable]
   [-NX enable | disable]
   [-AutoReconst enable | disable]
   [-ForcedWriteThrough enable | disable]
   [-LUChanging1 enable | disable]
   [-MultiStream enable | disable]
   [-MultiStreamWrite enable | disable]
   [-MultiStreamRead enable | disable]
   [-HiSpeedSeqWrite enable | disable]
   [-ShadowImageOSwitch enable | disable]
   [-SyncCacheAllExec enable | disable]
   [-SyncCacheInvalid enable | disable]
   [-ProcessorFailures reset | shutdown]
   [-inquiryCommandQueue on | off]
   [-inquiryVendor string]
   [-inquiryProduct string]
   [-inquiryRomMicro string]
   [-inquiryRamMicro string]
   [-WebTitle string]
   [-Rs232cOutflow ctl_no off | normal | hitrack]
   [-WriteVerifyExecution ctl_no on | off]
   [-dhcp ctl_no enable | disable]
   [-IPAddress ctl_no inet_addr]
   [-SubnetMask ctl_no netmask]
   [-DefaultGateway ctl_no gateway]

Description

This command references the contents of system parameters or set the parameters.

NOTE: If LAN configuration information (such as an IP Address) is modified, an error message (Interface Error) may be displayed when restarting an array, without displaying a restart completion message. When modifying LAN configuration information, restart the array manually.
### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the system parameters.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the system parameters.</td>
</tr>
<tr>
<td>-SystemStartup</td>
<td>Specify the configuration of an array unit.</td>
</tr>
<tr>
<td>-TakingID port_no</td>
<td>Specify the default controller of each port when a dual active configuration used the SCSI ID take over. port_no: Port number (A, B, C, D). ctl_no : Controller number (0, 1).</td>
</tr>
<tr>
<td>-DataShare used</td>
<td>notUsed</td>
</tr>
<tr>
<td>-DelayPlannedShut down time</td>
<td>Specify the time in minutes to delay the execution of the planned shutdown when the main switch has turned off. The applicable range is from 0 to 60 minutes in unit of 1 minute. The default value is 0.</td>
</tr>
<tr>
<td>-DriveDetach enable</td>
<td>disable</td>
</tr>
<tr>
<td>-PROCOM enable</td>
<td>disable</td>
</tr>
<tr>
<td>-ReportStatus enable</td>
<td>disable</td>
</tr>
<tr>
<td>-LuCacheWarning enable</td>
<td>disable</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| -NX enable | disable                | Specify whether to set the NX host connection mode effective or ineffective.  
|                               | enable : Enables the NX host connection mode.  
|                               | disable: Disables the NX host connection mode.                              |
| -AutoReconst enable | disable             | Specify whether to set the auto reconstruction mode effective or ineffective. 
|                               | enable : Enables the auto reconstruction mode.                              
|                               | disable: Disables the auto reconstruction mode.                             |
| -ForcedWriteThrough enable | disable           | Specify whether to set the forced write through mode effective or ineffective. 
|                               | enable : Enables the forced write through mode.                             
|                               | disable: Disables the forced write through mode.                            |
| -LUChanging1 enable | disable            | Specify whether to set the Changing Logical Unit Mode 1 effective or ineffective. 
|                               | enable : Enables the Changing Logical Unit Mode 1.                          
|                               | disable: Disables the Changing Logical Unit Mode 1.                         |
| -MultiStream enable | disable          | Specify whether to set the Multiple Stream Mode effective or ineffective.    
|                               | enable : Enables the Multiple Stream Mode.                                  
|                               | disable: Disables the Multiple Stream Mode.                                 |
| -MultiStreamWrite enable | disable        | Specify whether to set the Multiple Stream Write Mode effective or ineffective. 
|                               | enable : Enables the Multiple Stream Write Mode.                            
|                               | disable: Disables the Multiple Stream Write Mode.                           |
| -MultiStreamRead enable | disable         | Specify whether to set the Multiple Stream Read Mode effective or ineffective. 
|                               | enable : Enables the Multiple Stream Read Mode.                             
|                               | disable: Disables the Multiple Stream Read Mode.                            |
| -HiSpeedSeqWrite enable | disable        | Specify whether to set the High-speed Sequential Write Mode effective or ineffective. 
|                               | enable : Enables the High-speed Sequential Write Mode.                      
<p>|                               | disable: Disables the High-speed Sequential Write Mode.                     |</p>
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`- ShadowImageIOSwitch enable</td>
<td>Specify whether to set the High-speed Sequential Write Mode effective or ineffective.</td>
</tr>
<tr>
<td>disable`</td>
<td>enable : Enables the High-speed Sequential Write Mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the High-speed Sequential Write Mode.</td>
</tr>
<tr>
<td>`-SyncCacheAllExec enable</td>
<td>Specify whether to set the ShadowImage I/O Switch Mode effective or ineffective.</td>
</tr>
<tr>
<td>disable`</td>
<td>enable : Enables the ShadowImage I/O Switch Mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the ShadowImage I/O Switch Mode.</td>
</tr>
<tr>
<td>`-ProcessorFailures reset</td>
<td>Specify the action when a processor failure occurs.</td>
</tr>
<tr>
<td>shutdown`</td>
<td>reset : Resets the failure and restarts the controller.</td>
</tr>
<tr>
<td></td>
<td>shutdown: Shuts down the array unit.</td>
</tr>
<tr>
<td>`-inquiryCommandQueue on</td>
<td>Specify execution of command queuing for INQUIRY response information.</td>
</tr>
<tr>
<td>off`</td>
<td>on : Executes command queuing.</td>
</tr>
<tr>
<td></td>
<td>off: Suppresses command queuing.</td>
</tr>
<tr>
<td><code>-inquiryVendor string</code></td>
<td>Specify execution of command queuing for INQUIRY response information.</td>
</tr>
<tr>
<td></td>
<td>on : Executes command queuing.</td>
</tr>
<tr>
<td></td>
<td>off: Suppresses command queuing.</td>
</tr>
<tr>
<td><code>-inquiryProduct string</code></td>
<td>Specify the product type of Inquiry response information in less than or equal to 16 characters. If you want to enter NULL characters, enter &quot;</td>
</tr>
<tr>
<td><code>-inquiryRomMicro string</code></td>
<td>Specify the ROM microprogram version of Inquiry response information in less than or equal to 2 characters. If you want to enter NULL characters, enter &quot;&quot;</td>
</tr>
<tr>
<td><code>-inquiryRamMicro string</code></td>
<td>Specify the RAM microprogram version of Inquiry response information in less than or equal to 2 characters. If you want to enter NULL characters, enter &quot;&quot;</td>
</tr>
<tr>
<td><code>-WebTitle string</code></td>
<td>If the home page of the array unit is displayed with the browser, this option specifies a character string displayed on the title bar of the browser. Enter up to 32 one-byte coded alphanumeric characters or characters (except for the ' (single quotation mark), &quot; (double quotation mark), and \ (backslash) symbols) other than numeric.</td>
</tr>
</tbody>
</table>
The following example displays the system parameters of an array 9500a1.

```bash
% ausysparam -unit 9500a1 -refer
Password:
System parameter list.

DF Name : 9500a1
Date : 2004/04/20 13:00:00
Firmware Revision : 0658
Array Unit Type : 9500V
Serial Number : nnnnnnnnn

---- Common Parameter ----
System Startup Attribute = Dual Active Mode
SCSI ID/Port ID Take-over Mode = ---
Data Share Mode = Used
Delay Planned Shutdown = 0
Option 1
Drive Detach mode enable = OFF
Option 2
PROCOM mode enable = OFF
```

### Examples

The following example displays the system parameters of an array 9500a1.
Report status (normal / warning) = OFF
Turbo LU Warning = OFF
NX Mode = OFF
Auto Reconstruction Mode = OFF
Forced Write Through Mode = OFF
Changing Logical Unit Mode 1 = OFF
Multiple Stream Mode = OFF
Multiple Stream Mode (Write) = OFF
Multiple Stream Mode (Read) = OFF
High-speed Sequential Write Mode = OFF
Shadow Image I/O Switch Mode = OFF
Synchronize Cache All Execution Mode = OFF
Synchronize Cache Invalid Mode = OFF
Operation if the Processor failures Occurs = Reset a Fault

INQUIRY Information
Command Queuing = ON
Vendor ID = HITACHI
Product ID = DF600F
ROM Microprogram Version =
RAM Microprogram Version =
Web Title
Web Title ="

---- CTL0 Parameter ----
RS232C Error Information Outflow Mode = OFF
Write & Verify Execution Mode = ON
LAN Const
DHCP = OFF
IP Address = 0.0.0.0
Subnet Mask = 0.0.0.0
Default Gateway = 0.0.0.0
Ether Address = 00:00:87:B4:62:4C

---- CTL1 Parameter ----
RS232C Error Information Outflow Mode = OFF
Write & Verify Execution Mode = ON
LAN Const
DHCP = OFF
IP Address = 0.0.0.0
Subnet Mask = 0.0.0.0
Default Gateway = 0.0.0.0
Ether Address = 00:00:87:B4:62:1C
%

The following example sets a system parameter, to suppress the mode that sends error information to RS232C interface, for an array 9500a1.

% ausysparam -unit 9500a1 -set -Rs232cOutflow 0 off
Password:
When executing the command, the subsystem stops accepting access from the host.
Do you want to continue? (y/n [n]): y
In order to complete the setting, it is necessary to reboot the subsystem.
Host will be unable to access the subsystem while restarting. Host applications
that use the subsystem will terminate abnormally. Please stop host access before
you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting begins.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 4 - 15min.
The subsystem restarted successfully.
%

NOTE: When setting all the system parameter in Windows®, you cannot set
them on a command prompt due to the limitation on the number of
characters. Create the contents of the settings in a bat file, and then execute
the appropriate command. It may take time for an array to respond,
depending on the condition of the array. If the array does not respond after
15 minutes, check the condition of the array.
Referencing/setting the RTC

Command name

aurtc

Format

9500V, AMS, WMS, SMS, AMS2000, HUS
aurtc -unit unit_name --refer
aurtc -unit unit_name -set -auto [ -f ]
aurtc -unit unit_name -set -manual -date yyyy/mm/dd -time HH:MM:SS [ -f ]

Description

This command references and sets the RTC.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References RTC.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the RTC.</td>
</tr>
<tr>
<td>-auto</td>
<td>Sets the date and time of the machine which the Navigator is running, on RTC.</td>
</tr>
<tr>
<td>-manual</td>
<td>Sets the date and time specified by -date and -time options, to RTC.</td>
</tr>
<tr>
<td>-date yyyy/mm/dd</td>
<td>Specify the date to be set.</td>
</tr>
<tr>
<td></td>
<td>mm : month (01 to 12).</td>
</tr>
<tr>
<td></td>
<td>dd : day (01 to 31).</td>
</tr>
<tr>
<td>-time HH:MM:SS</td>
<td>Specify the time to be set.</td>
</tr>
<tr>
<td></td>
<td>HH: hour (00 to 23).</td>
</tr>
<tr>
<td></td>
<td>MM: minute (00 to 59).</td>
</tr>
<tr>
<td></td>
<td>SS: second (00 to 59).</td>
</tr>
<tr>
<td>-f</td>
<td>Omits the confirmation message when the command is executed.</td>
</tr>
</tbody>
</table>
**Examples**

The following example displays the RTC of an array 9500a1.

```
% aurtc -unit 9500a1 -refer
Password:
Date 2007/04/28    Time 18:14:28
%
```

The following example automatically sets the RTC of an array 9500a1.

```
% aurtc -unit 9500a1 -set -auto
Password:
Are you sure you want to set the RTC? (y/n [n]): y
The RTC has been set successfully.
%
```

**Referencing/setting LAN information**

**Command name**

aulan

**Format**

9500V, AMS, WMS

aulan -unit unit_name –refer

aulan -unit unit_name -set -ctl0 | -ctl1
    [-addr inet_addr] [-mask netmask] [-gate gateway]
    [-dhcp enable | disable]

AMS, WMS

aulan -unit unit_name –set
    -ctl0 | -ctl1 [-addr inet_addr]
    [-mask netmask]
    [-gate gateway]
    [-dhcp enable | disable]
    [-mipchg]

aulan -unit unit_name –set
    -ctl0 | -ctl1 [-addr inet_addr]
    [-mipchgmode enable | disable]
    [-mask netmask]
    [-gate gateway]
    [-neg auto | 10mh | 10mf | 100mh | 100mf]
    [-dhcp enable | disable ]

**Description**

This command displays and sets LAN information of the array.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus), &quot;_ (underline), &quot;. (period), &quot;@&quot;, or &quot; (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References LAN information.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets LAN information.</td>
</tr>
<tr>
<td>-ctl0</td>
<td>-ctl1</td>
</tr>
<tr>
<td>-addr inet_addr</td>
<td>Specify the IP addresses.</td>
</tr>
<tr>
<td>-mask netmask</td>
<td>Specify the subnet masks.</td>
</tr>
<tr>
<td>-gate gateway</td>
<td>Specify individual default gateways.</td>
</tr>
</tbody>
</table>
| -nego auto | 10mh | 10mf | 100mh | 100mf | Specify the negotiations.  
|               | auto : The disk array unit makes the decision automatically.  
|               | 10mh : 10 Mbps/Half  
|               | 10mf : 10 Mbps/Full  
|               | 100mh: 100 Mbps/Half  
|               | 100mf: 100 Mbps/Full  |
| -dhcp enable | disable | Specify whether to set the DHCP mode to enable or disable.  |
| -mipchg        | Specify this option when changing the IP addresses of maintenance port automatically.  |
| -mipchgmode enable | disable | Specify whether to set the Maintenance Port IP Address Automatic Change Mode to enable or disable.  
|               | enable : Enables the Maintenance Port IP Address Automatic Change Mode.  
|               | disable: Disables the Maintenance Port IP Address Automatic Change Mode.  |

Examples

The following example displays the LAN information of an array 9500a1.

```
% aulan -unit 9500a1 -refer  
Password:  
CTL IP Address  Subnet mask  Default Gateway  Ethernet address  DHCP  
0 125.0.9.98  255.255.255.0  125.0.9.15  00:00:87:50:78:AF OFF  
1 125.0.9.99  255.255.255.0  125.0.9.15  00:00:87:50:78:9F OFF  
%  
```

The following example sets LAN information for the Controller 0 side of an array 9500a1.

```
% aulan -unit 9500a1 -set -ctl0  
-address 192.168.100.100 -mask 255.255.255.0 -gate 192.168.100.5  
Password:  
Are you sure you want to set the LAN information? (y/n[n]): y  
```
In order to complete the setting, it is necessary to reboot the subsystem. When not restarting, the setting will be registered, but it will not become effective on the subsystem.

Do you restart the subsystem? (y/n [n]): y

Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop access before you restart the subsystem. Also, if you are logging in, the login status will be canceled when restarting begins.

Do you agree with restarting? (y/n): y

Are you sure you want to execute? (y/n [n]): y

Now restarting the subsystem. Start Time hh:mm:ss Time Required 4 - 15min.
The subsystem restarted successfully.

NOTE: To validate the LAN information, restart the array. The previous settings remain valid until restarting. The array cannot access the host until the reboot is completed and the system restarts. Therefore, verify that the host has stopped accessing data before beginning the restart process.

If LAN configuration information is modified, an error message (Interface Error) may appear without displaying a restart completion message when restarting is initiated. When an error message is displayed after the LAN configuration information is modified and a restarting is directed to be done, execute the auunitchg command. Make a change in the information that has been registered.

It may take time for an array to respond, depending on the condition of the array. If the array does not respond after 15 minutes, check the condition of the array.

Referencing/setting the port option

Command name

auportop

Format

9500V, AMS, WMS, SMS, AMS2000, HUS
auportop -unit unit_name --refer

9500V
auportop -unit unit_name --set
   -PortTypeOption ctl_no port_no
   ResetLipSignal | ResetLipProcess | LipPortAllReset | ReadFrameMin128
   enable | disable

AMS, WMS
auportop -unit unit_name --set
   -PortTypeOption ctl_no port_no
   ResetLipSignal | ResetLipProcess | LipPortAllReset | CrossCtl11O | CmdUniqueResponse
   enable | disable

SMS
auportop -unit unit_name --set
   -PortTypeOption ctl_no port_no
   ResetLipSignal | ResetLipProcess | LipPortAllReset | PLOGITimeoutPrevention | DisableAutodiscoverNewHG
   enable | disable
**Description**

This command references and sets the port option.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the port option.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the port option.</td>
</tr>
<tr>
<td>-PortTypeOption</td>
<td>Specifies the port type.</td>
</tr>
<tr>
<td>ctl_no port_no</td>
<td>ctl_no : Controller number (0, 1). &lt;br&gt;port_no : Port number (A, B, C, D). &lt;br&gt;ResetLipSignal : Sets ResetLip (signal). &lt;br&gt;ResetLipProcess: Sets ResetLip (processing). &lt;br&gt;LipPortAllReset: Sets the resetting of all ports by an LIP. &lt;br&gt;ReadFrameMin128: Sets Read Frame Min 128 Byte Mode. (DF600 only) &lt;br&gt;CrossCtlIO: Sets CPU Load Reduction for Cross-CTL I/O Mode. I/O Mode.</td>
</tr>
<tr>
<td></td>
<td>(For SMS and AMS2000) &lt;br&gt;CmdUniqueResponse: Sets Command Unique Response Mode. &lt;br&gt;PLOGITimeoutPrevention: Sets PLOGI Timeout Prevention Mode.</td>
</tr>
<tr>
<td>DisableAutodiscoveryNewHG</td>
<td>(For SMS and AMS2000) &lt;br&gt;DisableAutodiscoveryNewHG: Sets Disable Autodiscover New HG Mode.</td>
</tr>
<tr>
<td>enable</td>
<td>Enables the settings described above. &lt;br&gt;disable</td>
</tr>
</tbody>
</table>

Example

The following example displays the port option of an array 9500a1.

```
% auportop -unit 9500a1 -refer
Password: 
Port Options
Reset/LIP Mode (Signal)
  Port 0A = OFF
  Port 0B = OFF
  Port 1A = OFF
  Port 1B = OFF
Reset/LIP Mode (Process)
  Port 0A = OFF
  Port 0B = OFF
  Port 1A = OFF
  Port 1B = OFF
```
LIP Port All Reset Mode
Port 0A = OFF
Port 0B = OFF
Port 1A = OFF
Port 1B = OFF
Read Frame Min 128 Byte Mode
Port 0A = OFF
Port 0B = OFF
Port 1A = OFF
Port 1B = OFF
%

The following example sets the port option of an array 9500a1.

```
% auportop -unit 9500a1 -set -PortTypeOption 0 A ResetLipSignal enable
Password:
When setting starts, the subsystem stops accepting access to the port from the host.
Before setting, stop access to the port from the host.
Do you want to continue processing? (y/n [n]): y
%
```

The following example sets the port option of an array ams2300a1.

```
% auportop -unit 9500a1 -set -PortTypeOption 0 A ResetLipSignal enable
Password:
Are you sure you want to set the port option parameter? (y/n [n]): y
The port option parameter has been set successfully.
%
% auportop -unit ams2300a1 -refer
Port Options
Reset/LIP Mode (Signal)
Port 0A = ON
Port 0B = OFF
Port 0C = OFF
Port 0D = OFF
Port 1A = OFF
Port 1B = OFF
Port 1C = OFF
Port 1D = OFF
Reset/LIP Mode (Process)
Port 0A = OFF
Port 0B = OFF
Port 0C = OFF
Port 0D = OFF
Port 1A = OFF
Port 1B = OFF
Port 1C = OFF
Port 1D = OFF
LIP Port All Reset Mode
Port 0A = OFF
Port 0B = OFF
Port 0C = OFF
Port 0D = OFF
Port 1A = OFF
Port 1B = OFF
Port 1C = OFF
Port 1D = OFF
CPU Load Reduction for Cross-CTL I/O Mode
Port 0A = OFF
Port 0B = OFF
Port 0C = OFF
Port 0D = OFF
Port 1A = OFF
Port 1B = OFF
Port 1C = OFF
Port 1D = OFF
Command Unique Response Mode
Port 0A = OFF
Port 0B = OFF
Port 0C = OFF
Port 0D = OFF
Port 1A = OFF
Port 1B = OFF
Port 1C = OFF
Port 1D = OFF
PLOGI Timeout Prevention Mode
Port 0A = OFF
Port 0B = OFF
```
The following example displays the port option of an array unit hus110a1.

```
% auportop -unit ams2300a1 -refer
Port Options
Reset/LIP Mode (Signal)
Port 0A = ON
Port 0B = OFF
Port 0C = OFF
Port 0D = OFF
Port 1A = OFF
Port 1B = OFF
Port 1C = OFF
Port 1D = OFF
Reset/LIP Mode (Process)
Port 0A = OFF
Port 0B = OFF
Port 0C = OFF
Port 0D = OFF
Port 1A = OFF
Port 1B = OFF
Port 1C = OFF
Port 1D = OFF
LIP Port All Reset Mode
Port 0A = OFF
Port 0B = OFF
Port 0C = OFF
Port 0D = OFF
Port 1A = OFF
Port 1B = OFF
Port 1C = OFF
Port 1D = OFF
Command Unique Response Mode
Port 0A = OFF
Port 0B = OFF
Port 0C = OFF
Port 0D = OFF
Port 1A = OFF
Port 1B = OFF
Port 1C = OFF
Port 1D = OFF
PLOGI Timeout Prevention Mode
Port 0A = OFF
Port 0B = OFF
Port 0C = OFF
Port 0D = OFF
Port 1A = OFF
Port 1B = OFF
Port 1C = OFF
Port 1D = OFF
Disable Selective Ack Mode
```
Referencing/setting the boot option

Command name

aubootopt

Format

AMS, WMS, SMS, AMS2000, HUS
aubootopt -unit unit_name –refer

AMS, WMS
aubootopt -unit unit_name –set
[ -SystemStartup Single | Dual ]
[ -DelayPlannedShutdown time ]
[ -DriveDetach enable | disable ]
[ -inquiryVendor string ]
[ -inquiryProduct string ]
[ -inquiryRomMicro string ]
[ -inquiryRamMicro string ]

SMS, AMS2000, HUS
aubootopt -unit unit_name –set
[ -SystemStartup Single | Dual ]
[ -DelayPlannedShutdown time ]
[ -inquiryVendor string ]
[ -inquiryProduct string ]
[ -inquiryRomMicro string ]
[ -inquiryRamMicro string ]

Description

This command references or sets the boot option of the array.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <em>unit_name</em></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the boot option.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the boot option.</td>
</tr>
<tr>
<td>-SystemStartup</td>
<td>Specify the configuration of an array unit.</td>
</tr>
<tr>
<td>Single</td>
<td>Dual</td>
</tr>
<tr>
<td>-DelayPlannedShutdown <em>time</em></td>
<td>Specify the time in minutes to delay the execution of the planned shutdown when the main switch has turned off. The applicable range is from 0 to 60 minutes in unit of 1 minute. The default value is 0.</td>
</tr>
<tr>
<td>-DriveDetach enable</td>
<td>disable</td>
</tr>
<tr>
<td>-inquiryVendor <em>string</em></td>
<td>Specify the vendor name of Inquiry response information in less than or equal to 8 characters. If you want to enter NULL characters, enter “”.</td>
</tr>
<tr>
<td>-inquiryProduct <em>string</em></td>
<td>Specify the product type of Inquiry response information in less than or equal to 16 characters. If you want to enter NULL characters, enter “”.</td>
</tr>
<tr>
<td>-inquiryRomMicro <em>string</em></td>
<td>Specify the ROM microprogram version of Inquiry response information in less than or equal to 2 characters. If you want to enter NULL characters, enter “”</td>
</tr>
</tbody>
</table>

Example

The following example displays the boot option of an array ams500a1.

```
% aubootopt -unit ams500a1 -refer
Password:
System Startup Attribute = Dual Active Mode
Delay Planned Shutdown[min.] = 0
Drive Detach Mode = OFF
Vendor ID = HITACHI
Product ID = DF600F
ROM Microprogram Version =
RAM Microprogram Version =
%
```
Referencing/setting the time zone

Command name

autimezone

Format

AMS, WMS, SMS, AMS2000, HUS
autimezone -unit unit_name -refer
autimezone -unit unit_name -set
        [ -timezone num ] [ -dst used | notused ]
        [ -ntp1 address ] [ -ntp2 address ]
autimezone -unit unit_name -availablelist -timezone

Description

This command references or sets the time zone/Network Time Protocol (NTP) server.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the time zone/NTP server IP address.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the time zone/NTP server IP address.</td>
</tr>
<tr>
<td>-availablelist</td>
<td>A list of time zone numbers, each of which is eligible for the time zone is displayed.</td>
</tr>
<tr>
<td>-timezone num</td>
<td>Specify the time zone number by selecting it from the list of time zones that can be specified.</td>
</tr>
</tbody>
</table>
| -dst used | notused   | Specify whether to use the daylight saving time or not.  
             used   : Use the daylight saving time.  
             notused: Do not use the daylight saving time.  |
| -ntp1 address           | Specify NTP server1 IP address. To cancel the specification, enter ""        |
| -ntp2 address           | Specify NTP server2 IP address. To cancel the specification, enter ""        |
| -timezone               | A list of time zone numbers, each of which is eligible for the time zone is displayed. |

NOTE: When the array is used to connect to the NAS, you must reboot the NNC to update the NNC time zone and set the contents of a NTP server. It is unnecessary to reboot the array.
Examples

The following example displays the time zone of an array ams500 and NTP server IP address.

% autimezone-unit ams500 -refer
Password:
Time Zone : (GMT-12:00) International Date Line West
Daylight Saving Time : ---
NTP Server
Server1 : 125.0.9.98
Server1 : 125.0.9.99
%

The following example sets the NTP server IP address of an array ams500.

% autimezone-unit ams500 -set -ntp1 192.168.100.100
Password:
Are you sure you want to set the time zone/NTP server? (y/n [n]): y
The time zone/NTP server have been set successfully.
Restart NNC to apply the NNC setting in case that NNC is equipped.
%

The following example displays the eligibility for the time zone of an array ams500.

% autimezone-unit ams500-availablelist -timezone
Password:
Available Time Zone
<table>
<thead>
<tr>
<th>No.</th>
<th>DST</th>
<th>Time Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Disable</td>
<td>(GMT-12:00) International Date Line West</td>
</tr>
<tr>
<td>2</td>
<td>Disable</td>
<td>(GMT-11:00) Midway Island/ Samoa</td>
</tr>
<tr>
<td>3</td>
<td>Disable</td>
<td>(GMT-10:00) Hawaii</td>
</tr>
<tr>
<td>4</td>
<td>Enable</td>
<td>(GMT-09:00) Alaska</td>
</tr>
<tr>
<td>5</td>
<td>Enable</td>
<td>(GMT-08:00) Pacific Time (US &amp; Canada); Tijuana</td>
</tr>
<tr>
<td>6</td>
<td>Disable</td>
<td>(GMT-07:00) Arizona</td>
</tr>
<tr>
<td>7</td>
<td>Enable</td>
<td>(GMT-07:00) Chihuahua/ La Paz/ Mazatlan</td>
</tr>
<tr>
<td>8</td>
<td>Enable</td>
<td>(GMT-07:00) Mountain Time (US &amp; Canada)</td>
</tr>
<tr>
<td>9</td>
<td>Enable</td>
<td>(GMT-06:00) Central Time (US &amp; Canada)</td>
</tr>
<tr>
<td>10</td>
<td>Disable</td>
<td>(GMT-06:00) Central America</td>
</tr>
<tr>
<td>11</td>
<td>Disable</td>
<td>(GMT-06:00) Saskatchewan</td>
</tr>
<tr>
<td>12</td>
<td>Enable</td>
<td>(GMT-06:00) Guadalajara/ Mexico City/ Monterey</td>
</tr>
<tr>
<td>13</td>
<td>Enable</td>
<td>(GMT-05:00) Eastern Time (US &amp; Canada)</td>
</tr>
<tr>
<td>14</td>
<td>Disable</td>
<td>(GMT-05:00) Bogota/ Lima/ Quito</td>
</tr>
<tr>
<td>15</td>
<td>Disable</td>
<td>(GMT-05:00) Indiana (East)</td>
</tr>
<tr>
<td>16</td>
<td>Enable</td>
<td>(GMT-04:00) Atlantic Time (Canada)</td>
</tr>
<tr>
<td>17</td>
<td>Enable</td>
<td>(GMT-04:00) Santiago</td>
</tr>
<tr>
<td>18</td>
<td>Disable</td>
<td>(GMT-04:00) Caracas/ La Paz</td>
</tr>
<tr>
<td>19</td>
<td>Enable</td>
<td>(GMT-03:30) Newfoundland</td>
</tr>
<tr>
<td>20</td>
<td>Enable</td>
<td>(GMT-03:00) Brasilia</td>
</tr>
<tr>
<td>21</td>
<td>Disable</td>
<td>(GMT-03:00) Buenos Aires/ Georgetown</td>
</tr>
<tr>
<td>22</td>
<td>Enable</td>
<td>(GMT-03:00) Greenland</td>
</tr>
<tr>
<td>23</td>
<td>Enable</td>
<td>(GMT-02:00) Mid-Atlantic</td>
</tr>
<tr>
<td>24</td>
<td>Disable</td>
<td>(GMT-01:00) Cape Verde Is.</td>
</tr>
<tr>
<td>25</td>
<td>Enable</td>
<td>(GMT-01:00) Azores</td>
</tr>
<tr>
<td>26</td>
<td>Disable</td>
<td>(GMT) Casablanca/ Monrovia</td>
</tr>
<tr>
<td>27</td>
<td>Enable</td>
<td>(GMT) Greenwich Mean Time : Dublin/ Edinburgh/ Lisbon/ London</td>
</tr>
<tr>
<td>28</td>
<td>Enable</td>
<td>(GMT+01:00) Amsterdam/ Berlin/ Bern/ Rome/ Stockholm/ Vienna</td>
</tr>
<tr>
<td>29</td>
<td>Enable</td>
<td>(GMT+01:00) Sarajevo/ Skopje/ Warsaw/ Zagreb</td>
</tr>
<tr>
<td>30</td>
<td>Enable</td>
<td>(GMT+01:00) Brussels/ Copenhagen/ Madrid/ Paris</td>
</tr>
<tr>
<td>31</td>
<td>Enable</td>
<td>(GMT+01:00) Belgrade/ Bratislava/ Budapest/ Ljubljana/ Prague</td>
</tr>
<tr>
<td>32</td>
<td>Disable</td>
<td>(GMT+01:00) West Central Africa</td>
</tr>
</tbody>
</table>
%

The following example displays the time zone of array unit hus150 and NTP server.

% autimezone-unit hus150 -refer
Time Zone : (GMT+09:00) Osaka/ Sapporo/ Tokyo
Daylight Saving time : ---
NTP Server
Server1 : 125.0.9.98

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Hitachi Unified Storage Command Line Interface Reference Guide
The following example sets the NTP server IP address of array unit hus150.

```
% autimezone -unit hus150 -set -ntp1 192.168.100.100
Are you sure you want to set the time zone/NTP server? (y/n [n]): y
The time zone/NTP server have been set successfully.
Please wait a moment and confirm the synchronization state.
%
```

Referencing/setting the IP address of the maintenance port

**CAUTION!** Modifying the maintenance port IP address on the Simple Modular Storage 100 system invalidates your Hitachi warranty and support. Please consult your reseller before using the CLI.

**Command name**

aumaintelan

**Format**

AMS, WMS, SMS, AMS2000, HUS
aumaintelan -unit unit_name --refer

AMS, WMS
aumaintelan -unit unit_name -set -addr ip_addr

SMS, AMS2000, HUS
When setting the IPv4,
aumaintelan -unit unit_name -set -addr ip_addr
When setting the IPv6,
aumaintelan -unit unit_name -set --ipv6_addr ipv6_addr

AMS, WMS
aumaintelan -unit unit_name --availablelist
SMS, AMS2000, HUS
aumaintelan -unit unit_name --availablelist [-ipv4][-ipv6]

**Description**

This command references or sets the IP address of maintenance port.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot; , &quot;_ (underline)&quot; , &quot;. (period)&quot; , &quot;@&quot;, or &quot;_ (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the IP addresses of maintenance port.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the IP address of maintenance port.</td>
</tr>
<tr>
<td>-availablelist</td>
<td>Displays a list of IP addresses that can be assigned to the maintenance port of CTL0.</td>
</tr>
<tr>
<td>-addr ip_addr</td>
<td>Specify an IP address of the CTL0. Specify the same host address as that which has been assigned. (Host address: YYY of the XXX.XXX.XXX.YYY)</td>
</tr>
<tr>
<td>-ipv6_addr</td>
<td>Specify an IPv6 address of the CTL0. Specify the same address(YY part of YYYY::YYXX) as that which has been assigned.</td>
</tr>
<tr>
<td>-ipv4</td>
<td>Specify this option when referencing the list of IPv4 address.</td>
</tr>
<tr>
<td>-ipv6</td>
<td>Specify this option when referencing the list of IPv6 address.</td>
</tr>
</tbody>
</table>

Examples

The following example displays the IP addresses of maintenance port of an array ams500.

```bash
% aumaintelan -unit ams500 -refer
Password:
Maintenance Port Current Setting Result
CTL0   10.0.0.16 10.0.0.16 Normal
CTL1   10.0.0.17 10.0.0.17 Normal
NNC0   10.0.0.10 10.0.0.10 Normal
NNC2   10.0.0.12 10.0.0.12 Normal
%
```

The following example displays the available IP addresses of the maintenance port of an array ams500.

```bash
% aumaintelan -unit ams500 -availablelist
Password:
Available IP Address(CTL0)
10.0.0.16
192.168.0.16
192.168.233.16
172.23.211.16
10.197.181.16
%
```

The following example sets the IP addresses of the maintenance port of an array ams500.

```bash
% aumaintelan -unit ams500 -set -addr 192.168.233.16
Password:
The IP address of maintenance port is set up.
CTL0 : 192.168.233.16
CTL1 : 192.168.233.17
NNC0 : 192.168.233.10
NNC2 : 192.168.233.12
```
The following example displays the IP addresses of maintenance port of an array ams2300a1.

```
% aumaintelan -unit ams2300a1 -refer
CTL0
Current
   IPv4
      Result : ---
      IPv4 Address : 10.0.0.16
      IPv4 Subnet Mask : 255.255.255.0
      IPv4 Default Gateway : 0.0.0.0
   IPv6
      Result : Normal
      IPv6 Address : fe80::1f6
      Subnet Prefix Length : 64
      IPv6 Default Gateway : fe80::16
      Negotiation : Auto
   Setting
      IPv4
      IPv4 Address : 10.0.0.16
      IPv6
      IPv6 Address : fe80::1f6

CTL1
Current
   IPv4
      Result : ---
      IPv4 Address : 10.0.0.17
      IPv4 Subnet Mask : 255.255.255.0
      IPv4 Default Gateway : 0.0.0.0
   IPv6
      Result : Normal
      IPv6 Address : fe80::1f7
      Subnet Prefix Length : 64
      IPv6 Default Gateway : fe80::17
      Negotiation : Auto
   Setting
      IPv4
      IPv4 Address : 10.0.0.17
      IPv6
      IPv6 Address : fe80::1f7%
```

### Referencing/setting LAN information online

#### Command name

`auonlan`

#### Format

**AMS, WMS, SMS, AMS2000, HUS**

```
auonlan  -unit unit_name --refer
```

**AMS, WMS**

```
auonlan  -unit unit_name --set
   [-ctl0_addr inet_addr] [-ctl0_mask netmask]
   [-ctl0_gate gateway]
   [-ctl0_neg auto] [10mh | 10mf | 100mh | 100mf]
   [-ctl1_addr inet_addr] [-ctl1_mask netmask]
   [-ctl1_gate gateway]
   [-ctl1_neg auto] [10mh | 10mf | 100mh | 100mf]
   [-mipchgmode enable | disable]
```

**SMS, AMS2000, HUS**

When setting the IPv4

```
aonlan  -unit unit_name --set
   [-mipchgmode enable | disable]
   [-ctl0_neg auto] [10mh | 10mf | 100mh | 100mf | 1000mf]
   [-ctl1_neg auto] [10mh | 10mf | 100mh | 100mf | 1000mf]
```
This command references and sets LAN information online.
## Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References LAN information.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets LAN information.</td>
</tr>
<tr>
<td>-ctl0_addr inet_addr</td>
<td>Specify the IPv4 address of Controller 0.</td>
</tr>
<tr>
<td></td>
<td>inet_addr: IPv4 address</td>
</tr>
<tr>
<td>-ctl0_mask netmask</td>
<td>Specify the IPv4 subnet mask of Controller 0.</td>
</tr>
<tr>
<td></td>
<td>netmask: IPv4 subnet mask</td>
</tr>
<tr>
<td>-ctl0_gate gateway</td>
<td>Specify individual IPv4 default gateway of Controller 0.</td>
</tr>
<tr>
<td></td>
<td>gateway: IPv4 default gateway</td>
</tr>
<tr>
<td>-ctl0_neg0 auto</td>
<td>10mh</td>
</tr>
<tr>
<td></td>
<td>auto  : The disk array unit makes the decision automatically.</td>
</tr>
<tr>
<td></td>
<td>10mh  : 10 Mbps/Half</td>
</tr>
<tr>
<td></td>
<td>10mf  : 10 Mbps/Full</td>
</tr>
<tr>
<td></td>
<td>100mh : 100 Mbps/Half</td>
</tr>
<tr>
<td></td>
<td>100mf : 100 Mbps/Full</td>
</tr>
<tr>
<td></td>
<td>1000mf: 1000 Mbps/Full</td>
</tr>
<tr>
<td>-ctl0_dhcp enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the DHCP mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the DHCP mode.</td>
</tr>
<tr>
<td>-ctl1_addr inet_addr</td>
<td>Specify the IPv4 address of Controller 1.</td>
</tr>
<tr>
<td></td>
<td>inet_addr: IPv4 address</td>
</tr>
<tr>
<td>-ctl1_mask netmask</td>
<td>Specify the IPv4 subnet mask of Controller 1.</td>
</tr>
<tr>
<td></td>
<td>netmask: IPv4 subnet mask</td>
</tr>
<tr>
<td>-ctl1_gate gateway</td>
<td>Specify individual IPv4 default gateway of Controller 1.</td>
</tr>
<tr>
<td></td>
<td>gateway: IPv4 default gateway</td>
</tr>
<tr>
<td>-ctl1_neg0 auto</td>
<td>10mh</td>
</tr>
<tr>
<td></td>
<td>auto  : The disk array unit makes the decision automatically.</td>
</tr>
<tr>
<td></td>
<td>10mh  : 10 Mbps/Half</td>
</tr>
<tr>
<td></td>
<td>10mf  : 10 Mbps/Full</td>
</tr>
<tr>
<td></td>
<td>100mh : 100 Mbps/Half</td>
</tr>
<tr>
<td></td>
<td>100mf : 100 Mbps/Full</td>
</tr>
<tr>
<td></td>
<td>1000mf: 1000 Mbps/Full</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>-ctl1_dhcp enable</code></td>
<td>Specify whether to set the DHCP mode of Controller 1 to enable or disable.</td>
</tr>
<tr>
<td></td>
<td><code>enable</code>: Enables the DHCP mode.</td>
</tr>
<tr>
<td></td>
<td><code>disable</code>: Disables the DHCP mode.</td>
</tr>
<tr>
<td><code>-mipchgmode enable</code></td>
<td>Specify whether to set the Maintenance Port IP Address Automatic Change Mode to enable or disable.</td>
</tr>
<tr>
<td></td>
<td><code>enable</code>: Enables the Maintenance Port IP Address Automatic Change Mode.</td>
</tr>
<tr>
<td></td>
<td><code>disable</code>: Disables the Maintenance Port IP Address Automatic Change Mode.</td>
</tr>
<tr>
<td><code>-ipv6_ctl0_setting auto</code></td>
<td>Specify the IPv6 address setting mode.</td>
</tr>
<tr>
<td></td>
<td><code>auto</code>: The disk array unit decides automatically the IPv6 address, IPv6 subnet prefix length and IPv6 default gateway.</td>
</tr>
<tr>
<td></td>
<td><code>manual</code>: Specify the IPv6 address, IPv6 subnet prefix length and IPv6 default gateway manually.</td>
</tr>
<tr>
<td><code>-ipv6_ctl0_addr</code></td>
<td>Specify the IPv6 address of the Controller 0.</td>
</tr>
<tr>
<td><code>ipv6_addr</code></td>
<td><code>ipv6_addr</code>: IPv6 address</td>
</tr>
<tr>
<td><code>-ipv6_ctl0_prefix</code></td>
<td>Specify the IPv6 subnet prefix length of the Controller 0.</td>
</tr>
<tr>
<td><code>ipv6_subnet_prefix</code></td>
<td><code>ipv6_subnet_prefix</code>: IPv6 subnet prefix length</td>
</tr>
<tr>
<td><code>-ipv6_ctl0_gate</code></td>
<td>Specify individual IPv6 default gateway of Controller 0.</td>
</tr>
<tr>
<td><code>ipv6_gateway</code></td>
<td><code>ipv6_gateway</code>: IPv6 default gateway</td>
</tr>
<tr>
<td><code>-ipv6_ctl1_setting auto</code></td>
<td>Specify the IPv6 address setting mode.</td>
</tr>
<tr>
<td><code>auto</code></td>
<td><code>auto</code>: The disk array unit decides automatically the IPv6 address, IPv6 subnet prefix length and IPv6 default gateway.</td>
</tr>
<tr>
<td></td>
<td><code>manual</code>: Specify the IPv6 address, IPv6 subnet prefix length and IPv6 default gateway manually.</td>
</tr>
<tr>
<td><code>-ipv6_ctl1_addr</code></td>
<td>Specify the IPv6 address of the Controller 1.</td>
</tr>
<tr>
<td><code>ipv6_addr</code></td>
<td><code>ipv6_addr</code>: IPv6 address</td>
</tr>
<tr>
<td><code>-ipv6_ctl1_prefix</code></td>
<td>Specify the IPv6 subnet prefix length of the Controller 1.</td>
</tr>
<tr>
<td><code>ipv6_subnet_prefix</code></td>
<td><code>ipv6_subnet_prefix</code>: IPv6 subnet prefix length</td>
</tr>
<tr>
<td><code>-ipv6_ctl1_gate</code></td>
<td>Specify individual IPv6 default gateway of Controller 1.</td>
</tr>
<tr>
<td><code>ipv6_gateway</code></td>
<td><code>ipv6_gateway</code>: IPv6 default gateway</td>
</tr>
</tbody>
</table>
Examples

The following example displays the LAN information of an array ams500.

```plaintext
% auonlan -unit ams500 -refer
Password:
Current
CTL IP Address       Subnet Mask      Default Gateway  Result
0 125.0.9.98       255.255.255.0    125.0.9.15       Normal
1 125.0.9.99       255.255.255.0    125.0.9.15       Normal
Setting
CTL IP Address       Subnet Mask      Default Gateway
0 125.0.9.100      255.255.255.0    125.0.9.15
1 125.0.9.101      255.255.255.0    125.0.9.15
Maintenance Port IP Address Automatic Change Mode : ON
%
```

The following example sets LAN information for the Controller 0 side of an array ams500.

```plaintext
% auonlan -unit ams500 -set -ctl0_addr 192.168.100.100 -ctl0_mask 255.255.255.0
-ctl0_gate 192.168.100.5 -mipchgmode enable
Password:
Are you sure you want to set the LAN information? (y/n [n]): y
Your maintenance LAN port will changed as follows.
CTL0 - IP:10.0.0.16 SM:255.255.255.0 GW:N/A
CTL1 - IP:10.0.0.17 SM:255.255.255.0 GW:N/A
Do you want to continue processing? (y/n [n]): y
The LAN information has been set successfully.
The subsystem cannot be connected because LAN information is changed.
When unable to connect, please update the array unit information using auunitchg command, or confirm the LAN environment.
%
```

The following example displays the LAN information of an array ams2300a1.

```plaintext
% auonlan -unit ams2300a1 -refer
IPv4
Maintenance Port IP Address Automatic Change Mode : OFF
Current
CTL0
IPv4
Result : ---
IPv4 Address : 1.2.3.4
IPv4 Subnet Mask : 11.12.13.14
IPv4 Default Gateway : 21.22.23.24
IPv6
Result : Normal
IPv6 Address : fe80::1
Linklocal IPv6 Address : fe80::3
Subnet Prefix Length : 64
IPv6 Default Gateway : fe80::2
Negotiation : 100Mbps/Full
Ether Address : 00:00:00:00:00:00
CTL1
IPv4
Result : ---
IPv4 Address : 101.102.103.104
IPv4 Subnet Mask : 111.112.113.114
IPv4 Default Gateway : 121.122.123.124
IPv6
Result : Normal
IPv6 Address : fe80::11
Linklocal IPv6 Address : fe80::13
Subnet Prefix Length : 64
IPv6 Default Gateway : fe80::12
Negotiation : 100Mbps/Half
Ether Address : 00:00:00:00:00:00
Setting
CTL0
IPv4
DHCP : OFF
IPv4 Address : 51.52.53.54
```
<table>
<thead>
<tr>
<th></th>
<th>IPv4 Subnet Mask</th>
<th>61.62.63.64</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IPv4 Default Gateway</td>
<td>71.72.73.74</td>
</tr>
<tr>
<td></td>
<td>IPv6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IPv6 Address Setting Mode</td>
<td>MANUAL</td>
</tr>
<tr>
<td></td>
<td>IPv6 Address</td>
<td>fe80::fe01</td>
</tr>
<tr>
<td></td>
<td>Subnet Prefix Length</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>IPv6 Default Gateway</td>
<td>fe80::fe02</td>
</tr>
<tr>
<td></td>
<td>Negotiation</td>
<td>100Mbps/Full</td>
</tr>
</tbody>
</table>

CTL1

<table>
<thead>
<tr>
<th></th>
<th>IPv4 DHCP</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IPv4 Address</td>
<td>151.152.153.154</td>
</tr>
<tr>
<td></td>
<td>IPv4 Subnet Mask</td>
<td>161.162.163.164</td>
</tr>
<tr>
<td></td>
<td>IPv4 Default Gateway</td>
<td>171.172.173.174</td>
</tr>
<tr>
<td></td>
<td>IPv6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IPv6 Address Setting Mode</td>
<td>MANUAL</td>
</tr>
<tr>
<td></td>
<td>IPv6 Address</td>
<td>fe80::fe11</td>
</tr>
<tr>
<td></td>
<td>Subnet Prefix Length</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>IPv6 Default Gateway</td>
<td>fe80::fe12</td>
</tr>
<tr>
<td></td>
<td>Negotiation</td>
<td>100Mbps/Full</td>
</tr>
</tbody>
</table>

%
Setting up configuration

This section covers the following commands related to configuration:

- Referencing/setting the Fibre Channel information on page 3-129
- Referencing/setting the spare HDU on page 3-131
- Referencing/setting the fee-basis option on page 3-133
- Referencing/setting the drive restoration control information on page 3-136
- Referencing/setting the online verify information on page 3-139
- Referencing/setting the command device information on page 3-141
- Rebooting on page 3-143
- Referencing/setting volume pre-fetch information on page 3-144
- Referencing/splitting the Hi-Copy Pair information on page 3-145
- Referencing/setting the DMLU information on page 3-146
- Referencing/setting the iSCSI port information on page 3-147
- Referencing/setting the CHAP user information on page 3-153
- Referencing/sending a ping on page 3-156
- Referencing/setting the backend diagnosis information on page 3-157
- Setting the SNMP environment information and outputting its file on page 3-158
- Referencing/setting e-Mail alert information on page 3-159
- Referencing/setting the LED information on page 3-161
- Referencing/Starting additional unit information on page 3-163
- Referencing/setting LAN port information on page 3-163
- Setting the SSL option on page 3-167
Observe the following guidelines:

- When the AMS/WMS array is used to connect to the NAS, restarting the array stops the cluster between the NAS units and restarts the array. When restarting the array unfavorably, stop the cluster between the NAS units and then restart the array. Thereafter, start the cluster between the NAS units again.

- If you restart the array after issuing a power down instruction but before power down completes when the Powers Savings feature is used, the power down may fail because the array receives a command from a host immediately after the array restarts. If the power down fails, perform the power down again. Check that the power down instruction has not been issued or has been completed (no RAID in the Power Saving Status of Normal (Command Monitoring) exists) before restarting the array.

The following message appears when the LAN information is set. It accesses the user port and the maintenance port of the controller to be set with Web:

DMEA0011BD: The process cannot be performed because the User LAN port of array is being used by other applications. Refer to [netstat.inf] file in the directory where Storage Navigator Modular 2 is installed, close applications using User LAN port of array, and then try again.

- The usage condition of the LAN port is output to netstat.inf. In the netstat.inf file,
  - “Local address” refers to the IP address of the controller.
  - “Foreign Address” refers to the IP address of PC connecting with the array.
  - “State” refers to the status of the TCP connection. Regardless of “Status” in the netstat.inf file, stop all applications connecting from “Foreign address” and execute it again.
Referencing/setting the Fibre Channel information

Command name

aufibre1

Format

9500V, AMS, WMS, SMS, AMS2000, HUS

aufibre1 -unit unit_name --refer

9500V

aufibre1 -unit unit_name --set
    [-topo ctl_no port_no loop | ptop ]
    [-rate ctl_no port_no 1 | 2 | auto ]
    [-portaddr ctl_no port_no port_address ]

AMS, WMS

aufibre1 -unit unit_name --set
    [-topo ctl_no port_no loop | ptop ]
    [-rate ctl_no port_no 1 | 2 | 4 | auto ]
    [-portaddr ctl_no port_no port_address ]

SMS, AMS2000

aufibre1 -unit unit_name --set
    [-topo ctl_no port_no loop | ptop ]
    [-rate ctl_no port_no 1 | 2 | 4 | 8 | auto ]
    [-portaddr ctl_no port_no port_address ]

HUS

aufibre1 -unit unit_name --set
    [-topo ctl_no port_no loop | ptop ]
    [-rate ctl_no port_no 2 | 4 | 8 | auto ]
    [-portaddr ctl_no port_no port_address ]

Description

This command references or sets the fibre channel information.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays fibre channel information.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets fibre channel information.</td>
</tr>
<tr>
<td>-topo ctl_no port_no loop</td>
<td>Specify the topology of the specified port.</td>
</tr>
<tr>
<td>-rate ctl_no port_no 1</td>
<td>Specify the fibre channel transfer rate of the specified port.</td>
</tr>
<tr>
<td>-portaddr ctl_no port_no port-address</td>
<td>Specify the port address of the specified port.</td>
</tr>
</tbody>
</table>

Examples

The following example displays the fibre channel information of an array ams500a1.

```
% aufibre1 -unit ams500a1 -refer
Password:
Port Information

<table>
<thead>
<tr>
<th>Port Address</th>
<th>Setting Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>50060E8010200120</td>
<td>0000E8 000000</td>
</tr>
<tr>
<td>50060E8010200121</td>
<td>0000E8 000000</td>
</tr>
<tr>
<td>50060E8010200122</td>
<td>0000E8 000000</td>
</tr>
<tr>
<td>50060E8010200123</td>
<td>0000E8 000000</td>
</tr>
</tbody>
</table>

Transfer Rate

<table>
<thead>
<tr>
<th>Port Address</th>
<th>Setting Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>50060E8010200120</td>
<td>2Gbps</td>
</tr>
<tr>
<td>50060E8010200121</td>
<td>2Gbps</td>
</tr>
<tr>
<td>50060E8010200122</td>
<td>2Gbps</td>
</tr>
<tr>
<td>50060E8010200123</td>
<td>2Gbps</td>
</tr>
</tbody>
</table>

Topology Information

<table>
<thead>
<tr>
<th>Port Address</th>
<th>Setting Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>50060E8010200120</td>
<td>Point-to-Point</td>
</tr>
<tr>
<td>50060E8010200121</td>
<td>Point-to-Point</td>
</tr>
<tr>
<td>50060E8010200122</td>
<td>Point-to-Point</td>
</tr>
<tr>
<td>50060E8010200123</td>
<td>Point-to-Point</td>
</tr>
</tbody>
</table>
```
The following example sets the topology of Port A of controller 0 of an array name ams500a1 to loop.

```bash
% aufibre1 -unit ams500a1 -set -topo 0 A loop
Password:
Are you sure you want to set the fibre channel information? 
(y/n [n]): y
When setting starts, the subsystem stops accepting access to the port from the host.
Before setting, stop access to the port from the host.
Do you want to continue processing? (y/n [n]): y
The fibre channel information has been set successfully.
%
```

### Referencing/setting the spare HDU

**CAUTION! Modifying the spare HDU on the Simple Modular Storage 100 system invalidates your Hitachi warranty and support. Please consult your reseller before using the CLI.**

**Command name**

- **auspare**

**Format**

9500V
- `auspare -unit unit_name -set -uno unit_no -hno hdu_no`
- `auspare -unit unit_name -rm -uno unit_no -hno hdu_no`

AMS, WMS, AMS2000, HUS
- `auspare -unit unit_name –refer`
- `auspare -unit unit_name -set -drive unit_no.hdu_no ...`
- `auspare -unit unit_name -rm -drive unit_no.hdu_no ...`
- `auspare -unit unit_name -availablelist`

**Description**

This command references or sets a spare HDU. It is necessary to assign a spare drive to the maximum drive capacity in an array.

HDUs that can be set to a spare drive are data disk drives, for which a RAID is not yet defined, excluding HDUs 0 to 4 in Unit 0. (9500V).
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus), “_ (underline), “. (period), “@”, or “ (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the spare HDU.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets up the spare HDU.</td>
</tr>
<tr>
<td>-rm</td>
<td>Cancels the spare HDU.</td>
</tr>
<tr>
<td>-availablelist</td>
<td>A list of drives, each of which is eligible for a spare HDU is displayed.</td>
</tr>
<tr>
<td>-uno unit_no</td>
<td>Specify the unit number of the spare HDU.</td>
</tr>
<tr>
<td>-hno hdu_no</td>
<td>Specify the HDU number of the spare HDU.</td>
</tr>
<tr>
<td>-drive unit_no.hdu_no ...</td>
<td>Specify the Unit number and HDU number punctuating them with a period to be set or canceled. Single or multiple drive numbers can be specified. unit_no: Unit number hdu_no : HDU number Single specification: Specifying a single drive number. Example: -drive 1.0 Multiple specification: Specifying multiple drives numbers. Example: -drive 1.0 2.3 3.1 -drive 1.0-2.2 2.8</td>
</tr>
</tbody>
</table>

Examples

The following example lists drives, each of which is eligible for a spare HDU of an array ams500a1.

% auspare -unit ams500a1 -availablelist
Password:
Available Drives
  Unit  HDU  Capacity  Drive Type  Status
  1   13  146GB     FC          Undefined
  1   14  146GB     FC          Undefined
%

The following example sets the HDU in Unit number 1 position 14 as the spare HDU of an array ams500a1.

% auspare -unit ams500a1 -set -drive 1.14
Password:
Are you sure you want to set the spare drive? [y/n/n]: y
The drive of the unit number 1 and the HDU number 14 was set as a spare.
The spare drives have been set successfully.
%

The following example displays the setting of the spare HDU in an array ams500a1 by using the auspare command. Spare HDUs will be indicated as “Spare” in “Type” column.
Referencing/setting the fee-basis option

Command name

auopt

Format

9500V, AMS, WMS, SMS, AMS2000, HUS
auopt -unit unit_name -refer
When locking off the fee-basis option
9500V
auopt -unit unit_name -lock off -keycode key_code
auopt -unit unit_name -lock off -licensefile license_file_path
AMS, WMS
auopt -unit unit_name -lock off -keycode key_code
auopt -unit unit_name -lock off -licensefile license_file_path
SMS, AMS2000, HUS
auopt -unit unit_name -lock off -keycode key_code
auopt -unit unit_name -lock off -licensefile license_file_path [-all]
When locking on the fee-basis option
9500V, AMS, WMS, SMS, AMS2000, HUS
auopt -unit unit_name -lock on -keycode key_code
AMS2000, HUS
auopt -unit unit_name -reconfigurememory start | cancel

Description

This command locks or unlocks the specified fee-basis option. Unlocking or locking can be carried out by the key code or the license key file which is attached to the option facility. The fee-basis option can be enabled or disabled after it is unlocked (installed). This command starts or cancels the memory reconfiguring of fee-basis option.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, “_ (underline)”, “. (period)”, “@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-lock off</td>
<td>on</td>
</tr>
<tr>
<td>- keycode key_code</td>
<td>Specify the key code when unlocking or locking the fee-basis option.</td>
</tr>
<tr>
<td>- licensefile license_file_path</td>
<td>Specify the path of the license key file when unlocking the fee-basis option. license_file_path: The path of the license key file</td>
</tr>
<tr>
<td>- all</td>
<td>Specify this option when unlocking (installing) all fee-basis options at license key file.</td>
</tr>
<tr>
<td>- option option_name</td>
<td>Specify the name of the fee-basis option when enabling or disabling the use of unlocked fee-basis option. For the name of the option, refer to the manual for each fee-basis option.</td>
</tr>
<tr>
<td>- st enable</td>
<td>disable</td>
</tr>
</tbody>
</table>

Examples

The following example displays the status of unlocked (installed) fee-basis option of an array ams500a1.

```
% auopt -unit ams500a1 -refer
Password:
Option Name     Type   Term     Status
Reconfigure Memory Status
SNMP-AGENT      N/A     Permanent ---   Enable
%
```

The following example installs the LUN Manager fee-basis option that does not require rebooting an array ams500a1 by using the license key file.

```
% auopt -unit ams500a1 -lock off -licensefile d:\xxxxxxx.xxx
Password:
No. Option Name
1 LUN- MANAGER
Please specify the number of the option to unlock.
When you unlock the two or more options, partition the numbers, which are given in the list, with the space(s). When you unlock all options, input ‘all’. Input
```
The number of the option to unlock. (number/all/q[all]): 1
Are you sure you want to unlock the option? (y/n [n]): y

<table>
<thead>
<tr>
<th>Option Name</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUN-MANAGER</td>
<td>Unlock</td>
</tr>
</tbody>
</table>

The process was completed.

The following example starts the memory reconfiguring an array unit ams2300a1.

% auopt -unit ams2300a1 -reconfigurememory start
Are you sure you want to start reconfigure memory? (y/n [n]: y
While in progress, performance degradation of host I/Os to the array will occur.

Are you sure you want to continue? (y/n [n]): y
Memory configuring starts successfully.

%
Referencing/setting the drive restoration control information

**CAUTION!** Modifying the drive restoration control information on the Simple Modular Storage 100 system invalidates your Hitachi warranty and support. Please consult your reseller before using the CLI.

**Command name**

audrecopt

**Format**

9500V, AMS, WMS, SMS, AMS2000, HUS

audrecopt -unit unit_name –refer

9500V

audrecopt -unit unit_name –set

- -restor back | normal | priority -auto enable | disable [ -sparing rwv | rw | not ] [ -interval interval_time ]

- size n

AMS, WMS

audrecopt -unit unit_name –set

- -restor back | normal | priority -auto enable | disable [ -sparing rwv | rw | not ] [ -interval interval_time ]

- size n

- -spare variable | fixed

- -allunitnocompanyback enable | disable

SMS, AMS2000, HUS

audrecopt -unit unit_name –set

- -restor back | normal | priority -auto enable | disable [ -sparing rwv | rw | not ] [ -interval interval_time ]

- size n

- -spare variable | fixed

**Description**

This command references and sets the drive restoration control information.
### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot; , &quot;_ (underline)&quot;, &quot;. (period)&quot; , &quot;@&quot; , or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td><code>-refer</code></td>
<td>References the drive restoration control information.</td>
</tr>
<tr>
<td><code>-set</code></td>
<td>Sets the drive restoration control information.</td>
</tr>
<tr>
<td>`-restor back</td>
<td>normal</td>
</tr>
<tr>
<td></td>
<td>back : Executes restoration during the interval of the host command process.</td>
</tr>
<tr>
<td></td>
<td>normal : Prioritizes the command from the host and executes restoration every certain interval after the host command terminates.</td>
</tr>
<tr>
<td></td>
<td>priority: Executes restoration every certain interval with higher priority than that of the command from the host.</td>
</tr>
<tr>
<td>`-auto enable</td>
<td>disable`</td>
</tr>
<tr>
<td>`-sparing rwv</td>
<td>rw</td>
</tr>
<tr>
<td></td>
<td>rwv: When the count of either the Read/Write error or the online verify error exceeds a predetermined threshold value, the dynamic sparing starts.</td>
</tr>
<tr>
<td></td>
<td>rw : When the count of Read/Write error exceeds a predetermined threshold value, the dynamic sparing starts.</td>
</tr>
<tr>
<td></td>
<td>not: The dynamic sparing will not start even if the count of Read/Write error or online verify error exceeded a predetermined threshold value.</td>
</tr>
<tr>
<td><code>-interval interval_time</code></td>
<td>Specify the interval of executing restoration.</td>
</tr>
<tr>
<td></td>
<td>Specify the time using a value from 0 to 255 in units of 10 ms.</td>
</tr>
<tr>
<td></td>
<td>The default value is 10, which executes restoration at an interval of every 100 ms</td>
</tr>
<tr>
<td><code>-size n</code></td>
<td>Specify the unit of restored data per single operation in the restoration process. Specify a value of a multiple of 32 between 32 and 65,504 in units of 512 bytes. The default value is 32, which restores 16 k bytes data in a single operation. However, when the firmware revision of 9500V is x6x5 or later or AMS or WMS, the value of the range of 128 to 65408 is specified by the multiple of 128. When specifying 128, which restores 64 k byte data in a single operation.</td>
</tr>
<tr>
<td>`-spare variable</td>
<td>fixed`</td>
</tr>
<tr>
<td></td>
<td>variable: Active spare mode (Non-copyback)</td>
</tr>
<tr>
<td></td>
<td>fixed : Fixed spare mode (Copyback)</td>
</tr>
</tbody>
</table>
Examples

The following example displays the drive restoration control information of an array 9500a1.

```
% audrecopt -unit 9500a1 -refer
Password:
Drive Restoration Mode : Interleave(Normal)
Drive Restoration : Automatically
Dynamic Sparing : Executing(Read/Write & Online Verify)
Interval Time [10ms] : 0
Processing Unit Size [blocks] : 128
%
```

The following example sets the drive restoration control information for an array 9500a1.

```
% audrecopt -unit 9500a1 -set -restor normal
Password:
%
```

The following example displays the drive restoration control information of an array ams500a1.

```
% audrecopt -unit ams500a1 -refer
Password:
Drive Restoration Mode : Interleave(Normal)
Drive Restoration : Automatically
Dynamic Sparing : Executing(Read/Write & Online Verify)
Interval Time [10ms] : 0
Processing Unit Size [blocks] : 128
Spare Drive Operation Mode : Variable
Applying No Copy Back Mode on All the Units : Disable
%
```

**NOTE:** Even if the Spare Drive Operation Mode is set to Variable, it becomes operation of Fixed in SMS100.
Referencing/setting the online verify information

CAUTION!: Modifying the online verification information on the Simple Modular Storage 100 system invalidates your Hitachi warranty and support. Please consult your reseller before using the CLI.

Command name

auonlineverify

Format

9500V, AMS, WMS, SMS, AMS2000, HUS
auonlineverify -unit unit_name –refer

9500V, SMS
auonlineverify -unit unit_name –set
[-verify enable | disable ]
[ -skipverify on | off ]
AMS, WMS, AMS2000, HUS
auonlineverify -unit unit_name –set
[-verify enable | disable ]
[ -skipverify on | off ]
[ -cacheverify on | off ]

Description

This command references and sets the online verify information.
### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the online verify information.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the online verify information.</td>
</tr>
<tr>
<td>-verify enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Executes online verify test.</td>
</tr>
<tr>
<td></td>
<td>disable: Does not execute online verify test.</td>
</tr>
<tr>
<td>-skipverify on</td>
<td>off</td>
</tr>
<tr>
<td></td>
<td>enable : Executes online verify test.</td>
</tr>
<tr>
<td></td>
<td>disable: Does not execute online verify test.</td>
</tr>
<tr>
<td>-cacheverify on</td>
<td>off</td>
</tr>
<tr>
<td></td>
<td>on : Enables the cache verify.</td>
</tr>
<tr>
<td></td>
<td>off: Disables the cache verify.</td>
</tr>
</tbody>
</table>

### Examples

The following example displays the online verify information of an array ams500a1.

```
% auonlineverify -unit ams500a1 -refer
Password:
Online Verify Test : No
Skip Online Verify : ON
Cache Verify       : ON
%
```

The following example sets the online verify information to an array ams500a1, then displays the information.

```
% auonlineverify -unit ams500a1 -set -verify enable
Password:
Are you sure you want to set the online verify information? (y/n [n]): y
The online verify information has been set successfully.
%
% auonlineverify -unit ams500a1 -refer
Password:
Online Verify Test : Yes
Skip Online Verify : ON
Cache Verify       : ON
%
```
Referencing/setting the command device information

Command name

```
aucmddev
```

Format

```
9500V, AMS, WMS, SMS, AMS2000, HUS
aucmddev -unit unit_name -refer
     aucmddev -unit unit_name -set -dev n lu [ enable | disable ]
            [-dev n lu [ enable | disable ]] ...
     aucmddev -unit unit_name -chg -dev n lu enable | disable
            [-dev n lu enable | disable ] ...
     aucmddev -unit unit_name -rm -dev n [-dev n ] ...
AMS, WMS, SMS, AMS2000, HUS
aucmddev -unit unit_name -availablelist
```

Description

This command references and sets the command device.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the command device and the serial ID.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the command device and the serial ID.</td>
</tr>
<tr>
<td>-rm</td>
<td>Deletes the command device.</td>
</tr>
<tr>
<td>-chg</td>
<td>Changes the protection function of RAID Manager (CCI).</td>
</tr>
<tr>
<td>-availablelist</td>
<td>A list of logical unit numbers, each of which is eligible for the command device is displayed.</td>
</tr>
<tr>
<td>-dev n lu [ enable</td>
<td>Specify the parameter of the command device. When the specification of enable or disable is omitted, the protection function of RAID Manager (CCI) set ineffective.</td>
</tr>
<tr>
<td>disable ]</td>
<td></td>
</tr>
<tr>
<td>n : Command device number (1 or 2).</td>
<td></td>
</tr>
<tr>
<td>lu : Logical unit number.</td>
<td></td>
</tr>
<tr>
<td>enable : Enables the protection function of RAID Manager (CCI).</td>
<td></td>
</tr>
<tr>
<td>disable: Disables the protection function of RAID Manager (CCI).</td>
<td></td>
</tr>
<tr>
<td>-dev n</td>
<td>Specify the command device number to be deleted.</td>
</tr>
<tr>
<td>n: Command device number (1 or 2).</td>
<td></td>
</tr>
</tbody>
</table>

Examples

The following example displays command device set-up information for an array 9500a1.

```
% aucmddev -unit 9500a1 -refer
Password:
Command device    LUN  RAID Manager Protect
1      1  Disable
2     10  Disable
%
```

The following example sets up an array 9500a1 as command device 1, with its logical number set to 0.

```
% aucmddev -unit 9500a1 -set -dev 1 0
Password:
%
```
Rebooting

Command name

aureboot

Format

When rebooting after a shutdown.
9500V, AMS, WMS, SMS, AMS2000, HUS
aureboot -unit unit_name

When performing only a shutdown and not rebooting.
SMS, AMS2000, HUS
aureboot -unit unit_name -onlyshutdown

Description

This command reboots the array after a shutdown.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;:&quot; (minus), &quot;:&quot; (underline), &quot;.&quot; (period), &quot;@&quot; or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-onlyshutdown</td>
<td>Only a shutdown is performed. A reboot is not performed.</td>
</tr>
</tbody>
</table>

Examples

The following example reboots an array 9500a1.

```
% aureboot -unit 9500a1
Password:
Do you want to restart the subsystem? [y/n] y
Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting begins.
Do you agree with restarting? [y/n] y
Are you sure you want to execute? [y/n] y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 4 - 15min.
The subsystem restarted successfully.
%```

The following example reboots an array 9500a1 whose status is stopping under pseudo-plan.

```
% aureboot -unit 9500a1
Password:
The subsystem has stopped under pseudo-plan.
Do you want to restart the subsystem? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 4 - 15min.
The subsystem restarted successfully.
%
```

---

**Referencing/setting volume pre-fetch information**

**Command name**

aulupre

**Format**

```
9500V
aulupre -unit unit_name -refer
aulupre -unit unit_name -lu lun -stag num | default
```

**Description**

This command references or sets the logical unit pre-fetch information.

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <em>unit_name</em></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ “ (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the LU pre-fetch information.</td>
</tr>
<tr>
<td>-lu <em>lun</em></td>
<td>Specify the LU number of an LU whose pre-fetch information is to be set.</td>
</tr>
<tr>
<td>-stag num</td>
<td>default</td>
</tr>
</tbody>
</table>

  *num* : Specify the number of sub blocks.(1 to 65535)

  *default*: Sets the default size.

**Examples**

The following example displays the logical unit pre-fetch information for an array 9500a1.

```
% aulupre -unit 9500a1 -refer
Password:
LUN    Staging Size
  0      512
  1      512
%
```
The following example sets the logical unit 0 pre-fetch information for an array 9500a1.

```
% auilupre -unit 9500a1 -lu 0 -stag 512
Password:
%
```

**Referencing/splitting the Hi-Copy Pair information**

**Command name**

auhicopy

**Format**

```
9500V
auhicopy -unit unit_name refer [-lu lun ...]
auhicopy -unit unit_name -split -lu lun
```

**Description**

This command references or splits the Hi-Copy pair information.

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the Hi-Copy pair information.</td>
</tr>
<tr>
<td>-split</td>
<td>Splits the Hi-Copy pair.</td>
</tr>
<tr>
<td>-lu lun ...</td>
<td>Specify the LU numbers to reference the Hi-Copy pair information. When doing that, enter the LU number using numerals or a hyphen(s) (-). If the specification is omitted, all the pair information is displayed. Single or multiple LU numbers can be specified. Single specification: Specifying a single LU number. Example: -lu 3 Multiple specification: Specifying multiple LU numbers. Example: -lu 0 1 2 3 4 5 8 -lu 0-5 8</td>
</tr>
<tr>
<td>-lu lun</td>
<td>Specify the LU number to split the Hi-Copy pair.</td>
</tr>
</tbody>
</table>

**Examples**

The following example displays the Hi-Copy pair information for an array 9500a1.
The following example releases the Hi-Copy pair with which LU 100 is connected in an array 9500a1.

```bash
% auhicopy -unit 9500a1 -split -lu 100
Password:
Are you sure you want to split the pair of logical unit 100?
(y/n [n]): y
If you split the pair, all the area of LU will be copied when you create it again. Do you want to continue processing?
(y/n [n]): y
The pair of logical unit has been successfully split.
```

**Referencing/setting the DMLU information**

---

**CAUTION!** Modifying the differential management logical unit information on the Simple Modular Storage 100 system invalidates your Hitachi warranty and support. Please consult your reseller before using the CLI.

---

**Command name**

- audmlu

**Format**

- AMS, WMS, AMS2000, HUS

  ```bash
  audmlu -unit unit_name --refer
  audmlu -unit unit_name -set -lu lun
  audmlu -unit unit_name -rm -lu lun
  audmlu -unit unit_name -availablelist
  ```

**Description**

This command references or sets the DM-LU information.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the DM-LU information.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the DM-LU information.</td>
</tr>
<tr>
<td>-rm</td>
<td>Deletes the DM-LU information.</td>
</tr>
<tr>
<td>-availablelist</td>
<td>A list of logical unit numbers, each of which is eligible for the DM-LU is displayed.</td>
</tr>
<tr>
<td>-lu lun</td>
<td>Specify the LU number of an LU whose DM-LU information is to be set or deleted.</td>
</tr>
</tbody>
</table>

Example

The following example displays the DM-LU information for an array ams500a1.

```
% audmlu -unit ams500a1 -refer
Password:
LUN Capacity RAID Group RAID Level D-CTL C-CTL Type Status
 0 5.0 Gbyte 0 5(4D+1P) 0 0 FC Normal
%
```

Referencing/setting the iSCSI port information

Command name

auiscsi

Format

AMS, WMS, SMS, AMS2000, HUS100
auiscsi -unit unit_name -refer
AMS, WMS, SMS
auiscsi -unit unit_name -set ctl_no port_no
  [-addr inet_addr]
  [-mask netmask]
  [-gate gateway]
  [-portnum port_num]
  [-timer time]
AMS2000
auiscsi -unit unit_name -set ctl_no port_no
  [-addr inet_addr]
  [-mask netmask]
  [-gate gateway]
  [-portnum port_num]
  [-timer time]
  [-mtu 1500 | 4500 | 9000]
  [-headerdigest enable | disable]
  [-datadigest enable | disable]
HUS 100
auiscsi -unit unit_name -set ctl_no port_no -ipv6_status enable | disable
When IPv6 status is set as disable
auiscsi -unit unit_name -set ctl_no port_no
When IPv6 status is set as enable.
auiscsi -unit unit_name -set ctl_no port_no
[ -addr inet_addr ]
[ -mask netmask ]
[ -gate gateway ]
[ -ipv6_link_local_type auto | manual ]
[ -ipv6_link_local_addr ipv6_local_addr ]
[ -ipv6_global_addr_type auto | manual ]
[ -ipv6_global_addr1 ipv6_addr ]
[ -ipv6_global_addr2 ipv6_addr ]
[ -ipv6_gate ipv6_gateway ]
[ -portnum port_num ]
[ -timer time ]
[ -mtu 1500 | 4500 | 9000 ]
[ -vlan enable | disable ]
[ -vlanid vlan_id ]
[ -headerdigest enable | disable ]
[ -datadigest enable | disable ]
[ -windowscale enable | disable ]

**Description**

This command references or sets the iSCSI port information.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the iSCSI port information.</td>
</tr>
<tr>
<td>-set ctl_no port_no</td>
<td>Sets the iSCSI port information.</td>
</tr>
<tr>
<td>-addr inet_addr</td>
<td>Specify the IP address.</td>
</tr>
<tr>
<td>-mask netmask</td>
<td>Specify the subnet mask.</td>
</tr>
<tr>
<td>-gate gateway</td>
<td>Specify individual default gateway.</td>
</tr>
<tr>
<td>-portnum port_num</td>
<td>Specify the port number for TCP/IP communication.</td>
</tr>
<tr>
<td>-timer time</td>
<td>Specify the Keep Alive Timer.</td>
</tr>
<tr>
<td>-mtu 1500</td>
<td>4500</td>
</tr>
</tbody>
</table>

Examples

The following example displays the iSCSI port information for an array ams500.

```
% auiscsi -unit ams500 -refer
Password:
LAN Information
Port 0A
 IP Address : 125.0.9.98
 Subnet Mask : 255.255.255.0
 Default Gateway : 0.0.0.0
 Port Number : 3260
 Keep Alive Timer [sec.] : 60
 MTU : 1500
 Ethernet Address : 00:07:E9:E3:DD:CE
 Result : Normal
 Port 0B
 : 
%
```

The following example sets the iSCSI port information for port 0B of an array ams500.

```
% auiscsi -unit ams500 -set 0 B -addr 125.1.9.98
Password:
Are you sure you want to set the iSCSI port information?
```
When setting except Keep Alive Timer starts, the subsystem stops access to all ports on the controller side with setting port from the host.
Before setting, stop access to all ports on the controller side with setting port from the host.
Do you want to continue processing? (y/n [n]): y
The iSCSI port information has been set successfully.

The following example displays the iSCSI port information for an array ams2300a1.

```
% auiscsi -unit ams2300a1 -refer
Port 0A
Port Number           : 3260
Keep Alive Timer[sec.]: 60
MTU                    : 1500
Transfer Rate          : 10bps
Link Status            : Link Up
Ether Address          : 00:01:02:03:04:05
IPv4
IPv4 Address           : 100.101.102.103
IPv4 Subnet Mask       : 255.255.255.0
IPv4 Default Gateway   : 150.151.152.153
Connecting Hosts       : 10000
Result                 : Setting

Port 0B

%
```

The following example displays the iSCSI port information for an array unit hu110a1.

```
% auiscsi -unit hu110a1 -refer
Port 0A
Port Number           : 3260
Keep Alive Timer[sec.]: 60
MTU                    : 1500
Transfer Rate          : 1Gbps
Link Status            : Link Up
Ether Address          : 00:01:02:03:04:05
IPv4
IPv4 Address           : 100.101.102.103
IPv4 Subnet Mask       : 255.255.255.0
IPv4 Default Gateway   : 150.151.152.153
IPv4 Status            : Enable
IPv6
IPv6 Link Local IP Address
Address Type           : Manual
IP Address             : fe80::2022
Address Status         : ---
Global IP Address
Address Type           : Manual
IP Address 1
IP Address             : 2080::2022
Address Status         : ---
IP Address 2
IP Address             : 2081::2022
Address Status         : ---
Subnet Prefix Length   : 22
Default Gateway
IP Address Current     : 3034::2022
Setting                : 3033::2022
Address Status         : Unconfigured
Link MTU               : 1500
Connecting Hosts       : 10000
Result                 : Setting
VLAN Status            : Enable
VLAN ID                : 22
Header Digest          : Enable
Data Digest            : Enable
Windows Scale          : Enable
```
The following example sets the Windows Scale for port 0A of an array unit hus110a1.

% auiscsi -unit hus110a1 -set 0 A windowscale enable
Are you sure you want to set the iSCSI port information? (y/n [n]): y
When setting except Keep Alive Timer starts, the subsystem stops access to all ports on the controller side with setting port from the host.
Before setting, stop access to all ports on the controller side with setting port from the host.
Do you want to continue processing? (y/n [n]): y
The iSCSI port information has been set successfully.
%

Referencing/setting the iSNS information

Command name

auisns

Format

AMS, WMS, SMS, AMS2000, HUS
auisns -unit unit_name -refer
auisns -unit unit_name -set ctl_no port_no
[-server used | notused ]
[-addr inet_addr ]
[-portnum port_num ]

Description

This command references or sets the iSNS information.
## Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus), &quot; _ (underline), &quot;. (period), &quot;@&quot;, or &quot; (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td><code>-refer</code></td>
<td>References the iSNS information. Sets the iSNS information.</td>
</tr>
<tr>
<td>`-server used</td>
<td>notused`</td>
</tr>
<tr>
<td><code>used</code></td>
<td>Use the iSNS server.</td>
</tr>
<tr>
<td><code>notused</code></td>
<td>Does not use the iSNS server.</td>
</tr>
<tr>
<td><code>-addr inet_addr</code></td>
<td>Specify the IP address.</td>
</tr>
<tr>
<td><code>-portnum port_num</code></td>
<td>Specify the port number for TCP/IP communication.</td>
</tr>
</tbody>
</table>

The following example displays the iSNS information for an array ams500.

```bash
% auisns -unit ams500 -refer
Password:
Port 0A  
Server Use: Used  
IP Address: 192.168.10.15  
Port Number: 3205  
Port 0B  
%
```
Referencing/setting the CHAP user information

Command name

auchapuser

Format

AMS, WMS, SMS, AMS2000
auchapuser -unit unit_name -refer
   [ ctl_no port_no [ -user user_name | -userfile file_name ] ]

auchapuser -unit unit_name -add ctl_no port_no
   -user user_name | -userfile file_name
   [ -tno target_no ... | -talias target_alias ... ]

auchapuser -unit unit_name -chg ctl_no port_no
   -user user_name | -userfile file_name
   [ -newuser new_user_name | -newuserfile file_name ]
   [ -secret ]

auchapuser -unit unit_name -rm ctl_no port_no
   -user user_name | -userfile file_name

auchapuser -unit unit_name -assign ctl_no port_no
   -user user_name | -userfile file_name
   [ -tno target_no ... | -talias target_alias ... ]

auchapuser -unit unit_name -release ctl_no port_no
   -user user_name | -userfile file_name
   [ -tno target_no ... | -talias target_alias ... | -all ]

auchapuser -unit unit_name -availablelist ctl_no port_no
   [ -user user_name | -userfile file_name ]

Description

This command references or sets CHAP user information.

⚠️ **NOTE:** At the Windows® 98 MS-DOS prompt, the input buffer is up to 128 characters by default. Use the option **-userfile** or **-newuserfile** when a long CHAP User name is specified. The first line of the specified file is set for CHAP User name, and the second line and the following are invalid.
## Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <em>unit_name</em></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer [ ctl_no port_no ]</td>
<td>References CHAP user information. CHAP user information list is sorted by the CHAP user name. When the ctl_no port_no is not specified: CHAP user name of all ports is displayed. When the ctl_no port_no is specified: CHAP user name of the specified port is displayed. When the -user or -userfile option specified, the target that has been assigned to the specified CHAP user is also displayed.</td>
</tr>
<tr>
<td>-add ctl_no port_no</td>
<td>Sets CHAP user information. ctl_no: Controller number (0, 1) port_no: Port number (A, B, E, F)</td>
</tr>
<tr>
<td>-chg ctl_no port_no</td>
<td>Changes CHAP user information. ctl_no: Controller number (0, 1) port_no: Port number (A, B, E, F)</td>
</tr>
<tr>
<td>-rm ctl_no port_no</td>
<td>Deletes CHAP user information. ctl_no: Controller number (0, 1) port_no: Port number (A, B, E, F)</td>
</tr>
<tr>
<td>-assign ctl_no port_no</td>
<td>Assigns CHAP user to the target. ctl_no: Controller number (0, 1) port_no: Port number (A, B, E, F)</td>
</tr>
<tr>
<td>-release ctl_no port_no</td>
<td>Releases the target from CHAP user. ctl_no: Controller number (0, 1) port_no: Port number (A, B, E, F)</td>
</tr>
<tr>
<td>-availablelist ctl_no port_no</td>
<td>A list of targets that can be assigned to the specified controller number, port number, and CHAP user is displayed. ctl_no: Controller number (0, 1) port_no: Port number (A, B, E, F)</td>
</tr>
<tr>
<td>-user <em>user_name</em></td>
<td>Specify CHAP user name. user_name: CHAP user name (See Note 1)</td>
</tr>
<tr>
<td>-userfile <em>file_name</em></td>
<td>Specify the file(path) name when setting the CHAP user name using a file. file_name: File(path) name</td>
</tr>
</tbody>
</table>
### Option Description

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-tno target_no ...</td>
<td>Specify the target number. Single or multiple target numbers can be specified.</td>
</tr>
<tr>
<td></td>
<td>Single specification: Specifying a single target number.</td>
</tr>
<tr>
<td></td>
<td>Example: -tno 3</td>
</tr>
<tr>
<td></td>
<td>Multiple specification: Specifying multiple target numbers.</td>
</tr>
<tr>
<td></td>
<td>Example: -tno 0 1 2 3 4 5 8</td>
</tr>
<tr>
<td></td>
<td>-tno 0-5 8</td>
</tr>
<tr>
<td></td>
<td>target_no: Target number</td>
</tr>
<tr>
<td>-talias target_alias</td>
<td>Specify the target alias.</td>
</tr>
<tr>
<td></td>
<td>Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td></td>
<td>Cannot specify spaces only.</td>
</tr>
<tr>
<td></td>
<td>Single or multiple target aliases can be specified.</td>
</tr>
<tr>
<td></td>
<td>Single specification: Specifying a single target alias.</td>
</tr>
<tr>
<td></td>
<td>Example: -talias solaris</td>
</tr>
<tr>
<td></td>
<td>Multiple specification: Specifying multiple target aliases.</td>
</tr>
<tr>
<td></td>
<td>Example: -talias irix01 solaris win001</td>
</tr>
<tr>
<td></td>
<td>target_alias: Target alias (See Note 2)</td>
</tr>
<tr>
<td>-newuser new_user_name</td>
<td>Specify CHAP user name to be changed.</td>
</tr>
<tr>
<td></td>
<td>new_user_name: CHAP user name (See Note 1)</td>
</tr>
<tr>
<td>-newuserfile file_name</td>
<td>Specify the file(path) name when changing the CHAP user name using a file.</td>
</tr>
<tr>
<td></td>
<td>file_name: File(path) name</td>
</tr>
<tr>
<td>-secret</td>
<td>Specify this option when changing Secret. (See Note 3)</td>
</tr>
<tr>
<td>-all</td>
<td>Specify this option when releasing all targets that have been assigned to the specified CHAP user.</td>
</tr>
</tbody>
</table>

**Note 1:** For CHAP user name, less than or equal to 256 ASCII characters (alphabetic characters and the following symbols) can be used. (., -, +, @, =, ;, /, [ , ] , ~, (space))

**Note 2:** For target alias, less than or equal to 32 ASCII characters (alphabetic characters, numerals, and the following symbols) can be used. (!, #, $, %, &, +, -, =, @, ^, _, {, }, ~, (, (space))

**Note 3:** For Secret, 12 to 32 ASCII characters (alphabetic characters and the following symbols) can be used. (., -, +, @, =, ;, /, [ , ] , ~, (space))
**Example**

The following example displays the CHAP information for an array ams500.

```
% auchapuser -unit ams500 -refer
Port 0A
  User Name
    mng001
    mainte001
Port 0B
  %
```

**Referencing/sending a ping**

**Command name**

auping

**Format**

AMS, WMS, SMS, AMS2000, HUS

```
auping  -unit unit_name -refer
```

```
auping  -unit unit_name -start ctl_no port_no
    -addr inet_addr
```

**Description**

This command references the result of Ping execution or send Ping.

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, “_ (underline)”, “. (period)”, “@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the result of Ping execution.</td>
</tr>
<tr>
<td>-start ctl_no</td>
<td>Sends Ping from the specified port.</td>
</tr>
<tr>
<td>port_no</td>
<td></td>
</tr>
<tr>
<td>-addr inet_addr</td>
<td>Specify the IP address.</td>
</tr>
<tr>
<td></td>
<td><strong>inet_addr</strong>: IP address</td>
</tr>
</tbody>
</table>

**Examples**

The following example issues a ping to an array ams500.
% auping -unit ams500 -start 0 A -addr 192.168.15.207
Password:
Are you sure you want to start the ping test?
(y/n [n]): y
When starting the ping test, the access from the host may be delayed or the iSCS
I connection may temporarily be lost to the specified controller.
Do you want to continue processing? (y/n [n]): y
The ping test has been started.
Please check a result as -refer option.
%
The following example displays a result of an array ams500.

% auping -unit ams500 -refer
Password:
Port  Destination IP Address                   Success Count  Status
0A  192.168.15.207                            0/  5(  0%)   Complete
0B ---                                      ---            Not Executing
1A ---                                      ---            Not Executing
1B ---                                      ---            Not Executing
%

Referencing/setting the backend diagnosis information

Command name
aubackenddiag

Format
9500V, AMS, WMS
aubackenddiag -unit unit_name –refer
aubackenddiag -unit unit_name -set -autodiagthres num

Description
This command refers to or sets the backend diagnosis information.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-set</td>
<td>References the backend diagnosis information.</td>
</tr>
<tr>
<td>-autodiagthres num</td>
<td>Specify the auto diagnosis threshold.</td>
</tr>
</tbody>
</table>

Examples

The following example rdisplays the backend diagnosis information of an array ams500.
The following example sets the backend diagnosis information of an array ams500.

```
% aubackenddiag -unit ams500 -refer
Password:
Auto Diagnosis Threshold : 10
%
```

```
% aubackenddiag -unit ams500 -set -autodiagthres 255
Password:
Are you sure you want to set the backend diagnosis information?
(y/n [n]): y
The backend diagnosis information has been set successfully.
%
```

### Setting the SNMP environment information and outputting its file

#### Command name

**ausnmp**

#### Format

```
9500V, AMS, WMS, SMS, AMS2000, HUS
ausnmp  -unit unit_name -get [ -config config.txt ] [ -name name.txt ]
ausnmp  -unit unit_name -set [ -config config.txt ] [ -name name.txt ]
```

#### Description

This command reads and sets up the SNMP environment file.

#### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;:&quot;, &quot;-_ (underline)&quot;, &quot;, (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-get</td>
<td>Reads the SNMP environment information and outputs it into a specified file. Specify one or more options from &quot;-config&quot; or &quot;-name&quot;.</td>
</tr>
<tr>
<td>-set</td>
<td>References the backend diagnosis information.</td>
</tr>
<tr>
<td>-config config.txt</td>
<td>Specify the file name of environment setting file.</td>
</tr>
<tr>
<td>-name name.txt</td>
<td>Specify the file name of array unit name setting file.</td>
</tr>
</tbody>
</table>

#### Example

The following example sets the SNMP information of an array ams500a1.

```
% ausnmp -unit ams500a1 -get
```
% ausnmp –unit ams500 –set –config config.txt
Password:
Are you sure you want to set the SNMP information to the subsystem? (y/n [n]): y
The SNMP information has been set successfully.
%

Referencing/setting e-Mail alert information

Command name

auemailalert

Format

SMS, AMS2000, HUS
auemailalert -unit unit_name –refer
auemailalert -unit unit_name -testmail -ctl0 | -ctl1
auemailalert -unit unit_name -mail enable | disable

When the parameter information is not set
auemailalert -unit unit_name -set
  -domain domain_name
  -mailsvaddlr server_address
  -fromaddr from_address
  -toaddlr to_address [-to | -bcc]
  [-repaddlr reply_address]

When the parameter information has already been set
auemailalert -unit unit_name -set
  [-domain domain_name ]
  [-mailsvaddlr server_address ]
  [-fromaddr from_address ]
  [-toaddlr to_address [-to | -bcc]]
  [-repaddlr reply_address ]
auemailalert -unit unit_name –chg
  -toaddlr to_address
  [-newtoaddlr new_to_address]
  [-to | -bcc]
auemailalert -unit unit_name –rm
  -toaddlr to_address
auemailalert -unit unit_name -init

Description

This command references or sets the E-Mail Alert information.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “(space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the E-Mail Alert information.</td>
</tr>
<tr>
<td>-testmail</td>
<td>Sends a test mail.</td>
</tr>
</tbody>
</table>
Example

The following example displays the E-Mail Alert information of an array sms100.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-mail enable</td>
<td>Specify whether sending a mail or not.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Sends a mail.</td>
</tr>
<tr>
<td></td>
<td>disable: Does not send a mail.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the E-Mail Alert information.</td>
</tr>
<tr>
<td>-chg</td>
<td>Changes the E-Mail Alert information.</td>
</tr>
<tr>
<td>-rm</td>
<td>Deletes the E-Mail Alert information.</td>
</tr>
<tr>
<td>-init</td>
<td>Initializes the E-Mail Alert information.</td>
</tr>
<tr>
<td>-ctl0</td>
<td>-ctl1</td>
</tr>
<tr>
<td>-domain domain_name</td>
<td>Specify the domain of the mail server.</td>
</tr>
<tr>
<td></td>
<td>Specify the domain in less than or equal to 255 alphanumeric characters or codes.</td>
</tr>
<tr>
<td></td>
<td><strong>domain_name</strong>: Domain of the mail server</td>
</tr>
<tr>
<td>-mailsrvaddr server_address</td>
<td>Specify the mail server IP address.</td>
</tr>
<tr>
<td></td>
<td><strong>server_address</strong>: Mail server IP address</td>
</tr>
<tr>
<td>-fromaddr from_address</td>
<td>Specify the source mail address. Specify the source mail address in less than or equal to 63 alphanumeric characters or codes.</td>
</tr>
<tr>
<td></td>
<td><strong>from_address</strong>: Source mail address</td>
</tr>
<tr>
<td>-toaddr to_address</td>
<td>Specify the destination mail address. Specify the destination mail address in less than or equal to 63 alphanumeric characters or codes.</td>
</tr>
<tr>
<td></td>
<td><strong>to_address</strong>: Destination mail address</td>
</tr>
<tr>
<td>-to</td>
<td>-bcc</td>
</tr>
<tr>
<td></td>
<td>• Specify the send type of source mail address.</td>
</tr>
<tr>
<td></td>
<td>• If omitted send type, To is used.</td>
</tr>
<tr>
<td></td>
<td>• When the -chg option is specified, specify the changed send type.</td>
</tr>
<tr>
<td>-reppaddr reply_address</td>
<td>Specify the reply mail address. Specify the reply mail address in less than or equal to 63 alphanumeric characters or codes.</td>
</tr>
<tr>
<td></td>
<td><strong>reply_address</strong>: Reply mail address</td>
</tr>
<tr>
<td>-newtoaddr new_to_address</td>
<td>Specify the changed destination mail address. Specify the destination mail address in less than or equal to 63 alphanumeric characters or codes.</td>
</tr>
<tr>
<td></td>
<td><strong>new_to_address</strong>: Destination mail address</td>
</tr>
</tbody>
</table>
% auemailalert -unit sms100 –refer
E-mail Error Report : Disable
Parameter Setting
CTL0 : Unfinished
CTL1 : Unfinished

Setting Status : Normal
Parameter Information
Domain Name : N/A
Mail Server Address : N/A
From Address : N/A
Send To Address1 : To: N/A
Send To Address2 : To: N/A
Send To Address3 : To: N/A
Reply To Address : N/A
%

Referencing/setting the LED information

Command name

aulocateled

Format

AMS2000, HUS
aulocateled -unit unit_name –refer

aulocateled -unit unit_name -set [ -uno unit_no ... on | off ]
[ -ctu on | off ]

Description

This command references or sets the LED information.
## Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <em>unit_name</em></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underscore)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the LED information.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the LED information.</td>
</tr>
<tr>
<td>-uno <em>unit_no</em> ... on</td>
<td>Specify the unit number which instructs turning on or off of the LED.</td>
</tr>
<tr>
<td></td>
<td><em>unit_no</em>: Unit number</td>
</tr>
<tr>
<td></td>
<td>Single or multiple unit numbers can be specified.</td>
</tr>
<tr>
<td></td>
<td>Single specification: Specifying a single unit number.</td>
</tr>
<tr>
<td></td>
<td>Example: -uno 3</td>
</tr>
<tr>
<td></td>
<td>Multiple specification: Specifying multiple unit numbers.</td>
</tr>
<tr>
<td></td>
<td>Example: -uno 1 2 3 4 5 8 -uno 1-5 8</td>
</tr>
<tr>
<td></td>
<td>on : Turns on the LED.</td>
</tr>
<tr>
<td></td>
<td>off: Turns off the LED.</td>
</tr>
</tbody>
</table>

## Examples

The following example displays the LED information of an array unit ams2300a1.

```
% aulocateled –unit ams2300a1 –refer
Unit LED
  0 OFF
  1 OFF
  2 OFF
...
%
```

The following example sets the LED information of an array unit ams2300a1.

```
% aulocateled –unit ams2300a1 –set –uno 0-1 on
Are you sure you want to set LED information? (y/n [n]): y
LED information has been set successfully.
%
```
Referencing/Starting additional unit information

Command name

`auadditionalunit`

Format

AMS2000

```
auadditionalunit -unit unit_name -refer
auadditionalunit -unit unit_name -add
```

Description

This command refers to the additional unit information or starts the addition.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <code>unit_name</code></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the information of adding unit.</td>
</tr>
<tr>
<td>-add</td>
<td>Starts the addition of the unit.</td>
</tr>
</tbody>
</table>

Examples

The following example displays the additional unit information of an array unit ams2300a1.

```
% auadditionalunit -unit ams2300a1 -refer
Status : Normal(No Execute)
Adding Unit No. : ---
Base Unit No. : ---
%
```

The following example starts the additional unit information of an array unit ams2300a1.

```
% auadditionalunit -unit ams2300a1 -add
Are you sure you want to start to add units? (y/n [n]): y
Now adding units. Please do not power off the units and do not pull the cable from the units.
Adding units have been started.
%
```

Referencing/setting LAN port information

Command name

`aulanport`
### Format

**SMS, AMS2000, HUS**

```bash
aulanport -unit unit_name -refer
```

When setting the port effective or ineffective.

```bash
aulanport -unit unit_name -set -ctl0 | -ctl1 -nonsecureport enable | disable
```

When setting the port number:

```bash
aulanport -unit unit_name -set -ctl0 | -ctl1 [-nonsecureportnum port_num ] [-secureportnum port_num ]
```

**HUS 100**

```bash
aulanport -unit unit_name -refer
```

When setting the port effective or ineffective.

```bash
aulanport -unit unit_name -set -ctl0 | -ctl1 -nonsecureport enable | disable
```

When setting the port number:

```bash
aulanport -unit unit_name -set -ctl0 | -ctl1 [-nonsecureportnumb port_num ] [-secureportnumb port_num ]
```

```bash
aulanport -unit unit_name -set -packetfiltering enable | disable
```

### Description

This command references and sets LAN port information.

### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td><code>-refer</code></td>
<td>References LAN port information.</td>
</tr>
<tr>
<td><code>-set</code></td>
<td>Sets LAN port information.</td>
</tr>
<tr>
<td>`-ctl0</td>
<td>-ctl1`</td>
</tr>
<tr>
<td>`-nonsecureport enable</td>
<td>disable`</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the non-secure port.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the non-secure port.</td>
</tr>
<tr>
<td><code>-nonsecureportnum port_num</code></td>
<td>Specify the port number of non-secure port.</td>
</tr>
<tr>
<td><code>-secureportnum port_num</code></td>
<td>Specify the port number of secure port.</td>
</tr>
</tbody>
</table>

`port_num`: Port number
Examples

The following example displays the LAN port information of an array unit hus1110 when the LAN access filtering is enabled.

% aulanport -unit hus110 --refer

<table>
<thead>
<tr>
<th>CTL</th>
<th>Non-secure Port</th>
<th>Non-secure Port Number</th>
<th>Secure Port Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Disable</td>
<td>2000</td>
<td>28355</td>
</tr>
<tr>
<td></td>
<td>Enable</td>
<td>2000</td>
<td>28355</td>
</tr>
</tbody>
</table>

Packet Filtering : Disable

Filtering Log

<table>
<thead>
<tr>
<th>Time</th>
<th>IP Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012/12/24 21:44:02</td>
<td>162.98.209.44</td>
</tr>
<tr>
<td>2012/12/24 21:44:00</td>
<td>162.98.209.46</td>
</tr>
</tbody>
</table>

The following example displays the LAN port information of an array unit hus110 when the LAN access filtering is disabled.

% aulanport --unit hus110 --refer

<table>
<thead>
<tr>
<th>CTL</th>
<th>Non-secure Port</th>
<th>Non-secure Port Number</th>
<th>Secure Port Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Disable</td>
<td>2000</td>
<td>28355</td>
</tr>
<tr>
<td>1</td>
<td>Enable</td>
<td>2000</td>
<td>28355</td>
</tr>
</tbody>
</table>

Packet Filtering : N/A

Filtering Log

<table>
<thead>
<tr>
<th>Time</th>
<th>IP Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012/12/24 21:44:00</td>
<td>162.98.209.48</td>
</tr>
<tr>
<td>2012/12/24 21:45:02</td>
<td>162.98.209.47</td>
</tr>
</tbody>
</table>

The following example sets the LAN port information (Packet Filtering) of an array unit hus110.

% aulanport -unit hus110 -set -packetfiltering enable

Are you sure you want to set the LAN port information? [y/n [n]]: y

When Packet Filtering is enabled, the LAN access from the blocked node will not be allowed temporarily.
Are you sure you want to continue? (y/n [n]): y
The LAN port information has been set successfully.
%

The following example displays the LAN port information of an array unit ams2300a1.

% aulanport -unit ams2300a1 -refer

<table>
<thead>
<tr>
<th>CTL</th>
<th>Non-secure Port</th>
<th>Non-secure Port Number</th>
<th>Secure Port Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Enable</td>
<td>2000</td>
<td>28355</td>
</tr>
<tr>
<td>1</td>
<td>Enable</td>
<td>2000</td>
<td>28355</td>
</tr>
</tbody>
</table>
%

The following example sets the non-secure LAN port information of an array unit ams2300a1.

% aulanport -unit ams2300a1 -set -ctl0 -nonsecureportnum 2000
Are you sure you want to set the LAN port information? (y/n [n]): y
The LAN port information has been set successfully.
Please add “df-damp-snm port number/tcp” to services file, or change the port number of df-damp-snm in the file.
%
Setting the SSL option

Command name

ausslopt

Format

SMS, AMS2000, HUS
ausslopt -unit unit_name -import -certificate file_name

Description

This command sets the SSL option.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, “_ (underline)”, “. (period)”, “@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-import</td>
<td>Imports the SSL certificate.</td>
</tr>
<tr>
<td>-certificate file_name</td>
<td>Specify the name of the file(path) to set the SSL certificate.</td>
</tr>
</tbody>
</table>

Example

The following example imports the SSL certificate (file name: xxxxx.xxx) of an array unit ams2300a1.

% ausslopt –unit ams2300a1 –import –certificate xxxxx.xxx
Are you sure you want to import the SSL certificate?
(y/n): y
The SSL certificate has been imported successfully.
%

Referencing/setting the UPS information

Command name

auups

Format

HUS100
auups -unit unit_name -refer
auups -unit unit_name -set
   -info Standard | UPSInterlock1 | UPSInterlock2 | UPSInterlock3
**Description**

This command references or sets the UPS information.

**Example**

The following example displays the UPS information of an HUS 110 storage system.

```
% auups -unit hus110a1 -refer
UPS Information
  Current : Standard Mode
  Setting : Standard Mode
%
```

The following example sets the UPS information of an HUS 110 storage system.

```
% auups -unit hus110a1 -set -info UPSInterlock1
Are you sure you want to set the UPS information? (y/n [n]):
y
The UPS information set successfully.
In order to enable the set, shutdown the array.
%
```

**Referencing/setting the host response**

**Command name**

`auhostresp`

**Format**

```
HUS100
auhostresp -unit unit_name -refer
auhostresp -unit unit_name -set
   -SystemOption AutoSetSeparating enable | disable
```

**Description**

This command references or sets the host response.

---

**NOTE:** When the “Auto Set Separating Mode” setting changes, the “Autodiscover New HG Mode” of a port with a VMware host group can automatically change. If you have changed the “Autodiscover New HG Mode” setting, confirm the enable/disable state of the mode after the “Auto Set Separating Mode” setting has changed.

**Example**

The following example displays the host response information of an HUS 110 storage system.
% auhostresp -unit hus110a1 -refer
Host Response
    System
        Auto Set Separating Mode = OFF
%

The following example sets the host response information of an HUS 110 storage system.
% auhostresp -unit hus110a1 -set -SystemOption AutoSetSeparating enable
Are you sure you want to set the host response? (y/n [n]): y
The host response has been set successfully.
%

Referencing/setting the SSD/FMD Endurance information

Command name

aussdfmdendurance

Format

HUS100
aussdfmdendurance -unit unit_name -refer
aussdfmdencurance -unit unit_name -chg -alertlevelthreshold num

Description

This command references or sets the SSD Endurance information.

Example

The following example displays the SSD Endurance information of an array unit hus150a1.
% aussdfmdendurance -unit hus150a1 -refer
Alert Level Threshold  SSD: 90%  FMD: 90%
History 1: 2012/04/11
2: 2012/04/21
3: 2012/05/01
4: N/A
%

The following example sets the SSD endurance information of an array unit hus110a1.
% aussdfmdendurance -unit hus110a1 -chg -fmdalertlevelthreshold 90
Are you sure you want to change the SSD/FMD endurance information? (y/n [n]): y
The SSD/FMD endurance information has been changed successfully.

Referencing/setting the FMD Battery Life Information

Command name

aufmdbatterylife

Format

HUS100

aufmdbatterylife -unit unit_name -refer

aufmdbatterylife -unit unit_name -chg -alertlevelthreshold num

Description

This command references or sets the FMD battery life.

Example

The following example displays the FMD endurance information of an array unit hus150a1.

% aufmdbatterylife -unit hus150a1 -refer
Alert Level Threshold: 90%
History  1: 2012/04/11
         2: 2012/04/21
         3: 2012/05/01
         4: N/A

Unit  HDU  RAIDGr DPPool Lifelnd  LifeStat   1   2   3   4
0  0   1   N/A     50%  Normal  49% 48% 47% N/A
1  1   5   N/A     91%  Over   90% 89% 88% N/A
2  2  N/A   8    99%  N/A    98% 97% 96% N/A
%  
%

The following example sets the FMD endurance information of an array unit hus150a1.

% aufmdbatterylife -unit hus150a1 -chg -alertlevelthreshold 90
Are you sure you want to change the FMD battery life information? (y/n [n]): y
The FMD battery life information has been changed successfully.

Referencing the host login information

Command name

auhostlogininfo

Format

HUS100

auhostlogininfo -unit unit_name -refer

Description

This command references the host login information of the iSCSI port.

Example

The following example displays the iSCSI host login information of an array unit hus150a1.

% auhostlogininfo -unit hus150a1 -refer

<table>
<thead>
<tr>
<th>Port</th>
<th>Target</th>
<th>Host iSCSI Name</th>
</tr>
</thead>
</table>
| 0A   | 000:T000 | iqn.2005-08.jp.co.h44.ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc...
The following example displays the iSCSI host login information of an array unit hus150a1. When no login host exists:

```
% auhostlogininfo -unit hus150a1 -refer
DMEC002015: No information displayed.
```
Adding/Removing the I/F Module/Interface Board

Command name

aupartinterface

Format

HUS100

aupartinterface -unit unit name -add

When removing I/F module:

aupartinterface -unit unit name -rm -ifmodule slot_no

When removing interface board:

aupartinterface -unit unit name -rm -ifboard

Description

This command adds or removes the I/F module or interface board.

Example

Perform the host I/O module addition of Slot 0F/1F of array unit hus150.

% aupartinterface-unit hus150 -add
Are you sure you want to continue? (y/n [n]): y
The preparation for adding host I/O modules has started.
Make sure to add the same host I/O modules type to the slot F of controller 0 and controller 1.
10 seconds later, press the return key.
If you press the return key before to add host I/O modules, the adding host I/O modules is failed and unequipped.
When the slot F of controller 0 and controller 1 already added to host I/O modules, press the return key.
Starting the host I/O modules addition could lead to performance deterioration or host time-outs.
The addition of I/O modules has been started.
%

Try again adding the host I/O module after the addition of the host I/O module in the array unit hus150.

% aupartinterface-unit hus150 -add
The preparation for adding host I/O modules has started.
Make sure to add the same host I/O modules type to the slot F of controller 0 and controller 1.
10 seconds later, press the return key.
If you press the return key before to add host I/O modules, the adding host I/O modules is failed and unequipped.
When the slot F of controller 0 and controller 1 already added to host I/O modules, press the return key.
Starting the host I/O modules addition could lead to performance deterioration or host time-outs.
The addition of I/O modules has been started.
%

Perform the interface board addition whose array unit hus130.
% aupartinterface-unit hus130 -add
Are you sure you want to continue? (y/n [n]): y
The preparation for adding interface boards has been issued.
Make sure to add the same I/F boards type to controller 0 and controller 1.
10 seconds later, press the return key.
If press the return before to add I/F boards, the adding I/F boards is failed and unequipped.
When controller 0 and controller 1 already added to I/F boards, press the return key.
Starting the I/F boards addition could lead to performance deterioration or host time-outs.
The addition of I/F boards has been started.
%

Try again adding the interface board after the addition of the interface board in the array unit hus130.
% aupartinterface-unit hus130 -add
The preparation for adding interface boards has been issued.
Make sure to add the same I/F boards type to controller 0 and controller 1.
10 seconds later, press the return key.
If press the return before to add I/F boards, the adding I/F boards is failed and unequipped.
When controller 0 and controller 1 already added to I/F boards, press the return key.
Starting the I/F boards addition could lead to performance deterioration or host time-outs.
The addition of I/F boards has been started.
%

Perform the starting of the host I/O module removal of Slot 0F/1F whose array unit hus150.
% aupartinterface-unit hus150 -rm -ifmodule F
Are you sure you want to removed host I/O modules?
Removing these host I/O modules will cause host access to all logical units via the host I/O modules stop. Please stop host access before you removing it.
Are you sure you want to continue? (y/n [n]): y
The remove host I/O modules has been issued.
By "auparts" command, verify the status to make sure that you are able to remove the host I/O modules. Verify that the STATUS LED is red, then remove the host I/O modules from controller 0 and controller 1.
%

Perform the starting of the interface board removal whose array unit hus130.
% aupartinterface-unit hus130 -rm -ifboard
Are you sure you want to removed interface boards?
Removing these interface boards will cause host access to all logical units via the interface boards to stop. Please stop host access before you removing it.
Are you sure you want to continue? (y/n [n]): y
The remove interface boards has been issued.
By "auparts" command, verify the status to make sure that you are able to remove the interface boards. Verify that the STATUS LED is red, then remove the interface boards from controller 0 and controller 1.
%
Perform the preparation of the host I/O module addition of Slot 0F/1F whose array unit is hus150.

    % aupartinterface -unit hus150 -prepareadd
    Are you sure you want to start the preparation of adding host I/O modules? (y/n [n]): y
    The preparation for adding host I/O modules has started.
    By "auparts" command, verify the status to make sure that you are able to remove the interface boards. Verify that the STATUS LED is red, then remove the interface boards from controller 0 and controller 1.

%
File output of configuration and configuration setting by file

This section describes how to save the array configuration information to a text file, or to set the array configuration using a text file. The configuration information that is saved to the text file is the status of the system parameters and the constituent parts of the RAID/LU and the array. The configuration to be set is the system parameters and RAID/LU. The status of the constituent parts of the array cannot be set.

The configuration information is handled with separate text files for the system parameters and for RAID/LU.

The copying of configuration between arrays can be carried out, by saving a text file of the configuration from an array, and then by using the saved text file to set another array.

Editing a text file to set an array can be done, but it is recommended that this function be used only for the configuration of the same array. To change the configuration, it is recommended that you use the configuration procedures.

The topics covered in this section are:

- File output of system parameters on page 3-177
- Controller parameters on page 3-182
- File output configuration of RAID/volume and status on page 3-183
- Changing the Advanced Security Mode on page 3-192
- Setting the system parameters with a file on page 3-193
- Setting the RAID/volume definition with a file on page 3-195
- Import/export the system constituent information on page 3-197
File output of system parameters

Command name

ausyspout

Format

9500V
ausyspout -unit unit_name -file file_name

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-file file_name</td>
<td>Specify the name the file (path) to output the system parameters.</td>
</tr>
</tbody>
</table>

Description

This command outputs the contents of the setting for the system parameters set in the array in a specified file, in a text format.

Example

The following example outputs the setting information of the system parameters of an array 9500a1 to file: sysprm.txt to the directory where Storage Navigator Modular 2 is installed.

% ausyspout -unit 9500a1 -file sysprm.txt
%

The format of the output file consists of the following fields:

- File header
- Registration name with Navigator 2 of the array
- Output time (time of the computer where Navigator 2 is installed)
- Firmware revision
- Array type
- Common controller parameters
- Controller parameters

Figure 3-1 on page 3-178 describes the fields of this output.
Figure 3-1: Format of System Parameter Output File
Common controller parameters

The common system parameters of the array are output. An output example of the system parameters of 9500 is shown in Figure 3-2.

Figure 3-2: Output Example of System Common Parameters

Table 3-4 describes the common controller parameters.

<table>
<thead>
<tr>
<th>No.</th>
<th>Parameter</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>System Startup Attributes</td>
<td>System Startup</td>
</tr>
<tr>
<td></td>
<td>Single Mode</td>
<td>Single</td>
</tr>
<tr>
<td></td>
<td>Dual Active Mode</td>
<td>DualIDTake</td>
</tr>
<tr>
<td></td>
<td>Hot Standby Mode</td>
<td>DualIDTake</td>
</tr>
<tr>
<td></td>
<td>SCSI ID/Port ID Take-over Mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Used</td>
<td>HotIDTake</td>
</tr>
<tr>
<td></td>
<td>Not Used</td>
<td>HotNotIDTake</td>
</tr>
<tr>
<td></td>
<td>Default Controller</td>
<td>TalkingID</td>
</tr>
</tbody>
</table>
Table 3-4: Common Parameters (Continued)

<table>
<thead>
<tr>
<th>No.</th>
<th>Parameter</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Delay Planned Shutdown</td>
<td>-DelayPlannedShutdown</td>
</tr>
<tr>
<td>4</td>
<td>Option 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drive Detach Mode Enable</td>
<td>-DriveDetach</td>
</tr>
<tr>
<td>4</td>
<td>Option 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PROCOM Mode Enable</td>
<td>-PROCOM</td>
</tr>
<tr>
<td></td>
<td>Report Status (normal/warning)</td>
<td>-ReportStatus</td>
</tr>
<tr>
<td></td>
<td>Turbo LU Warning</td>
<td>-LuCacheWarning</td>
</tr>
<tr>
<td></td>
<td>NX Mode Enable</td>
<td>-NX</td>
</tr>
<tr>
<td></td>
<td>Auto Reconstruction Mode Enable</td>
<td>-AutoReconst</td>
</tr>
<tr>
<td></td>
<td>ForcedWriteThrough</td>
<td>- ForcedWriteThrough</td>
</tr>
<tr>
<td></td>
<td>Changing Logical Unit Mode 1</td>
<td>-LUChanging1</td>
</tr>
<tr>
<td></td>
<td>Multiple Stream Mode</td>
<td>-MultiStream</td>
</tr>
<tr>
<td></td>
<td>Multiple Stream Write Mode</td>
<td>-MultiStreamWrite</td>
</tr>
<tr>
<td></td>
<td>Multiple Stream Read Mode</td>
<td>-MultiStreamRead</td>
</tr>
<tr>
<td></td>
<td>High-Speed Sequential Write Mode</td>
<td>-HiSpeedSeqWrite</td>
</tr>
<tr>
<td></td>
<td>ShawdowImage I/O Switch Mode</td>
<td>ShawdowImageIOSwitch</td>
</tr>
<tr>
<td></td>
<td>Synchronize Cache All Execution</td>
<td>SyncCacheAllExec</td>
</tr>
<tr>
<td></td>
<td>Synchronize Cache Invalid</td>
<td>SyncCacheInvalid</td>
</tr>
</tbody>
</table>
Table 3-4: Common Parameters (Continued)

<table>
<thead>
<tr>
<th>No.</th>
<th>Parameter</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Operation if the Processor Failures Occur</td>
<td>-ProcessorFailures</td>
</tr>
<tr>
<td>6</td>
<td>INQUIRY Information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>INQUIRY Information</td>
<td>-InquiryCommandQueue</td>
</tr>
<tr>
<td></td>
<td>Vendor ID</td>
<td>-inquiryVendor</td>
</tr>
<tr>
<td></td>
<td>Product ID</td>
<td>-inquiryProduct</td>
</tr>
<tr>
<td></td>
<td>ROM Microprogram Version</td>
<td>-inquiryRomMicro</td>
</tr>
<tr>
<td></td>
<td>RAM Microprogram Version</td>
<td>-inquiryRammicro</td>
</tr>
<tr>
<td>7</td>
<td>Web Title</td>
<td>-WebTitle</td>
</tr>
</tbody>
</table>

Depending on the array that is connected, there are items that may not require setting; these items will not be saved in the file. If the value of an item in the parameters is given as “---”, it is an item that is not supported in the configuration of the array.
Controller parameters

The parameters of the controller in the system parameters of the array are listed.

---- CTL0 Parameter ----
RS232C Error Information Outflow Mode = OFF
Write & Verify Execution Mode = ON
LAN Const
  DHCP = OFF
  IP Address = 0.0.0.0
  Subnet Mask = 0.0.0.0
  Default Gateway = 0.0.0.0
  Ether Address = 00:00:00:00:00:00
---- CTL1 Parameter ----
RS232C Error Information Outflow Mode = OFF
Write & Verify Execution Mode = ON
LAN Const
  DHCP = OFF
  IP Address = 0.0.0.0
  Subnet Mask = 0.0.0.0
  Default Gateway = 0.0.0.0
  Ether Address = 00:00:00:00:00:00

Figure 3-3: Output Example of System Controller's Parameters

The parameters of controller are the items shown in Table 3-5.

Table 3-5: Controller Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS232C Error Information Outflow Mode</td>
<td>-Rs232cOutflow</td>
</tr>
<tr>
<td>Write &amp; Verify Execution Mode</td>
<td>-WriteVerifyExecution</td>
</tr>
<tr>
<td>LAN Const</td>
<td>-dhcp5</td>
</tr>
<tr>
<td></td>
<td>-IPAddress</td>
</tr>
<tr>
<td></td>
<td>-SubnetMask</td>
</tr>
<tr>
<td></td>
<td>-DefaultGateway</td>
</tr>
</tbody>
</table>

Depending on the array that is connected, there are items that may not need to be set; these items will not be saved in the file. If the value of an item in the parameters is given as “---”, it is an item that is not supported in the configuration of the array.
**File output configuration of RAID/volume and status**

**Command name**

`auconfigout`

**Format**

```
9500V
auconfigout -unit unit_name -file file_name
```

**Description**

This command outputs the RAID/LU configuration and constituent parts status already set in an array in specified file in a text format.

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, “_ (underline)”, “. (period)”, “@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td><code>-file file_name</code></td>
<td>Specify the name the file (path) to output the configuration information.</td>
</tr>
</tbody>
</table>

**Example**

The following example outputs RAID/LU configuration information of array 9500a1, by the `config.txt` file, into a directory in which Storage Navigator Modular 2 has been installed.

```
% auconfigout -unit 9500a1 -file config.txt
%```
The format of the output file consists of the following items. The layout of the output file is shown in Figure 3-4. Figure 3-5 on page 3-185 is the layout of the output file for 9500.

File header
Registration name at Navigator 2 of the array
Output time (time of the computer where Navigator 2 is installed)
Firmware revision
Array type
RAID/LU configuration
Status of constituent parts

File header
Registration name with Navigator of the array unit
Output time of the file (Time of the machine where Navigator is installed)

Array unit configuration information list.
DF Name : 9500
Date: 2006/11/19 15:54:49
Firmware Revision : 0858-R
Array Unit Type : 9500V
Serial Number : 850000026

Figure 3-4: RAID/LU Configuration information output file format
Figure 3-5: RAID/volume configuration information output file format
The function outputs the RAID configuration of the array. RAIDs that have not been created appear as “-” in the “Level” column.

```
<table>
<thead>
<tr>
<th>RAID Group</th>
<th>RAID Level</th>
<th>Start Location</th>
<th>Number of HDU</th>
<th>Number of parity group</th>
<th>Free Capacity</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>FC</td>
</tr>
</tbody>
</table>
```

Figure 3-6: RAID array configuration

### Table 3-6: RAID array configuration information

<table>
<thead>
<tr>
<th>RAID Array Configuration Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAID Group</td>
<td>RAID group number.</td>
</tr>
<tr>
<td>RAID Level</td>
<td>RAID level. If no RAID is set, “-” appears. No other information is displayed.</td>
</tr>
<tr>
<td>Start Location</td>
<td></td>
</tr>
<tr>
<td>Unit No.</td>
<td>Starting unit number of the RAID group.</td>
</tr>
<tr>
<td>HDU No.</td>
<td>Starting HDU number of the RAID group.</td>
</tr>
<tr>
<td>Number of HDU in parity group</td>
<td>Number of HDUs in the parity group of the RAID group.</td>
</tr>
<tr>
<td>Number of parity group</td>
<td>Number of parity groups in the RAID group.</td>
</tr>
<tr>
<td>Free Capacity</td>
<td>Capacity [Block] that can be defined by the logical unit of the RAID group.</td>
</tr>
<tr>
<td>Type</td>
<td>Ddrive interface type is displayed.</td>
</tr>
</tbody>
</table>

### Formatting LU configuration information

The LU configuration of the array is listed. Information is displayed up to the created LU numbers.

```
<table>
<thead>
<tr>
<th>LU Configuration Information</th>
<th>staging C-CTL D-CTL RG RAIDs Capacity Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 20480 Unformatted</td>
<td>112 0 0 0 5 10.0 MB FC</td>
</tr>
<tr>
<td>1 20480 Unformatted</td>
<td>112 0 0 0 5 10.0 MB FC</td>
</tr>
<tr>
<td>2 20480 Unformatted</td>
<td>112 0 0 0 5 10.0 MB FC</td>
</tr>
</tbody>
</table>
```

Figure 3-7: Volume configuration of the array

### Table 3-7: Volume configuration information

<table>
<thead>
<tr>
<th>LU Configuration Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU</td>
<td>LU number.</td>
</tr>
<tr>
<td>Capacity</td>
<td>LU capacity (in units of block).</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the logical unit.</td>
</tr>
<tr>
<td>Normal</td>
<td>Normal status in which the logical unit is defined and formatted.</td>
</tr>
<tr>
<td>Unformatted</td>
<td>Status in which the logical unit is defined, but not formatted.</td>
</tr>
<tr>
<td>Detached</td>
<td>Status in which the logical unit is blocked.</td>
</tr>
<tr>
<td>Regression</td>
<td>Status in which the logical unit is regressed.</td>
</tr>
</tbody>
</table>
Table 3-7: Volume configuration information (Continued)

<table>
<thead>
<tr>
<th>LU Configuration Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invalidated(Normal)</td>
<td>Status in which the logical unit is invalidated (formatted).</td>
</tr>
<tr>
<td>Invalidated(Unformat)</td>
<td>Status in which the logical unit is invalidated (not formatted).</td>
</tr>
<tr>
<td>Invalidated(Regression)</td>
<td>Status in which the logical unit is invalidated (regression).</td>
</tr>
<tr>
<td>Staging Size</td>
<td>Pre-read data amount (in units of block).</td>
</tr>
<tr>
<td>C-CTL</td>
<td>Number of the controller currently in use.</td>
</tr>
<tr>
<td>D-CTL</td>
<td>Default number of the controller controlling the logical unit.</td>
</tr>
<tr>
<td>RG</td>
<td>Number of the RAID group that creates the logical unit.</td>
</tr>
<tr>
<td>RAID</td>
<td>RAID level of the RAID group that creates the logical unit.</td>
</tr>
<tr>
<td>Capacity</td>
<td>LU capacity (in units of MB or GB).</td>
</tr>
<tr>
<td>Type</td>
<td>Drive interface type is displayed.</td>
</tr>
</tbody>
</table>

Format for drive information

The information and status of the drive of the array are listed. "Nothing" is shown after **Location** for the location of a HDU not installed.

<table>
<thead>
<tr>
<th>Location</th>
<th>Vendor ID</th>
<th>Product ID</th>
<th>Revision</th>
<th>Capacity</th>
<th>Status</th>
<th>Serial Number</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK3203-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305K9173</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK3205-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305K9762</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK5203-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L0459</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK5205-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L0574</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK3202-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L1620</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK3203-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L1620</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK3205-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L1620</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK5202-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L1620</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK5203-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L1620</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK5205-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L1620</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK3202-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L1620</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK3203-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L1620</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK3205-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L1620</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK5202-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L1620</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK5203-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L1620</td>
<td>FC</td>
</tr>
<tr>
<td></td>
<td>HITACHI</td>
<td>DK5205-72PC</td>
<td>KDKO</td>
<td>7200</td>
<td>Standby</td>
<td>305L1620</td>
<td>FC</td>
</tr>
</tbody>
</table>

Figure 3-8: Information and status of the drive

Table 3-8: Drive status information

<table>
<thead>
<tr>
<th>Drive Status Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Installation location of the drive.</td>
</tr>
<tr>
<td>Vendor ID</td>
<td>Vendor ID of the drive.</td>
</tr>
<tr>
<td>Product ID</td>
<td>Product ID of the drive.</td>
</tr>
<tr>
<td>Revision</td>
<td>Firmwave revision of the drive</td>
</tr>
<tr>
<td>Capacity</td>
<td>Capacity of the drive.</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the drive.</td>
</tr>
<tr>
<td>Normal</td>
<td>Normal (RAID, LU defined).</td>
</tr>
<tr>
<td>Detached</td>
<td>Detached.</td>
</tr>
</tbody>
</table>
Table 3-8: Drive status information (Continued)

<table>
<thead>
<tr>
<th>Drive Status Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standby</td>
<td>Normal (LU undefined).</td>
</tr>
<tr>
<td>Undefine</td>
<td>Normal (RAID undefined).</td>
</tr>
<tr>
<td>Recon</td>
<td>Reconfiguring (copying from collection or backup).</td>
</tr>
<tr>
<td>Serial Number</td>
<td>Serial number of the drive.</td>
</tr>
<tr>
<td>Type</td>
<td>Interface type of the drive.</td>
</tr>
</tbody>
</table>

Format for cache information

The configuration information and status of the cache of the array are listed.

![Table 3-9: Drive status information](image)

Table 3-9: Cache information

<table>
<thead>
<tr>
<th>Cache Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot</td>
<td>Installation location of the cache.</td>
</tr>
<tr>
<td>Capacity</td>
<td>Capacity (in MB) of the cache of controller.</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the cache of controller.</td>
</tr>
<tr>
<td>Normal</td>
<td>Normal.</td>
</tr>
<tr>
<td>Detached</td>
<td>Detached.</td>
</tr>
<tr>
<td>Nothing (---: Slot not supported)</td>
<td>Not installed.</td>
</tr>
</tbody>
</table>
Format for fan information

The status of the fan of the array is output.

<table>
<thead>
<tr>
<th>Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Table 3-10: Fan Information

<table>
<thead>
<tr>
<th>Fan Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Installation location of the fan.</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the fan.</td>
</tr>
<tr>
<td>Normal</td>
<td>Normal operation.</td>
</tr>
<tr>
<td>Alarm</td>
<td>Abnormal condition.</td>
</tr>
</tbody>
</table>

Format for battery information

The status of the battery of the array is output.

<table>
<thead>
<tr>
<th>Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Table 3-11: Battery Information

<table>
<thead>
<tr>
<th>Battery Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Installation location of the battery.</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the battery.</td>
</tr>
<tr>
<td>Normal</td>
<td>Normal operation.</td>
</tr>
<tr>
<td>Alarm</td>
<td>Abnormal condition.</td>
</tr>
</tbody>
</table>
Format for AC power information

The status of the AC power supply of the array is output.

```
---- AC Power Information ----
Location  Status
Unit0.AC0  Normal
Unit0.AC1  Normal
Unit1.AC0  Nothing
Unit1.AC1  Nothing
```

Table 3-12: AC power information

<table>
<thead>
<tr>
<th>AC Power Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Installation location of the AC power supply.</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the AC power supply.</td>
</tr>
<tr>
<td>Normal</td>
<td>Normal operation.</td>
</tr>
<tr>
<td>Alarm</td>
<td>Abnormal condition.</td>
</tr>
</tbody>
</table>

Format for battery backup status information

The status of the battery backup circuit of the array is output.

```
---- Battery Backup Information ----
Location  Status
0         Normal
1         Normal
```

Table 3-13: Battery backup information

<table>
<thead>
<tr>
<th>Battery Backup Status Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Installation location of the battery backup circuit</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the battery backup circuit.</td>
</tr>
<tr>
<td>Normal</td>
<td>Normal operation.</td>
</tr>
<tr>
<td>Alarm</td>
<td>Abnormal condition.</td>
</tr>
</tbody>
</table>
Format for loop information

The status of the loop of the array is output.

<table>
<thead>
<tr>
<th>Path</th>
<th>Loop</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Normal</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Normal</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>Normal</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Normal</td>
</tr>
</tbody>
</table>

**Table 3-14: Loop information**

<table>
<thead>
<tr>
<th>Loop Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Path</td>
<td>Path number.</td>
</tr>
<tr>
<td>Loop</td>
<td>Loop number.</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the loop.</td>
</tr>
<tr>
<td>Normal</td>
<td>Normal operation.</td>
</tr>
<tr>
<td>Alarm</td>
<td>Abnormal condition.</td>
</tr>
</tbody>
</table>

Format for enclosure information

The status of the enclosure of the array is output.

<table>
<thead>
<tr>
<th>Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 0, ENC 0</td>
<td>Normal</td>
</tr>
<tr>
<td>Unit 0, ENC 1</td>
<td>Normal</td>
</tr>
<tr>
<td>Unit 1, ENC 0</td>
<td>Normal</td>
</tr>
<tr>
<td>Unit 1, ENC 1</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 3-15: Enclosure information**

<table>
<thead>
<tr>
<th>Enclosure Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Installation location of the enclosure.</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the enclosure.</td>
</tr>
<tr>
<td>Normal</td>
<td>Normal operation.</td>
</tr>
<tr>
<td>Alarm</td>
<td>Abnormal condition.</td>
</tr>
</tbody>
</table>

---

3-191
Changing the Advanced Security Mode

Command name

auaccountopt

Format

auaccountopt -unit disk array-name -set -advancedsecuritymode enable

Description

The command sets the account authentication options. One of the options is the administrative state of the advanced security mode. This mode can be in either an enabled or disabled state.

Example

% auaccountopt -unit disk array-name -set -advancedsecuritymode enable

The Account Authentication is enabled. Please log in.

User ID: root

Password: root-password

Are you sure you want to set the account option? (y/n [n]): y

The account option has been set successfully.

%
Setting the system parameters with a file

Command name

- ausyspset

Format

9500V
ausyspset  -unit unit_name -file file_name

Description

This command sets the contents of the system parameters described in a file to the array.

If you set the file that was output under the condition in which any fee-based optional feature is in an unlocked (installed) status, the setting may terminate abnormally. Use a file that was output under the condition in which all fee-based optional features are in a locked (de-installed) status.

The files have a standard format. The format of the files is the same as those that are output from an array.

In the case of connection with a dual system, setting will not be carried out if one of the controllers is detached. Please confirm that the array is not in a warning status before using it.

When executing the command, an array is disabled to execute commands from both the host and the Storage Navigator Modular 2. In addition, to make the set system parameters effective, restart an array. The previous settings remain effective until the unit restarts.

After the setting is finished, restart an array, make sure that the unit has started, and then connect the unit to the host and the Storage Navigator Modular 2. When an array is restarted, the unit is not ready to accept access from the host until restarting is complete. After making sure that the host has stopped accessing, restart the unit.

Options

- -unit unit_name
  Specify the name of the array unit to be set with the configuration information for the system parameters.
  Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols "- (minus)", "_ (underline)", ". (period)”, ”@”, or " (space)”. Space in front and in the rear of the character string is removed.

- -file file_name
  Specify the name of the file (path) to input the configuration information.

For the file format and the contents of the settings in the files, see the following individually. When specifying individual items of a file, enter a blank space after “=”.

For the file format, see subsection File output of system parameters System Parameters.
For setting items, see subsection Referencing/setting system parameters and subsection File output of system parameters System Parameters.

**Example**

The following example sets array 9500a1 according to the configuration system parameters described in `sysprm.txt`.

```
% ausyspset -unit 9500a1 -file sysprm.txt
Password:
When executing the command, the subsystem stops accepting access from the host.
Do you want to continue? (y/n [n]): y
In order to complete the setting, it is necessary to reboot the subsystem. Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem. Also, if you are logging in, the login status will be canceled when restarting begins. Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 4 - 15min. The subsystem restarted successfully.
```

**NOTE:** It may take time for an array to respond, depending on the condition of the array. If the array does not respond after 15 minutes or more, check the condition of the array.
Setting the RAID/volume definition with a file

Command name

`auconfigset`

Format

```
9500V
auconfigset -unit unit_name -file file_name
```

Description

This command sets the RAID/LU setting information described in the file to the array.

When setting the RAID/LU, all the current RAID/LU will be deleted so that all the user data before the setting will be lost. If the user data is required, please perform the setting after taking a backup.

The files have a standard format. The format of the files is the same as those that are output from an array.

For the file format, see the following:

- Subsection File Output of the Configuration of RAID/LU
- Status of Constituent Parts

The items to be set in the files are the “RAID configuration information”, “LU configuration information”, and the “drive information” of the output files. The output files include items about the status of configuration components, but the items are ignored at the time of setting. The contents of the set items are described below.

- **RAID configuration information**: Sets up the RAID configuration. Specifies the RAID level, RAID number, and the RAID size. For RAIDs that are not to be setup, enters “-” for “Level”, and does not set other items.

- **LU configuration information**: Sets up an LU configuration. Specifies the LU number, LU capacity, and the amount of data pre-read, the number of the current controller controlling an LU, the number of the default controller controlling an LU, the RAID number, the RAID level, and the status of an LU.

  When formatting, specifies “Normal” for the LU status. If other status is specified, formatting is not executed.

  If all capacity contained in an RAID is allocated to one LU in the group, specifies “All” for “Capacity”.

  Although “0” or “1” is specified for the number of the current controller controlling an LU, the current controller number is set to the same as the number of the default controller controlling an LU.
• **Drive information**: Sets up the configuration of HDUs mounted in the array for which to set the drive information. Specifies the drive capacity. Do not set other items, but lists the items.

• Specifies “Nothing” for not-mounted HDUs. If a capacity larger than a total capacity of mounted HDUs is specified, it is handled as an error, and an HDU configuration is not setup.

### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-file file_name</td>
<td>Specify the name the file (path) to input the configuration information.</td>
</tr>
</tbody>
</table>

### Example

The following example sets array 9500a1 according to the RAID/LU configuration described in config.txt.

```bash
% auconfigset -unit 9500a1 -file config.txt
Password:
The new RAID/LU configuration will be set in the subsystem.
When this process starts, all of the current RAID/LU configuration will be deleted.
If you delete the logical unit(s), you will not be able to recover your data. Please make sure to perform backup of all important data before this operation.
When you delete your logical unit, the data becomes unusable. Systems or applications that use this subsystem will terminate abnormally. Please make sure to stop host access to the subsystem before performing this operation.
Are you sure you want to set new RAID/LU configuration? (y/n [n]): y
The new RAID/LU configuration will be set in the subsystem.
Are you sure you want to execute? (y/n [n]): y
The RAID configuration setting has started.
The LU configuration setting has started.
LUx format start
LUy format start
LUx format end:Completed Successfully.
LUy format end:Completed Successfully:
:
The RAID/LU configuration have been set successfully.
%
```
Import/export the system constituent information

Command name

auconstitute

Format

AMS, WMS
auconstitute -unit unit_name –export
-config file_name
-sysp file_name
-hg file_name
-bootopt file_name
-parts file_name
-sysluuserlu file_name
auconstitute -unit unit_name –export
-config file_name
-sysp file_name
-bootopt file_name
-parts file_name
-sysluuserlu file_name
-port file_name
-lan file_name
auconstitute -unit unit_name –import
-config file_name
-sysp file_name
-bootopt file_name
-sysluuserlu file_name
-port file_name
-lan file_name

SMS
auconstitute -unit unit_name –export
-config file_name
-sysp file_name
-bootopt file_name
-parts file_name
-port file_name
-lan file_name
auconstitute -unit unit_name –import
-config file_name
-sysp file_name
-bootopt file_name
-port file_name
-lan file_name

AMS2000, HUS
auconstitute -unit unit_name –export
-config file_name
-sysp file_name
-bootopt file_name
-parts file_name
-port file_name
-lan file_name
auconstitute -unit unit_name –import
**Description**

This command outputs the system constituent information of the array to a specified file, in a text format. This command sets the system constituent information described in a file to the array.
## Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td><code>-export</code></td>
<td>Exports the system constituent information.</td>
</tr>
<tr>
<td><code>-import</code></td>
<td>Imports the system constituent information.</td>
</tr>
<tr>
<td><code>-config file_name</code></td>
<td>Specify the name of a file(path) to output/set the RAID Groups/DP Pools/Logical Units information. When specification of input classification (-reglu, -dplu, -rgdplu) is omitted, to output/set the configuration information.</td>
</tr>
<tr>
<td><code>-rglu</code></td>
<td>Specify when outputting/setting up the RAID Groups/Logical Units information.</td>
</tr>
<tr>
<td><code>-dplu</code></td>
<td>Specify when outputting/setting up the DP Pools/Logical Units information.</td>
</tr>
<tr>
<td><code>-rgdplu</code></td>
<td>Specify when outputting/setting up the RAID Groups/DP Pools/Logical Units information.</td>
</tr>
<tr>
<td><code>-sysp file_name</code></td>
<td>Specify the name the file(path) to output/set the system parameters.</td>
</tr>
<tr>
<td><code>-hg file_name</code></td>
<td>Specify the name the file(path) to output/set the port information. When specification of input classification (-portop, -opt, -map, -wwn) is omitted, all the information is set up.</td>
</tr>
<tr>
<td><code>-portop</code></td>
<td>Specify when setting up the port option of the host group.</td>
</tr>
<tr>
<td><code>-opt</code></td>
<td>Specify when setting up the host group option.</td>
</tr>
<tr>
<td><code>-map</code></td>
<td>Specify when setting up the mapping information of the host group.</td>
</tr>
<tr>
<td><code>-wwn</code></td>
<td>Specify when setting up the host information.</td>
</tr>
<tr>
<td><code>-bootopt file_name</code></td>
<td>Specify the name the file(path) to output/set the boot option.</td>
</tr>
<tr>
<td><code>-parts file_name</code></td>
<td>Specify the name the file(path) to output the parts information.</td>
</tr>
<tr>
<td><code>-syssluserlu file_name</code></td>
<td>Specify the name the file(path) to output/set the system LU/user LU. When specifications of input classification (-portop, -opt, -map, -wwn, -iscsiportop, -targetopt, -targetmap, -initiator, -iscsi, -isns) is omitted, all the information is set up.</td>
</tr>
<tr>
<td><code>-port file_name</code></td>
<td>Specify the name the file(path) to output/set the port information.</td>
</tr>
<tr>
<td><code>-iscsiportop</code></td>
<td>Specify when setting up the port option of the iSCSI port.</td>
</tr>
<tr>
<td><code>-targetopt</code></td>
<td>Specify when setting up the target option.</td>
</tr>
</tbody>
</table>
The format of the CHAP User information settings file is shown in Table 3-16 on page 3-200.

**Table 3-16: Format of CHAP user information settings file**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-targetmap</td>
<td>Specify when setting up the mapping information of the target.</td>
</tr>
<tr>
<td>-initiator</td>
<td>Specify when setting up the initiator information.</td>
</tr>
<tr>
<td>-iscs</td>
<td>Specify when setting up the iSCSI port information.</td>
</tr>
<tr>
<td>-isns</td>
<td>Specify when setting up the iSNS information.</td>
</tr>
<tr>
<td>-chapuser file_name</td>
<td>Specify the name the file(path) to set CHAP user information.</td>
</tr>
<tr>
<td>-lan file_name</td>
<td>Specify the name the file(path) to output/set the LAN information.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>File Contents</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User name, secret, Target No. or alias</td>
<td>The lines are invalid until &lt;CHAP User&gt; appears.</td>
</tr>
<tr>
<td>&lt;CHAP User&gt;,</td>
<td>The valid lines are from &lt;CHAP User&gt; to &lt;END&gt;</td>
</tr>
<tr>
<td>&lt;Port 0A&gt;,</td>
<td>The line specifies the port. (&lt;Port ALL&gt; specifies all ports)</td>
</tr>
<tr>
<td>hitachi-0,abcdefghij00,alias0</td>
<td>The first column is CHAP User, and the second column is Secret.</td>
</tr>
<tr>
<td>hitachi-1,abcdefghij01,alias1</td>
<td>The third row and the following are aliases of Target to assign.</td>
</tr>
<tr>
<td>#hitachi-1,abcdefghij01,alias1</td>
<td>The line with the first character of # is a comment line. (Invalid line)</td>
</tr>
<tr>
<td>hitachi-2,abcdefghij02,3</td>
<td>The Target number can be specified as the alias of Target.</td>
</tr>
<tr>
<td>&lt;Port 0B&gt;,</td>
<td></td>
</tr>
<tr>
<td>&lt;Add CHAP User&gt;,</td>
<td>If &lt;Add CHAP User&gt; is specified, CHAP User is added.</td>
</tr>
<tr>
<td>hitachi-0,abcdefghij00,alias0</td>
<td>If nothing is specified, all CHAP Users are deleted, and then added.</td>
</tr>
<tr>
<td>hitachi-1,abcdefghij01,alias0,alias01,alias02</td>
<td>One or more Targets can be specified.</td>
</tr>
<tr>
<td>&lt;Port 1A&gt;,</td>
<td></td>
</tr>
<tr>
<td>&lt;Port 1B&gt;,</td>
<td></td>
</tr>
<tr>
<td>&lt;END&gt;,</td>
<td>The line of &lt;END&gt; and the following are all invalid lines.</td>
</tr>
</tbody>
</table>
Examples

The following example outputs RAID/LU constituent information of array ams500a1, by config.txt file, into the directory in which Storage Navigator Modular 2 has been installed.

% auconstitute -unit ams500a1 -export -config config.txt
Password:
Are you sure you want to output the RAID/LU configuration to the file? 
(y/n [n]): y
The RAID/LU configuration have been outputted to the file.
%The following example sets array ams500a1 according to the RAID/LU constituent described in the config.txt file.

% auconstitute -unit ams500a1 -import -config config.txt
Password:
The new RAID/LU configuration will be set in the subsystem.
When this process starts, all of the current RAID/LU configuration will be deleted.
Do you want to continue processing? (y/n [n]): y
If you delete the logical unit(s), you will not be able to recover your data. Please make sure to perform backup of all important data before this operation.
When you delete your logical unit, the data becomes unusable. Systems or applications that use this subsystem will terminate abnormally. Please make sure to stop host access to the subsystem before performing this operation.
Are you sure you want to set new RAID/LU configuration? (y/n [n]): y
The RAID/LU configuration setting has started.
The RAID/LU configuration setting is complete.
The LU configuration setting is complete.
The RAID/LU configuration have been set successfully.
%
Outputting the RAID Group/DP Pool/volume information onto a file

Command name

auconfigreport

Format

SMS
auconfigreport -unit unit_name -filetype csv
   -resource rg
       [-item [ raidlevel ] [ paritygroups ] [ type ]
           [ totalcapacity ] [ freecapacity ] [ priority ]
           [ status ] [ recoveryinfo ]]
   -fmtcapa tb | gb | mb | block
   -file file_name

AMS2000, HUS
auconfigreport -unit unit_name -filetype csv
   -resource rg
       [-item [ raidlevel ] [ paritygroups ] [ type ]
           [ totalcapacity ] [ freecapacity ] [ priority ]
           [ status ] [ recoveryinfo ]]
   -fmtcapa tb | gb | mb | block
   -file file_name

SMS, AMS2000
auconfigreport -unit unit_name -filetype csv
   -resource lu
       [-item [ capacity ] [ stripesize ] [ rgnum ] [ dpnum ]
           [ raidlevel ] [ type ] [ pathinfo ] [ status ]
           [ totalcapacity ] [ freecapacity ] [ rotationalspeed ]]
   -fmtcapa tb | gb | mb | block
   -nosublu
   -file file_name
   -file file_name

HUS100
auconfigreport -unit unit_name -filetype csv
   -resource rg
       [-item [ raidlevel ] [ paritygroups ] [ type ]
           [ totalcapacity ] [ freecapacity ] [ priority ]
           [ status ] [ recoveryinfo ] [ rotationalspeed ]]
   -fmtcapa tb | gb | mb | block
   -nosublu
   -file file_name
   -file file_name

HUS100
auconfigreport -unit unit_name -filetype csv
   -resource lu
       [-item [ capacity ] [ stripesize ] [ rgnum ] [ dpnum ]
           [ raidlevel ] [ type ] [ pathinfo ] [ status ]
           [ tiermode ] [ rotationalspeed ]]
       [-fmtcapa tb | gb | mb | block]
   -totalsize
   -file file_name
   -file file_name

Description

This command outputs the RAID group, DP pool or LU information to a specified file. Options
### CLI command list

**Examples**

The following example outputs RAID configuration information of array ams2300a1, by configrg.csv file, into the directory in which Storage Navigator Modular 2 has been installed.
CLI command list

Hitachi Unified Storage Command Line Interface Reference Guide

% auconfigreport -unit ams2300a1 -filetype csv -resource rg -file configrg.csv
The RAID group information will be output to the file.
Are you sure you want to continue? (y/n [n]): y
The RAID group information has been output to the file.
%

File contents of configrg.csv:

<table>
<thead>
<tr>
<th>RAID Group</th>
<th>RAID Level, Parity Groups, Type, Total Capacity</th>
<th>Free Capacity, Priority, Status, Reconstruction Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6 (8D+2P), 1, SAS, 128.0 GB (100.0%)</td>
<td>RAID Group Expansion, Normal, N/A</td>
</tr>
<tr>
<td>1</td>
<td>6 (8D+2P), 1, SAS, 128.0 GB (100.0%)</td>
<td>RAID Group Expansion, Normal, N/A</td>
</tr>
</tbody>
</table>

The following example outputs LU information of array ams2300a1, by configlu.csv file into the directory in which Navigator 2 has been installed.

% auconfigreport -unit ams2300a1 -filetype csv -resource lu -file configlu.csv
LU information will be output to the file.
Are you sure you want to continue (y/n [n]): y
LU information has been output to the file.
%

File contents of configlu.csv:

| LU, Capacity, Stripe, Size, RAID Group, DP Pool, RAID Level, Type, Number of Paths, Status |
|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| 0, 50, 0 GB, 256KB, 0, N/A, 6 (8D+2P), SAS, 0 Normal |
| 1, 50, 0 GB, 256KB, 0, N/A, 6 (8D+2P), SAS, 0 Normal |
| 1001, 10, 0 GB, 256KB, 1, N/A, 6 (8D+2P), SAS, 0 Normal |
| 1022, 200, 0 GB, 256KB, 1, N/A, 6 (8D+2P), SAS, 0 Normal |
| 2000, 1, 0 TB, 256KB, N/A, 49, 6 (8D+2P), SAS, 0 Normal |
| 2001, 1, 0 TB, 256KB, N/A, 49, 6 (8D+2P), SAS, 0 Normal |

The following example outputs volume information of array unit hus150 by the config.csv file into the directory in which Navigator 2 has been installed.

% auconfigreport -unit hus150 -filetype csv -resource lu -file config.csv
LU information will be output to the file.
Are you sure you want to continue (y/n [n]): y
LU information has been output to the file.
%

File contents of config.csv

| LU, Capacity, Stripe, Size, RAID Group, DP Pool, RAID Level, Type, Number of Paths, Status |
|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| 0, 50, 0 GB, 256KB, 0, N/A, 6 (8D+2P), SAS, 0 Normal |
| 5, 1, 0 GB, 256KB, 0, N/A, 6 (8D+2P), SAS, 0 Normal |
| 5, 1, 0 GB, 256KB, 0, N/A, 6 (8D+2P), SAS, 0 Normal |

The following example outputs DP pool information of an array hus110a1, by configDP.csv file, into the directory in which Navigator 2 has been installed.

% auconfigreport -unit hus110a1 -filetype csv -resource dp -file configDP.csv -fmtcapa gb
The DP pool information will be output to the file.
Are you sure you want to continue? (y/n [n]): y
The DP pool information has been output to the file.
%

File contents of configDP.csv
% DP Pool, RAID Level, Total Capacity, Consumed Capacity, Type, Status, Reconstruction Progress, Stripe Size, Needing Preparation Capacity
0,6D + 2P, 3667.0 GB, 916.0 GB, SSD, Normal, N/A, 256KB, 4.7 GB %
Host groups information

This section covers the following commands related to host groups:

- Referencing/setting host information on page 3-207
- Referencing/setting host group options on page 3-214
- Referencing/setting mapping information on page 3-234
- Referencing/registration/changing/deleting a host group on page 3-237
- File output of host group information on page 3-240
- Setting the host group information with a file on page 3-242
Referencing/setting host information

Command name

auhgwn

Format

9500V
When the LUN Management of the fee-basis option is effective.
auhgwn -unit unit_name --refer
[ -login ctl_no port_no ]
[ -permhg ctl_no port_no -gno group_no | -gname group_name ]
auhgwn -unit unit_name --set
[ -hgs ctl_no port_no on | off ]
[ -permhg ctl_no port_no node_name port_name
-gno group_no | -gname group_name ]
When specifying the node name and port name
auhgwn -unit unit_name --assign
-permhg ctl_no port_no node_name port_name
-gno group_no | -gname group_name
auhgwn -unit unit_name --rm
[ -perm ctl_no port_no node_name port_name ]
[ -permhg ctl_no port_no node_name port_name
-gno group_no | -gname group_name ]
auhgwn -unit unit_name --chg
-rename ctl_no port_no node_name port_name
-gno group_no | -gname group_name
-newwwname new_wwn_name
When specifying the wwn name.
auhgwn -unit unit_name --assign
-permhg ctl_no port_no -wwname wwn_name
-gno group_no | -gname group_name
auhgwn -unit unit_name --rm
[ -perm ctl_no port_no -wwname wwn_name ]
[ -permhg ctl_no port_no -wwname wwn_name
-gno group_no | -gname group_name ]
auhgwn -unit unit_name --chg
-rename ctl_no port_no -wwname wwn_name
-gno group_no | -gname group_name
-newwwname new_wwn_name
When the LUN Security of the fee-basis option is effective.
auhgwn -unit unit_name --refer
auhgwn -unit unit_name --set
[ -lus ctl_no port_no on | off ]
[ -luschk ctl_no port_no inqc | allc ]
[ -perm ctl_no port_no node_name port_name ]
[ -permlu ctl_no port_no node_name port_name lun... ]
[ -permluall ctl_no port_no node_name port_name ]
auhgwn -unit unit_name --rm
[ -perm ctl_no port_no node_name port_name ]
[ -permlu ctl_no port_no node_name port_name lun... ]
[ -permluall ctl_no port_no node_name port_name ]
auhgwn -unit unit_name --assign
AMS, WMS, SMS, AMS2000, HUS
auhgwn -unit unit_name --refer
[ -login ctl_no port_no ]
[ -permhg ctl_no port_no -gno group_no | -gname group_name ]
auhgwn -unit unit_name --set
[ -hgs ctl_no port_no on | off ]
[ -permhg ctl_no port_no port_name
-gno group_no | -gname group_name ]
When specifying the port name
auhgwn -unit unit_name --assign
-permhg ctl_no port_no port_name
-gno group_no | -gname group_name

auhgwn -unit unit_name -rm
[-perm ctl_no port_no port_name]
[-permhg ctl_no port_no port_name]
-gno group_no | -gname group_name

auhgwn -unit unit_name -chg
-rename ctl_no port_no port_name
-gno group_no | -gname group_name
-newwwname new_wwn_name

When specifying the wwn name.
auhgwn -unit unit_name -assign
-permhg ctl_no port_no -wname wwn_name
-gno group_no | -gname group_name

auhgwn -unit unit_name -rm
[-perm ctl_no port_no -wname wwn_name]
[-permhg ctl_no port_no -wname wwn_name]
-gno group_no | -gname group_name

auhgwn -unit unit_name -chg
-rename ctl_no port_no -wname wwn_name
-gno group_no | -gname group_name
-newwwname new_wwn_name

### Description

This command references or sets the host information.

### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, “_ (underline)”, “. (period)”, “@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the host information.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the host information.</td>
</tr>
<tr>
<td>-rm</td>
<td>Deletes the host information.</td>
</tr>
<tr>
<td>-chg</td>
<td>Changes the host information.</td>
</tr>
<tr>
<td>-assign</td>
<td>Assigns the host information to the specified host group.</td>
</tr>
<tr>
<td>-login ctl_no port_no</td>
<td>Displays the host information that is logged in on the specified port.</td>
</tr>
</tbody>
</table>

**ctl_no**: Controller number (0, 1)

**port_no**: Port number (A, B, C, D, E, F, G, H)
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-permhg ctl_no</td>
<td>When the -refer option is specified:</td>
</tr>
<tr>
<td>port_no</td>
<td>Displays the host information that has been and can be assigned to the specified host group. Specification of the -gno or -gname option is indispensable.</td>
</tr>
<tr>
<td></td>
<td>When the -set option is specified:</td>
</tr>
<tr>
<td></td>
<td>Specify the host information to be assigned to the specified host group. Specification of the -wname option is indispensable.</td>
</tr>
<tr>
<td></td>
<td>Specification of the -gno or -gname option is indispensable.</td>
</tr>
<tr>
<td></td>
<td>When the -assign option is specified:</td>
</tr>
<tr>
<td></td>
<td>Specify the host information which can be assigned to the host group from that logged in on the specified port. Specification of the -wname option is indispensable.</td>
</tr>
<tr>
<td></td>
<td>Specification of the -gno or -gname option is indispensable.</td>
</tr>
<tr>
<td></td>
<td>When the -rm option is specified:</td>
</tr>
<tr>
<td></td>
<td>Specify the host information to be deleted from that which has been assigned to the specified host group. Specification of the -wname option is indispensable.</td>
</tr>
<tr>
<td></td>
<td>Specification of the -gno or -gname option is indispensable.</td>
</tr>
<tr>
<td>ctl_no</td>
<td>: Controller number (0, 1)</td>
</tr>
<tr>
<td>port_no</td>
<td>: Port number (A, B, C, D, E, F, G, H)</td>
</tr>
<tr>
<td>-hgs ctl_no</td>
<td>Specify whether to validate or invalidate the host group security of the specified port.</td>
</tr>
<tr>
<td>port_no on</td>
<td>off</td>
</tr>
<tr>
<td></td>
<td>: Controller number (0, 1)</td>
</tr>
<tr>
<td></td>
<td>: Port number (A, B, C, D, E, F, G, H)</td>
</tr>
<tr>
<td></td>
<td>on : Enables the host group security.</td>
</tr>
<tr>
<td></td>
<td>off : Disables the host group security.</td>
</tr>
<tr>
<td>-perm ctl_no</td>
<td>Specify the host information to be deleted from that logged in on the specified port.</td>
</tr>
<tr>
<td>port_no</td>
<td>Specification of the -wname option is indispensable.</td>
</tr>
<tr>
<td></td>
<td>: Controller number (0, 1)</td>
</tr>
<tr>
<td></td>
<td>: Port number (A, B, C, D, E, F, G, H)</td>
</tr>
<tr>
<td><strong>Option</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>------------</td>
<td>----------------</td>
</tr>
</tbody>
</table>
| `-rename ctl_no port_no` | Specify the host information whose WWN name is to be changed from that which has been assigned to the specified host group.  
  Specification of the `-gno` or `-gname` option is indispensable.  
  Specification of the `-wname` and `-newwwname` option is indispensable.  
  
  `ctl_no` : Controller number (0, 1)  
  `port_no` : Port number (A, B, C, D, E, F, G, H) |
| `-wname wwn_name` | Specify a WWN name of the host. Space in front and in the rear of the character string is removed. Cannot specify spaces only.  
  `wwn_name` : WWN name (See Note 1) |
| `-gno group_no` | Specify a host group number.  
  `group_no` : Host group number |
| `-gname group_name` | Specify a host group name.  
  `group_name` : Host group name (See Note 1) |
| `-newwwname new_wwn_name` | Specify the changed WWN name.  
  `new_wwn_name` : WWN name (See Note 1) |
| **9500V only:** | |
| `-permhg ctl_no port_no node_name port_name` | When the `-set` option is specified: Specify the host information to be assigned to the specified host group.  
  Specification of the `-gno` or `-gname` option is indispensable.  
  When the `-assign` option is specified: Specify the host information which can be assigned to the host group from that logged in on the specified port.  
  Specification of the `-gno` or `-gname` option is indispensable.  
  When the `-rm` option is specified: Specify the host information to be deleted from that which has been assigned to the specified host group.  
  Specification of the `-gno` or `-gname` option is indispensable.  
  
  `ctl_no` : Controller number (0, 1)  
  `port_no` : Port number (A, B, C, D)  
  `node_name` : Node name of the host (16 hexadecimal characters)  
  `port_name` : Port name of the host (16 hexadecimal characters) |
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-perm ctl_no</code></td>
<td>Specify the host information to be deleted from that logged in on the specified port.</td>
</tr>
<tr>
<td><code>port_no</code></td>
<td></td>
</tr>
<tr>
<td><code>node_name</code></td>
<td></td>
</tr>
<tr>
<td><code>port_name</code></td>
<td></td>
</tr>
<tr>
<td><code>-rename ctl_no</code></td>
<td>Specify the host information whose WWN name is to be changed from that which has been assigned to the specified host group. Specification of the <code>-gno</code> or <code>-gname</code> option is indispensable.</td>
</tr>
<tr>
<td><code>port_no</code></td>
<td></td>
</tr>
<tr>
<td><code>node_name</code></td>
<td></td>
</tr>
<tr>
<td><code>port_name</code></td>
<td></td>
</tr>
<tr>
<td><code>-lus ctl_no</code></td>
<td>Specify whether the LUN security of the specified port is enabled or disabled.</td>
</tr>
<tr>
<td><code>port_no</code></td>
<td></td>
</tr>
<tr>
<td>on</td>
<td>Enables the LUN Security.</td>
</tr>
<tr>
<td>off</td>
<td>Disables the LUN Security.</td>
</tr>
<tr>
<td><code>-luschk ctl_no</code></td>
<td>Specify the LUN security check level of the specified port.</td>
</tr>
<tr>
<td><code>port_no</code></td>
<td></td>
</tr>
<tr>
<td><code>inqc</code></td>
<td>Check with an INQUIRY SCSI command.</td>
</tr>
<tr>
<td><code>allc</code></td>
<td>Check with all the SCSI commands.</td>
</tr>
<tr>
<td><code>-perm ctl_no</code></td>
<td>When the <code>-set</code> option is specified:</td>
</tr>
<tr>
<td><code>port_no</code></td>
<td>Specify host information (node name and port name) that can be accessed by the specified port.</td>
</tr>
<tr>
<td><code>node_name</code></td>
<td></td>
</tr>
<tr>
<td><code>port_name</code></td>
<td></td>
</tr>
<tr>
<td><code>-perm ctl_no</code></td>
<td>When the <code>-rm</code> option is specified:</td>
</tr>
<tr>
<td><code>port_no</code></td>
<td>Specify the host information to be deleted from the host information (node name and port name) that can be accessed by the specified port.</td>
</tr>
<tr>
<td><code>node_name</code></td>
<td></td>
</tr>
<tr>
<td><code>port_name</code></td>
<td></td>
</tr>
</tbody>
</table>

 ctl_no : Controller number (0, 1)  
 port_no : Port number (A, B, C, D)  
 node_name: Node name of the host (16 hexadecimal characters)  
 port_name: Port name of the host (16 hexadecimal characters)
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| `-permlu` `ctl_no` `port_no` `node_name` `port_name` `lun...` | When the `-set` option is specified:  
When using the LUN security function at a specified port, specifies LUs, to which the host is permitted to access, into host information registered with the `-perm` option (multiple LUs can be specified).  
Host information and LUN security are not allowed to be registered at the same time.  
When the `-rm` option is specified:  
Specify the LUNs whose access permission is to be deleted from the LUN security set by the specified port. (Multiple LUs can be specified.)  

  - `ctl_no`: Controller number (0, 1)  
  - `port_no`: Port number (A, B, C, D)  
  - `node_name`: Node name of the host (16 hexadecimal characters)  
  - `port_name`: Port name of the host (16 hexadecimal characters)  
  - `lun...`: LU number |
| `-permluall` `ctl_no` `port_no` `node_name` `port_name` | When the `-set` option is specified:  
When using the LUN security function at a specified port, specifies host information that is already registered with the `-perm` option, which specifies permission to access to all LUs.  
Host information and LUN security are not allowed to be registered at the same time.  
When the `-rm` option is specified:  
Specify the host information whose access permission is to be deleted from the LUN security set by the specified port.  

  - `ctl_no`: Controller number (0, 1)  
  - `port_no`: Port number (A, B, C, D)  
  - `node_name`: Node name of the host (16 hexadecimal characters)  
  - `port_name`: Port name of the host (16 hexadecimal characters) |
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| -permhg $ctl_no$ $port_no$ $port_name$ | When the `-set` option is specified:  
  - Specify the host information to be assigned to the specified host group.  
  - Specification of the `-gno` or `-gname` option is indispensable.  
  - When the `-assign` option is specified:  
    - Specify the host information which can be assigned to the host group from that logged in on the specified port.  
    - Specification of the `-gno` or `-gname` option is indispensable.  
  When the `-rm` option is specified:  
  - Specify the host information to be deleted from that which has been assigned to the specified host group.  
  - Specification of the `-gno` or `-gname` option is indispensable.  
  
  $ctl_no$: Controller number (0, 1)  
  $port_no$: Port number (A, B, C, D, E, F, G, H)  
  $port_name$: Port name of the host (16 hexadecimal characters) |
| -perm $ctl_no$ $port_no$ $port_name$ | Specify the host information to be deleted from that logged in on the specified port.  
  
  $ctl_no$: Controller number (0, 1)  
  $port_no$: Port number (A, B, C, D, E, F, G, H)  
  $port_name$: Port name of the host (16 hexadecimal characters) |
| -rename $ctl_no$ $port_no$ $port_name$ | Specify the host information whose WWN name is to be changed from that which has been assigned to the specified host group.  
  - Specification of the `-gno` or `-gname` option is indispensable.  
  - Specification of the `-newwname` option is indispensable.  
  
  $ctl_no$: Controller number (0, 1)  
  $port_no$: Port number (A, B, C, D, E, F, G, H)  
  $port_name$: Port name of the host (16 hexadecimal characters) |
Example

The following example displays the host information of an array ams500 when the LUN Manager is effective.

```bash
% auhgwwn -unit ams500 -refer
Port 0A Host Group Security ON
Detected WWN
Name          Port Name
ams500srv     210100E08B3E031F
AMS500SRV     210000E08B8F4CC7
              210000E08B1E031F
Assigned WWN
Name          Port Name          Host Group
ams500srv     210100E08B3E031F  000:AMS500srv
AMS500SRV     210000E08B8F4CC7  001:ams500srv-CTL0

Referencing/setting host group options

Command name

auhgopt

Format

9500V, AMS, WMS, SMS, AMS2000, HUS
auhgopt  -unit unit_name --refer

9500V
When specifying per host group option.
auhgopt  -unit unit_name --set
  [-HostConnection  ctl_no port_no group_no]
    [Standard | OpenVMS | TRESPASS | WolfPack ]
  [-SPC2           ctl_no port_no group_no enable] [disable]
  [-SameNodeName   ctl_no port_no group_no enable] [disable]
  [-TruCluster     ctl_no port_no group_no enable] [disable]
  [-pathswAPG      ctl_no port_no group_no enable] [disable]
  [-pathswAP       ctl_no port_no group_no enable] [disable]
  [-pathswAA       ctl_no port_no group_no enable] [disable]
  [-PIDNoRep       ctl_no port_no group_no enable] [disable]
  [-PIDConv        ctl_no port_no group_no enable] [disable]
  [-NoRSVConf     ctl_no port_no group_no enable] [disable]
  [-ftSRV2        ctl_no port_no group_no enable] [disable]
  [-SRCReadReject  ctl_no port_no group_no enable] [disable]
  [-UASuppress     ctl_no port_no group_no enable] [disable]
  [-HISUP         ctl_no port_no group_no enable] [disable]
  [-CCHS          ctl_no port_no group_no enable] [disable]
  [-HPUX2         ctl_no port_no group_no enable] [disable]
  [-ProdidDF400    ctl_no port_no group_no enable] [disable]
  [-NACA          ctl_no port_no group_no enable] [disable]
  [-SUNCluster    ctl_no port_no group_no enable] [disable]
  [-PRSV          ctl_no port_no group_no enable] [disable]
  [-TargetReset   ctl_no port_no group_no enable] [disable]
  [-Reserve       ctl_no port_no group_no enable] [disable]
  [-LURreset      ctl_no port_no group_no enable] [disable]
  [-TPRLO         ctl_no port_no group_no enable] [disable]

When specifying per host group.
auhgopt  -unit unit_name --set ctl_no port_no
  [-gno group_no] [-gname group_name]
  [-HostConnection  standard | OpenVMS | TRESPASS | WolfPack ]
  [-SPC2           enable] [disable]
  [-SameNodeName   enable] [disable]
  [-TruCluster     enable] [disable]
  [-pathswAPG      enable] [disable]
  [-pathswAP       enable] [disable]
  [-pathswAA       enable] [disable]
  [-PIDNoRep       enable] [disable]
```
**AMS, WMS**
When specifying per host group option.
```
auhgopt -unit unit_name --set
```
```
-HostConnection ctl_no port_no group_no
-HP ctl_no port_no group_no enable | disable
-PSUEReadReject ctl_no port_no group_no enable | disable
-UASuppress ctl_no port_no group_no enable | disable
-NACA ctl_no port_no group_no enable | disable
-HISUPOff ctl_no port_no group_no enable | disable
-ResetPropagation ctl_no port_no group_no enable | disable
-UniqueReserve1 ctl_no port_no group_no enable | disable
-ASLReportAPG ctl_no port_no group_no enable | disable
-ASLReportAP ctl_no port_no group_no enable | disable
-ASLReportAA ctl_no port_no group_no enable | disable
-PIDNoRep ctl_no port_no group_no enable | disable
-PIDConv ctl_no port_no group_no enable | disable
-TruCluster ctl_no port_no group_no enable | disable
-SerialResponse ctl_no port_no group_no enable | disable
-SameNodeName ctl_no port_no group_no enable | disable
-CCHS ctl_no port_no group_no enable | disable
-SPC2 ctl_no port_no group_no enable | disable
-SvolDisableAdvance ctl_no port_no group_no enable | disable
```

When specifying per host group.
```
auhgopt -unit unit_name --set ctl_no port_no
-gno group_no | -gname group_name
```
```
-HostConnection standard | OpenVMS | TRESPASS | WolfPack |
-HP ctl_no port_no group_no enable | disable
-PSUEReadReject ctl_no port_no group_no enable | disable
-UASuppress enable | disable
-NACA enable | disable
-HISUPOff enable | disable
-ResetPropagation enable | disable
-UniqueReserve1 enable | disable
-ASLReportAPG enable | disable
-ASLReportAP enable | disable
-ASLReportAA enable | disable
-PIDNoRep enable | disable
-PIDConv enable | disable
-TruCluster enable | disable
-SerialResponse enable | disable
-SameNodeName enable | disable
-CCHS enable | disable
-SPC2 enable | disable
-SvolDisableAdvance enable | disable
```

**SMS**
When specifying per host group option.
```
auhgopt -unit unit_name --set ctl_no port_no
```
```
-HostConnection ctl_no port_no group_no
-HP ctl_no port_no group_no enable | disable
-PSUEReadReject ctl_no port_no group_no enable | disable
-ModeParamChanged ctl_no port_no group_no enable | disable
-NACA ctl_no port_no group_no enable | disable
-TaskIsolation ctl_no port_no group_no enable | disable
-UniqueReserve1 ctl_no port_no group_no enable | disable
-PIDConv ctl_no port_no group_no enable | disable
-TruCluster ctl_no port_no group_no enable | disable
-SerialResponse ctl_no port_no group_no enable | disable
-SameNodeName ctl_no port_no group_no enable | disable
```
-CCHS
c-ld_no port_no group_no enable | disable
-InquirySerial
c-ld_no port_no group_no enable | disable
-NOPInSuppress
c-ld_no port_no group_no enable | disable
-SvolDisableAdvance
c-ld_no port_no group_no enable | disable
-DiscoveryCHAP
c-ld_no port_no group_no enable | disable
-UAChange
c-ld_no port_no group_no enable | disable

When specifying per host group.
auhgopt -unit unit_name -set ctrl_no port_no
-gno group_no | -gname group_name
-HostConnection standard | OpenVMS | TRESPASS | WolfPack
-HP enable | disable
-PSUEReadReject enable | disable
-ModeParamChanged enable | disable
-NACA enable | disable
-TaskIsolation enable | disable
-UniqueReserve1 enable | disable
-PIDConv enable | disable
-TruCluster enable | disable
-SerialResponse enable | disable
-SameNodeName enable | disable
-CCHS enable | disable
-InquirySerial enable | disable
-NOPInSuppress enable | disable
-SvolDisableAdvance enable | disable
-DiscoveryCHAP enable | disable
-UAChange enable | disable

When specifying simple setting option,
auhgopt -unit unit_name -set ctrl_no port_no
-gno group_no | -gname group_name
-platformNotSpecified | HP | Solaris | AIX | Linux | Windows | VMware | NetWare
-middlewareNotSpecified | VCS | TruCluster

AMS2000, HUS
When specifying per host group option.
auhgopt -unit unit_name -set
-HostConnection ctrl_no port_no group_no
standard | OpenVMS | TRESPASS | WolfPack
-HP ctrl_no port_no group_no enable | disable
-PSUEReadReject ctrl_no port_no group_no enable | disable
-ModeParamChanged ctrl_no port_no group_no enable | disable
-NACA ctrl_no port_no group_no enable | disable
-TaskIsolation ctrl_no port_no group_no enable | disable
-UniqueReserve1 ctrl_no port_no group_no enable | disable
-PIDConv ctrl_no port_no group_no enable | disable
-TruCluster ctrl_no port_no group_no enable | disable
-SerialResponse ctrl_no port_no group_no enable | disable
-SameNodeName ctrl_no port_no group_no enable | disable
-CCHS ctrl_no port_no group_no enable | disable
-InquirySerial ctrl_no port_no group_no enable | disable
-NOPInSuppress ctrl_no port_no group_no enable | disable
-SvolDisableAdvance ctrl_no port_no group_no enable | disable
-DiscoveryCHAP ctrl_no port_no group_no enable | disable
-UniqueExtendedCOPY ctrl_no port_no group_no enable | disable
-UAChange ctrl_no port_no group_no enable | disable

When specifying per host group option.
auhgopt -unit unit_name -set
-HostConnection ctrl_no port_no group_no
standard | OpenVMS | TRESPASS | WolfPack
-HP enable | disable
-PSUEReadReject enable | disable
-ModeParamChanged enable | disable
-NACA enable | disable
-TaskIsolation enable | disable
-UniqueReserve1 enable | disable
-PIDConv enable | disable
-TruCluster enable | disable
-SerialResponse enable | disable
-SameNodeName enable | disable
-CCHS enable | disable
-InquirySerial enable | disable
-NOPInSuppress enable | disable
-SvolDisableAdvance enable | disable
-DiscoveryCHAP enable | disable
-UniqueExtendedCOPY enable | disable
-UAChange enable | disable

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CLI command list
**Description**

This command references or sets the host group options.

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of an array unit in which the host group options are to be referenced or set. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;,@&quot;, or &quot; &quot; (space). Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the host group options.</td>
</tr>
</tbody>
</table>

When specifying per option (For 9500V, AMS, WMS, SMS, and AMS2000)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-set</td>
<td>Sets the host group options.</td>
</tr>
<tr>
<td>-HostConnection ctl_no port_no group_no standard</td>
<td>Specify the mode to be emulated. controller number (0, 1) port_no: Port number (A, B, C, D, E, F, G, H) group_no: Host Group number standard: Open system emulation mode OpenVMS : Open VMS mode TRESPASS: TRESPASS mode WolfPack: WolfPack mode</td>
</tr>
<tr>
<td>-SameNodeName ctl_no port_no group_no enable</td>
<td>Specify whether to set the Same Node Name mode effective or ineffective. ctl_no: Controller number (0, 1). port_no: Port number (A, B, C, D, E, F, G, H). group_no: Host Group number. enable: Enables the Same Node Name mode. disable: Disables the Same Node Name mode.</td>
</tr>
</tbody>
</table>
When specifying per option (9500V only)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-TruCluster ctl_no</td>
<td>SPECIFY WHETHER TO SET THE TRU CLUSTER CONNECTION MODE EFFECTIVE OR INEFFECTIVE.</td>
</tr>
<tr>
<td>port_no group_no enable</td>
<td>SPECIFY WHETHER TO SET THE TRU CLUSTER CONNECTION MODE EFFECTIVE OR INEFFECTIVE.</td>
</tr>
<tr>
<td>enable</td>
<td>SPECIFY WHETHER TO SET THE TRU CLUSTER CONNECTION MODE EFFECTIVE OR INEFFECTIVE.</td>
</tr>
<tr>
<td>disable</td>
<td>SPECIFY WHETHER TO SET THE TRU CLUSTER CONNECTION MODE EFFECTIVE OR INEFFECTIVE.</td>
</tr>
</tbody>
</table>

 ctl_no : Controller number (0, 1).
 port_no : Port number (A, B, C, D, E, F, G, H).
 group_no: Host Group number.
 enable : Enables the Tru Cluster Connection mode.
 disable : Disables the Tru Cluster Connection mode.

-PIDConv ctl_no      | SPECIFY WHETHER TO SET THE PORT-ID CONVERSION MODE EFFECTIVE OR INEFFECTIVE. |
| port_no group_no enable | SPECIFY WHETHER TO SET THE PORT-ID CONVERSION MODE EFFECTIVE OR INEFFECTIVE. |
| enable | SPECIFY WHETHER TO SET THE PORT-ID CONVERSION MODE EFFECTIVE OR INEFFECTIVE. |
| disable | SPECIFY WHETHER TO SET THE PORT-ID CONVERSION MODE EFFECTIVE OR INEFFECTIVE. |

 ctl_no : Controller number (0, 1).
 port_no : Port number (A, B, C, D, E, F, G, H).
 group_no: Host Group number.
 enable : Enables the Port-ID Conversion mode.
 disable : Disables the Port-ID Conversion mode.

-CCHS ctl_no      | SPECIFY WHETHER TO SET THE CCHS CONVERT MODE EFFECTIVE OR INEFFECTIVE. |
| port_no group_no enable | SPECIFY WHETHER TO SET THE CCHS CONVERT MODE EFFECTIVE OR INEFFECTIVE. |
| enable | SPECIFY WHETHER TO SET THE CCHS CONVERT MODE EFFECTIVE OR INEFFECTIVE. |
| disable | SPECIFY WHETHER TO SET THE CCHS CONVERT MODE EFFECTIVE OR INEFFECTIVE. |

 ctl_no : Controller number (0, 1).
 port_no : Port number (A, B, C, D, E, F, G, H).
 group_no: Host Group number.
 enable : Enables the CCHS convert mode.
 disable : Disables the CCHS convert mode.

-NACA ctl_no      | SPECIFY WHETHER TO SET THE NACA MODE EFFECTIVE OR INEFFECTIVE. |
| port_no group_no enable | SPECIFY WHETHER TO SET THE NACA MODE EFFECTIVE OR INEFFECTIVE. |
| enable | SPECIFY WHETHER TO SET THE NACA MODE EFFECTIVE OR INEFFECTIVE. |
| disable | SPECIFY WHETHER TO SET THE NACA MODE EFFECTIVE OR INEFFECTIVE. |

 ctl_no : Controller number (0, 1).
 port_no : Port number (A, B, C, D, E, F, G, H).
 group_no: Host Group number.
 enable : Enables the NACA mode.
 disable : Disables the NACA mode.

-pathswAPG ctl_no      | SPECIFY WHETHER TO SET THE PATH SWITCH MODE (ACTIVE/PASSIVE GROUP) EFFECTIVE OR INEFFECTIVE. |
| port_no group_no enable | SPECIFY WHETHER TO SET THE PATH SWITCH MODE (ACTIVE/PASSIVE GROUP) EFFECTIVE OR INEFFECTIVE. |
| enable | SPECIFY WHETHER TO SET THE PATH SWITCH MODE (ACTIVE/PASSIVE GROUP) EFFECTIVE OR INEFFECTIVE. |
| disable | SPECIFY WHETHER TO SET THE PATH SWITCH MODE (ACTIVE/PASSIVE GROUP) EFFECTIVE OR INEFFECTIVE. |

 ctl_no : Controller number (0, 1).
 port_no : Port number (A, B, C, D).
 group_no: Host Group number.
 enable : Enables the Path Switch mode (Active/Passive Group).
 disable : Disables the Path Switch mode (Active/Passive Group).
<table>
<thead>
<tr>
<th>CLI command</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>-pathswAP ctl_no port_no group_no enable</td>
<td>Specify whether to set the Path Switch mode (Active/Passive) effective or ineffective.</td>
<td>ctl_no: Controller number (0, 1). port_no: Port number (A, B, C, D). group_no: Host Group number. enable: Enables the Path Switch mode (Active/Passive). disable: Disables the Path Switch mode (Active/Passive).</td>
</tr>
<tr>
<td>-pathswAA ctl_no port_no group_no enable</td>
<td>Specify whether to set the Path Switch mode (Active/Active) effective or ineffective.</td>
<td>ctl_no: Controller number (0, 1). port_no: Port number (A, B, C, D). group_no: Host Group number. enable: Enables the Path Switch mode (Active/Active). disable: Disables the Path Switch mode (Active/Active).</td>
</tr>
<tr>
<td>-NoRSVConf ctl_no port_no group_no enable</td>
<td>Specify whether to set the No_RSV_Conf mode effective or ineffective.</td>
<td>ctl_no: Controller number (0, 1). port_no: Port number (A, B, C, D). group_no: Host Group number. enable: Enables the No_RSV_Conf mode. disable: Disables the No_RSV_Conf mode.</td>
</tr>
<tr>
<td>-ftSRV2 ctl_no port_no group_no enable</td>
<td>Specify whether to set the ftServer Connection mode 2 effective or ineffective.</td>
<td>ctl_no: Controller number (0, 1). port_no: Port number (A, B, C, D). group_no: Host Group number. enable: Enables the ftServer Connection mode 2. disable: Disables the ftServer Connection mode 2.</td>
</tr>
<tr>
<td>-SRCReadReject ctl_no port_no group_no enable</td>
<td>Specify whether to set the SRC Read Command Reject mode effective or ineffective.</td>
<td>ctl_no: Controller number (0, 1). port_no: Port number (A, B, C, D). group_no: Host Group number. enable: Enables the SRC Read Command Reject mode. disable: Disables the SRC Read Command Reject mode.</td>
</tr>
<tr>
<td>-HISUP ctl_no port_no group_no enable</td>
<td>Specify whether to set the HISUP mode effective or ineffective.</td>
<td>ctl_no: Controller number (0, 1). port_no: Port number (A, B, C, D). group_no: Host Group number. enable: Enables the HISUP mode. disable: Disables the HISUP mode.</td>
</tr>
</tbody>
</table>
### CLI command list

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>-HPUX2 ctl_no port_no group_no enable</td>
<td>Specify whether to set the HP connection mode effective or ineffective.</td>
<td>Ctrl_no (0, 1), Port_no (A, B, C, D), Group_no.</td>
</tr>
<tr>
<td>-ProdDF400 ctl_no port_no group_no enable</td>
<td>Specify whether to set the Product ID DF400 mode effective or ineffective.</td>
<td>Ctrl_no (0, 1), Port_no (A, B, C, D), Group_no.</td>
</tr>
<tr>
<td>-SUNCluster ctl_no port_no group_no enable</td>
<td>Specify whether to set the SUN Cluster Connection mode effective or ineffective.</td>
<td>Ctrl_no (0, 1), Port_no (A, B, C, D), Group_no.</td>
</tr>
<tr>
<td>-PRSV ctl_no port_no group_no enable</td>
<td>Specify whether to set the Persistent RSV Cluster mode effective or ineffective.</td>
<td>Ctrl_no (0, 1), Port_no (A, B, C, D), Group_no.</td>
</tr>
<tr>
<td>-TargetReset ctl_no port_no group_no enable</td>
<td>Specify whether to set the Target reset mode effective or ineffective.</td>
<td>Ctrl_no (0, 1), Port_no (A, B, C, D), Group_no.</td>
</tr>
<tr>
<td>-Reserve ctl_no port_no group_no enable</td>
<td>Specify whether to set the Reserve mode effective or ineffective.</td>
<td>Ctrl_no (0, 1), Port_no (A, B, C, D), Group_no.</td>
</tr>
</tbody>
</table>
-LUReset *ctl_no* *port_no* *group_no* enable | disable

Specify whether to set the LU reset mode effective or ineffective.

 ctl_no  : Controller number (0, 1).
 port_no  : Port number (A, B, C, D).
 group_no: Host Group number.
 enable  : Enables the LU reset mode.
 disable : Disables the LU reset mode.

-TPRLO *ctl_no* *port_no* *group_no* enable | disable

Specify whether to set the Third Party Process Logout mode effective or ineffective.

 ctl_no  : Controller number (0, 1).
 port_no  : Port number (A, B, C, D).
 group_no: Host Group number.
 enable  : Enables the Third Party Process Logout mode.
 disable : Disables the Third Party Process Logout mode.

When specifying per option (For 9500V, AMS and WMS)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-SPC2 <em>ctl_no</em> <em>port_no</em> <em>group_no</em> enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>ctl_no  : Controller number (0, 1).</td>
</tr>
<tr>
<td></td>
<td>port_no : Port number (A, B, C, D).</td>
</tr>
<tr>
<td></td>
<td>group_no: Host Group number.</td>
</tr>
<tr>
<td></td>
<td>enable  : Enables the SPC-2 Mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the SPC-2 Mode.</td>
</tr>
<tr>
<td>-PIDNoRep <em>ctl_no</em> <em>port_no</em> <em>group_no</em> enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>ctl_no  : Controller number (0, 1).</td>
</tr>
<tr>
<td></td>
<td>port_no : Port number (A, B, C, D).</td>
</tr>
<tr>
<td></td>
<td>group_no: Host Group number.</td>
</tr>
<tr>
<td></td>
<td>enable  : Enables the Port-ID No Report mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the Port-ID No Report mode.</td>
</tr>
<tr>
<td>-UASuppress <em>ctl_no</em> <em>port_no</em> <em>group_no</em> enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>ctl_no  : Controller number (0, 1).</td>
</tr>
<tr>
<td></td>
<td>port_no : Port number (A, B, C, D).</td>
</tr>
<tr>
<td></td>
<td>group_no: Host Group number.</td>
</tr>
<tr>
<td></td>
<td>enable  : Suppress the unit attention.</td>
</tr>
<tr>
<td></td>
<td>disable : Does not suppress the unit attention.</td>
</tr>
</tbody>
</table>
When specifying per option (For AMS and WMS)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Parameters</th>
<th>Details</th>
</tr>
</thead>
</table>
| -HISUPOff ctl_no port_no group_no enable | Specify whether to set the HISUP OFF Mode effective or ineffective. | ctl_no : Controller number (0, 1).  
port_no : Port number (A, B, C, D).  
group_no : Host Group number.  
enable : Enables the HISUP OFF Mode.  
disable : Disables the HISUP OFF Mode. |                                                                                               |
| -ResetPropagation ctl_no port_no group_no enable | Specify whether to set the Reset Propagation Mode effective or ineffective. | ctl_no : Controller number (0, 1).  
port_no : Port number (A, B, C, D).  
group_no : Host Group number.  
enable : Enables the Reset Propagation Mode.  
disable : Disables the Reset Propagation Mode. |                                                                                               |
| -ASLReportAPG ctl_no port_no group_no enable | Specify whether to set the ASL Report Mode (Active/Passive Group) effective or ineffective. | ctl_no : Controller number (0, 1).  
port_no : Port number (A, B, C, D).  
group_no : Host Group number.  
enable : Enables the ASL Report Mode (Active/Passive Group).  
disable : Disables the ASL Report Mode (Active/Passive Group). |                                                                                               |
| -ASLReportAP ctl_no port_no group_no enable | Specify whether to set the ASL Report Mode (Active/Passive) effective or ineffective. | ctl_no : Controller number (0, 1).  
port_no : Port number (A, B, C, D).  
group_no : Host Group number.  
enable : Enables the ASL Report Mode (Active/Passive).  
disable : Disables the ASL Report Mode (Active/Passive). |                                                                                               |
| -ASLReportAA ctl_no port_no group_no enable | Specify whether to set the ASL Report Mode (Active/Active) effective or ineffective. | ctl_no : Controller number (0, 1).  
port_no : Port number (A, B, C, D).  
group_no : Host Group number.  
enable : Enables the ASL Report Mode (Active/Active).  
disable : Disables the ASL Report Mode (Active/Active). |                                                                                               |
When specifying per option (For AMS, WMS, SMS, and AMS2000)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>**-HP ctl_no port_no group_no enable</td>
<td>Specify whether to set the HP-UX Mode effective or ineffective.</td>
</tr>
<tr>
<td>**-PSUEReadReject ctl_no port_no group_no enable</td>
<td>Specify whether to set the PSUE Read Reject Mode effective or ineffective.</td>
</tr>
<tr>
<td>**-UniqueReserve1 ctl_no port_no group_no enable</td>
<td>Specify whether to set the Unique Reserve Mode effective or ineffective.</td>
</tr>
<tr>
<td>**-SerialResponse ctl_no port_no group_no enable</td>
<td>Specify whether to set the Product Serial Response Mode effective or ineffective.</td>
</tr>
<tr>
<td>**-SvolDisableAdvance ctl_no port_no group_no enable</td>
<td>Specify whether to set the S-VOL Disable Advanced Mode effective or ineffective.</td>
</tr>
</tbody>
</table>

When specifying per option (For SMS and AMS2000)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>

**CLI command list**

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<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-ModeParamChanged</td>
<td>Specify whether to set the Mode Parameters Changed Notification Mode effective or ineffective.</td>
</tr>
<tr>
<td></td>
<td><code>ctl_no</code>: Controller number (0, 1).</td>
</tr>
<tr>
<td></td>
<td><code>port_no</code>: Port number (A, B, C, D, E, F, G, H).</td>
</tr>
<tr>
<td></td>
<td><code>group_no</code>: Host Group number.</td>
</tr>
<tr>
<td></td>
<td><code>enable</code>: Enables the Mode Parameters Changed Notification Mode.</td>
</tr>
<tr>
<td></td>
<td><code>disable</code>: Disables the Mode Parameters Changed Notification Mode.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-TaskIsolation</td>
<td>Specify whether to set the Task Management Isolation Mode effective or ineffective.</td>
</tr>
<tr>
<td></td>
<td><code>ctl_no</code>: Controller number (0, 1).</td>
</tr>
<tr>
<td></td>
<td><code>port_no</code>: Port number (A, B, C, D, E, F, G, H).</td>
</tr>
<tr>
<td></td>
<td><code>group_no</code>: Host Group number.</td>
</tr>
<tr>
<td></td>
<td><code>enable</code>: Enables the Task Management Isolation Mode.</td>
</tr>
<tr>
<td></td>
<td><code>disable</code>: Disables the Task Management Isolation Mode.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-InquirySerial</td>
<td>Specify whether to set the Inquiry Serial Number Conversion Mode effective or ineffective.</td>
</tr>
<tr>
<td></td>
<td><code>ctl_no</code>: Controller number (0, 1).</td>
</tr>
<tr>
<td></td>
<td><code>port_no</code>: Port number (A, B, C, D, E, F, G, H).</td>
</tr>
<tr>
<td></td>
<td><code>group_no</code>: Host Group number.</td>
</tr>
<tr>
<td></td>
<td><code>enable</code>: Enables the Inquiry Serial Number Conversion Mode.</td>
</tr>
<tr>
<td></td>
<td><code>disable</code>: Disables the Inquiry Serial Number Conversion Mode.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-NOPInSuppress</td>
<td>Specify whether to set the NOP-In Suppress Mode effective or ineffective.</td>
</tr>
<tr>
<td></td>
<td><code>ctl_no</code>: Controller number (0, 1).</td>
</tr>
<tr>
<td></td>
<td><code>port_no</code>: Port number (A, B, C, D, E, F, G, H).</td>
</tr>
<tr>
<td></td>
<td><code>group_no</code>: Host Group number.</td>
</tr>
<tr>
<td></td>
<td><code>enable</code>: Enables the NOP-In Suppress Mode.</td>
</tr>
<tr>
<td></td>
<td><code>disable</code>: Disables the NOP-In Suppress Mode.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-DiscoveryCHAP</td>
<td>Specify whether to set the Discovery CHAP Mode effective or ineffective.</td>
</tr>
<tr>
<td></td>
<td><code>ctl_no</code>: Controller number (0, 1).</td>
</tr>
<tr>
<td></td>
<td><code>port_no</code>: Port number (A, B, C, D, E, F, G, H).</td>
</tr>
<tr>
<td></td>
<td><code>group_no</code>: Host Group number.</td>
</tr>
<tr>
<td></td>
<td><code>enable</code>: Enables the Discovery CHAP Mode.</td>
</tr>
<tr>
<td></td>
<td><code>disable</code>: Disables the Discovery CHAP Mode.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-UAChange</td>
<td>Specify whether to set the Unit Retention Change Mode effective or ineffective.</td>
</tr>
<tr>
<td></td>
<td><code>ctl_no</code>: Controller number (0, 1)</td>
</tr>
<tr>
<td></td>
<td><code>port_no</code>: Port number (A, B, C, D, E, F, G, H).</td>
</tr>
<tr>
<td></td>
<td><code>group_no</code>: Host Group number.</td>
</tr>
<tr>
<td></td>
<td><code>enable</code>: Enables the Unit Attention Change Mode.</td>
</tr>
<tr>
<td></td>
<td><code>disable</code>: Disables the Unit Attention Change Mode.</td>
</tr>
</tbody>
</table>
When specifying per option (For AMS2000)

- `UniqueExtendedCopy ctl_no port_no group_no enable | disable`
  Specify whether to set the Unique Extended COPY Mode effective or ineffective
  
  `ctl_no`: Controller number (0, 1),
  `port_no`: Port number (A, B, C, D, E, F, G, H)
  `group_no`: Host Group number
  `enable`: Enables the Unique Extended COPY Mode.
  `disable`: Disables the Unique Extended COPY Mode.

- `UniqueWriteSame ctl_no port_no group_no enable | disable`
  Specify whether to set the Unique Write Same Mode effective or ineffective
  
  `ctl_no`: Controller number (0, 1),
  `port_no`: Port number (A, B, C, D, E, F, G, H)
  `group_no`: Host Group number
  `enable`: Enables the Unique Write Same Mode.
  `disable`: Disables the Unique Write Same Mode

- `DPDepletionReply ctl_no port_no target_no enable | disable`
  Specify whether to set the DP Depletion Detail Reply Mode effective or ineffective.
  
  `ctl_no`: Controller number (0, 1),
  `port_no`: Port number (A, B, E, F)
  `target_no`: Target number
  `enable`: Enables the DP Depletion Detail Reply Mode.
  `disable`: Disables the DP Depletion Detail Reply Mode

When specifying per host group (For 9500V, AMS, WMS, SMS, and AMS2000)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-set ctl_no port_no</code></td>
<td>Sets the host group options.</td>
</tr>
<tr>
<td></td>
<td><code>ctl_no</code>: Controller number (0, 1).</td>
</tr>
<tr>
<td></td>
<td><code>port_no</code>: Port number (A, B, C, D, E, F, G, H).</td>
</tr>
<tr>
<td><code>-gno group_no</code></td>
<td>Specify a host group number.</td>
</tr>
<tr>
<td></td>
<td><code>group_no</code>: Host group number.</td>
</tr>
<tr>
<td><code>-gname group_name</code></td>
<td>Specify a host group name.</td>
</tr>
<tr>
<td></td>
<td><code>group_name</code>: Host group name.</td>
</tr>
<tr>
<td>`-HostConnection standard</td>
<td>Specify the mode to be emulated.</td>
</tr>
<tr>
<td>standard</td>
<td>OpenVMS</td>
</tr>
<tr>
<td></td>
<td>OpenVMS</td>
</tr>
<tr>
<td></td>
<td>TRESPASS</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>-SameNodeName enable</td>
<td>Specify whether to set the Same Node Name mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the Same Node Name mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the Same Node Name mode.</td>
</tr>
<tr>
<td>-TruCluster enable</td>
<td>Specify whether to set the Tru Cluster Connection mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the Tru Cluster Connection mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the Tru Cluster Connection mode.</td>
</tr>
<tr>
<td>-PIDConv enable</td>
<td>Specify whether to set the Port-ID Conversion mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the Port-ID Conversion mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the Port-ID Conversion mode.</td>
</tr>
<tr>
<td>-CCHS enable</td>
<td>Specify whether to set the CCHS convert mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the CCHS convert mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the CCHS convert mode.</td>
</tr>
<tr>
<td>-NACA enable</td>
<td>Specify whether to set the NACA mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the NACA mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the NACA mode.</td>
</tr>
<tr>
<td></td>
<td>When specifying per host group (9500V only)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-pathswAPG enable</td>
<td>Specify whether to set the Path Switch mode (Active/Passive Group) effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the Path Switch mode (Active/Passive Group).</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the Path Switch mode (Active/Passive Group).</td>
</tr>
<tr>
<td>-pathswAP enable</td>
<td>Specify whether to set the Path Switch mode (Active/Passive) effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the Path Switch mode (Active/Passive).</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the Path Switch mode (Active/Passive).</td>
</tr>
<tr>
<td>-pathswAA enable</td>
<td>Specify whether to set the Path Switch mode (Active/Active) effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the Path Switch mode (Active/Active).</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the Path Switch mode (Active/Active).</td>
</tr>
<tr>
<td>CLI command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>-NoRSVConf enable</td>
<td>Specify whether to set the No_RSV_Conf mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the No_RSV_Conf mode.</td>
</tr>
<tr>
<td>disable</td>
<td>disable : Disables the No_RSV_Conf mode.</td>
</tr>
<tr>
<td>-ftSRV2 enable</td>
<td>Specify whether to set the ftServer Connection mode 2 effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the ftServer Connection mode 2.</td>
</tr>
<tr>
<td>disable</td>
<td>disable : Disables the ftServer Connection mode 2.</td>
</tr>
<tr>
<td>-SRCReadReject enable</td>
<td>Specify whether to set the SRC Read Command Reject mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the SRC Read Command Reject mode.</td>
</tr>
<tr>
<td>disable</td>
<td>disable : Disables the SRC Read Command Reject mode.</td>
</tr>
<tr>
<td>-HISUP enable</td>
<td>Specify whether to set the HISUP mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the HISUP mode.</td>
</tr>
<tr>
<td>disable</td>
<td>disable : Disables the HISUP mode.</td>
</tr>
<tr>
<td>-HPUX2 enable</td>
<td>Specify whether to set the HP connection mode 2 effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the HP connection mode 2.</td>
</tr>
<tr>
<td>disable</td>
<td>disable : Disables the HP connection mode 2.</td>
</tr>
<tr>
<td>-ProdidDF400 enable</td>
<td>Specify whether to set the Product ID DF400 mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the Product ID DF400 mode.</td>
</tr>
<tr>
<td>disable</td>
<td>disable : Disables the Product ID DF400 mode.</td>
</tr>
<tr>
<td>-SUNCluster enable</td>
<td>Specify whether to set the SUN Cluster Connection mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the SUN Cluster Connection mode.</td>
</tr>
<tr>
<td>disable</td>
<td>disable : Disables the SUN Cluster Connection mode.</td>
</tr>
<tr>
<td>-PRSV enable</td>
<td>Specify whether to set the Persistent RSV Cluster mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the Persistent RSV Cluster mode.</td>
</tr>
<tr>
<td>disable</td>
<td>disable : Disables the Persistent RSV Cluster mode.</td>
</tr>
</tbody>
</table>
When specifying per host group (For 9500V, AMS and WMS)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-TargetReset <code>enable</code></td>
<td>Specify whether to set the Target reset mode effective or ineffective. <code>enable</code> : Enables the Target reset mode. <code>disable</code> : Disables the Target reset mode.</td>
</tr>
<tr>
<td>-Reserve <code>enable</code></td>
<td>Specify whether to set the Reserve mode effective or ineffective. <code>enable</code> : Enables the Reserve mode. <code>disable</code> : Disables the Reserve mode.</td>
</tr>
<tr>
<td>-LUReset <code>enable</code></td>
<td>Specify whether to set the LU reset mode effective or ineffective. <code>enable</code> : Enables the LU reset mode. <code>disable</code> : Disables the LU reset mode.</td>
</tr>
<tr>
<td>-SPC2 <code>ctl_no port_no group_no</code> <code>enable</code></td>
<td>Specify whether to set the SPC-2 Mode effective or ineffective. <code>ctl_no</code> : Controller number (0, 1). <code>port_no</code> : Port number (A, B, C, D). <code>group_no</code> : Host Group number. <code>enable</code> : Enables the SPC-2 Mode. <code>disable</code> : Disables the SPC-2 Mode.</td>
</tr>
<tr>
<td>-PIDNoRep <code>enable</code></td>
<td>Specify whether to set the Port-ID No Report mode effective or ineffective. <code>enable</code> : Enables the Port-ID No Report mode. <code>disable</code> : Disables the Port-ID No Report mode.</td>
</tr>
<tr>
<td>-UASuppress <code>enable</code></td>
<td>Specify whether or not to suppress a unit attention (06/2A00). <code>enable</code> : Suppress the unit attention. <code>disable</code> : Does not suppress the unit attention.</td>
</tr>
</tbody>
</table>
### When specifying per host group (For AMS and WMS)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`-HISUPOff enable</td>
<td>disable`</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the HISUP OFF Mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the HISUP OFF Mode.</td>
</tr>
<tr>
<td>`-ResetPropagation enable</td>
<td>disable`</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the Reset Propagation Mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the Reset Propagation Mode.</td>
</tr>
<tr>
<td>`-ASLReportAPG enable</td>
<td>disable`</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the ASL Report Mode (Active/Passive Group).</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the ASL Report Mode (Active/Passive Group).</td>
</tr>
<tr>
<td>`-ASLReportAP enable</td>
<td>disable`</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the ASL Report Mode (Active/Passive).</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the ASL Report Mode (Active/Passive).</td>
</tr>
<tr>
<td>`-ASLReportAA enable</td>
<td>disable`</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the ASL Report Mode (Active/Active).</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the ASL Report Mode (Active/Active).</td>
</tr>
</tbody>
</table>

### When specifying per host group (For AMS, WMS, SMS and AMS2000)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`-HP enable</td>
<td>disable`</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the HP-UX Mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the HP-UX Mode.</td>
</tr>
<tr>
<td>`-PSUEReadReject enable</td>
<td>disable`</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the PSUE Read Reject Mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the PSUE Read Reject Mode.</td>
</tr>
</tbody>
</table>
When specifying per host group (For SMS and AMS2000)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-UniqueReserve1</td>
<td>Specify whether to set the Unique Reserve Mode 1 effective or ineffective.</td>
</tr>
<tr>
<td>enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>-SerialResponse</td>
<td>Specify whether to set the Product Serial Response Mode effective or ineffective.</td>
</tr>
<tr>
<td>enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>-SvolDisableAdvance</td>
<td>Specify whether to set the S-VOL Disable Advanced Mode effective or ineffective.</td>
</tr>
<tr>
<td>enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-ModeParamChanged ctl_no port_no group_no enable</td>
<td>disable</td>
</tr>
<tr>
<td>ctl_no : Controller number (0, 1).</td>
<td>port_no : Port number (A, B, C, D, E, F, G, H).</td>
</tr>
<tr>
<td>enable : Enables the Mode Parameters Changed Notification Mode.</td>
<td>disable : Disables the Mode Parameters Changed Notification Mode.</td>
</tr>
<tr>
<td>-TaskIsolation ctl_no port_no group_no enable</td>
<td>disable</td>
</tr>
<tr>
<td>ctl_no : Controller number (0, 1).</td>
<td>port_no : Port number (A, B, C, D, E, F, G, H).</td>
</tr>
<tr>
<td>enable : Enables the Task Management Isolation Mode.</td>
<td>disable : Disables the Task Management Isolation Mode.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| `-InquirySerial ctl_no port_no group_no enable | disable` | Specify whether to set the Inquiry Serial Number Conversion Mode effective or ineffective.  
  
  `ctl_no` : Controller number (0, 1).  
  `port_no` : Port number (A, B, C, D, E, F, G, H).  
  `group_no`: Host Group number.  
  `enable` : Enables the Inquiry Serial Number Conversion Mode.  
  `disable` : Disables the Inquiry Serial Number Conversion Mode. |
| `-NOPInSuppress ctl_no port_no group_no enable | disable` | Specify whether to set the NOP-In Suppress Mode effective or ineffective.  
  
  `ctl_no` : Controller number (0, 1).  
  `port_no` : Port number (A, B, C, D, E, F, G, H).  
  `group_no`: Host Group number.  
  `enable` : Enables the NOP-In Suppress Mode.  
  `disable` : Disables the NOP-In Suppress Mode. |
| `-DiscoveryCHAP ctl_no port_no group_no enable | disable` | Specify whether to set the Discovery CHAP Mode effective or ineffective.  
  
  `ctl_no` : Controller number (0, 1).  
  `port_no` : Port number (A, B, C, D, E, F, G, H).  
  `group_no`: Host Group number.  
  `enable` : Enables the Discovery CHAP Mode.  
  `disable` : Disables the Discovery CHAP Mode. |
| `-UAChange ccl_no port_no group_no enable | disable` | Specify whether to set the Unit Retention Change Mode effective or ineffective.  
  
  `ccl_no`: Controller number (0, 1)  
  `port_no` : Port number (A, B, C, D, E, F, G, H).  
  `group_no`: Host Group number.  
  `enable`: Enables the Unit Attention Change Mode.  
  `disable`: Disables the Unit Attention Change Mode. |
| `-platform NotSpecified | HP | Solaris | AIX | Linux | Windows | VMware | NetWare` | Specify the Platform.  
  
  NotSpecified: not specified  
  HP: HP-UX  
  Solaris: Solaris  
  AIX: AIX  
  Linux: Linux  
  Windows: Windows  
  VMware: VMware  
  NetWare: NetWare |
| `-middleware NotSpecified | VCS | TrueCluster` | Specify the Middleware.  
  
  NotSpecified: not specified  
  VCS: VCS  
  TrueCluster: Tru Cluster |
When specifying per option (For AMS2000)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| - UniqueExtendedCopy ctl_no port_no group_no enable | Specify whether to set the Unique Extended COPY Mode effective or ineffective  
| disable                       | ctl_no : Controller number (0, 1),                                         |
|                               | port_no : Port number (A, B, C, D, E, F, G, H)                             |
|                               | group_no : Host Group number                                               |
|                               | enable : Enables the Unique Extended COPY Mode.                            |
|                               | disable : Disables the Unique Extended COPY Mode.                          |

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| - UniqueWriteSame ctl_no port_no group_no enable | Specify whether to set the Unique Write Same Mode effective or ineffective  
| disable                       | ctl_no : Controller number (0, 1),                                         |
|                               | port_no : Port number (A, B, C, D, E, F, G, H)                             |
|                               | group_no : Host Group number                                               |
|                               | enable : Enables the Unique Write Same Mode.                               |
|                               | disable : Disables the Unique Write Same Mode.                            |

Note: -platform and -middleware option and each host group option can also be specified at the same time.

Example

The following example displays the host group options of an array 9500.

```
% auhgopt -unit 9500 -refer
Port 0A, Group 0
  Host connection mode 1 = standard
  Host connection mode 2
  SPC-2 Mode = OFF
  Same Mode Name Mode = OFF
  Tru Cluster Connection Mode = OFF
  Path Switch Mode(Active/Passive Group) = OFF
  Path Switch Mode(Active/Passive) = OFF
  Path Switch Mode(Active/Active) = OFF
  Port-ID No Report Mode = OFF
  Port-ID Conversion Mode = OFF
  No_RSV_Conf Mode = OFF
  ftServer Connection Mode 2 = OFF
  SRC Read Command Reject Mode = OFF
  UA(06/2A00) suppress Mode = OFF
  HISUP Mode = OFF
  CCHS Mode = OFF
  HP Connection Mode 2 = OFF
  Product ID DF400 Mode = OFF
  NACA Mode = OFF
  SUN Cluster Connection Mode = OFF
  Persistent RSV Cluster Mode = OFF
  Target Reset (Bus Device Reset) Mode = OFF
  Reserve Mode = OFF
  Logical Unit Reset Mode = OFF
  Third Party Process Logout Mode = OFF

Port 0B, Group 0
  :  

Port 1A, Group 0
  :  

Port 1B, Group 0
```
The following example displays the host group options of an array ams500.

```
% auhgopt -unit ams500 -refer
Port 0A, Group 0
  Host connection mode 1 = standard
  Host connection mode 2
  HP-UX Mode = OFF
  PSUE Read Reject Mode = OFF
  UA(06/2A00) suppress Mode = OFF
  NACA Mode = OFF
  HISUP OFF Mode = ON
  Reset Propagation Mode = OFF
  Unique Reserve Mode 1 = OFF
  ASL Report Mode(Active/Passive Group) = OFF
  ASL Report Mode(Active/Passive) = OFF
  ASL Report Mode(Active/Active) = OFF
  Port-ID No Report Mode = OFF
  Port-ID Conversion Mode = OFF
  Tru Cluster Mode = OFF
  Product Serial Response Mode = OFF
  Same Node Name Mode = OFF
  CCHS Mode = OFF
  Inquiry Serial Number Conversion Mode = OFF
  NOP-In Suppress Mode = OFF
  S-VOL Disable Advanced Mode = OFF

Port 0B, Group 0

Port 1A, Group 0

Port 1B, Group 0

%```

The following example displays the host group options of an array ams2300.

```
% auhgopt -unit ams2300 -refer
Port 0A, Group 0
  Platform = not specified
  Middleware = not specified
  Host connection mode 1 = Standard Mode
  Host connection mode 2
  HP-UX Mode = OFF
  PSUE Read Reject Mode = OFF
  Mode Parameters Changed Notification Mode = OFF
  NACA Mode = OFF
  Task Management Isolation Mode = ON
  Unique Reserve Mode 1 = OFF
  Port-ID Conversion Mode = OFF
  Tru Cluster Mode = OFF
  Product Serial Response Mode = OFF
  Same Node Name Mode = OFF
  CCHS Mode = OFF
  Inquiry Serial Number Conversion Mode = OFF
  NOP-In Suppress Mode = OFF
  S-VOL Disable Advanced Mode = OFF
  Discovery CHAP Mode = OFF
  Unique Extended COPY Mode = OFF
  Unique Write Same Mode = OFF
  DF Depletion Detail Reply Mode = OFF
  Unit Attention Change Mode = OFF

Port 0B, Group 0

Port 1A, Group 0

%```
Referencing/setting mapping information

Command name

auhgmap

Format

9500V, AMS, WMS, SMS, AMS2000, HUS
auhgmap -unit unit_name --refer
When specifying host group number.
auhgmap -unit unit_name -add ctl_no port_no group_no hlu lu
auhgmap -unit unit_name -chg ctl_no port_no group_no hlu lu
auhgmap -unit unit_name -rm ctl_no port_no group_no hlu lu
When specifying host group number or name.
auhgmap -unit unit_name -add ctl_no port_no
   -gno group_no | -gname group_name -hlu hlu -lu
auhgmap -unit unit_name -chg ctl_no port_no
   -gno group_no | -gname group_name -hlu hlu -lu
auhgmap -unit unit_name -rm ctl_no port_no
   -gno group_no | -gname group_name -hlu hlu -lu
auhgmap -unit unit_name -MappingMode on | off
AMS, WMS, SMS, AMS2000, HUS
auhgmap -unit unit_name -availablelist ctl_no port_no
   -gno group_no | -gname group_name -hlu | -lu

Description

This command sets mapping information.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of an array unit in which the mapping information to be referenced or set. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;, (space)&quot;,  or &quot;. (space)&quot;. Space in front and in the rear of the character string is removed</td>
</tr>
<tr>
<td>-refer</td>
<td>References the mapping information</td>
</tr>
</tbody>
</table>
### Option | Description
--- | ---
-MappingMode on | Specifies whether to set the Mapping mode effective or ineffective.
| off | on : Enables the Mapping mode
| off: Disables the Mapping mode
-availablelist ctl_no
| port_no | A list of LUNs or H-LUNs, each of which is eligible for the mapping is displayed within the specified controller number, a port number, and a host group.
|hlu | Specify when displaying a list of H-LUNs, each of which is eligible for the mapping.
-lu | Specify when displaying a list of LUNs, each of which is eligible for the mapping.

#### When specifying host group number

| Option | Description
--- | ---
-add ctl_no
| port_no group_no hlu lu | Adds the mapping information.
| ctl_no : Controller number (0, 1)
| port_no : Port number (A, B, C, D, E, F, G, H)
| group_no: Host Group number
| hlu : LU number recognized by the host
| lu : LU number of the array unit
-chg ctl_no
| port_no group_no hlu lu | Changes the mapping information.
| ctl_no : Controller number (0, 1)
| port_no : Port number (A, B, C, D, E, F, G, H)
| group_no: Host Group number
| hlu : LU number recognized by the host
| lu : LU number of the array unit
-rm ctl_no
| port_no group_no hlu lu | Deletes the mapping information.
| ctl_no : Controller number (0, 1)
| port_no : Port number (A, B, C, D, E, F, G, H)
| group_no: Host Group number
| hlu : LU number recognized by the host
| lu : LU number of the array unit

#### When specifying host group number or host group name

| Option | Description
--- | ---
-add ctl_no
| port_no | Adds the mapping information.
| ctl_no : Controller number (0, 1)
| port_no : Port number (A, B, C, D, E, F, G, H)
-chg ctl_no
| port_no | Changes the mapping information.
| ctl_no : Controller number (0, 1)
| port_no : Port number (A, B, C, D, E, F, G, H)
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-rm ctl_no port_no</td>
<td>Deletes the mapping information.</td>
</tr>
<tr>
<td></td>
<td>ctl_no : Controller number (0, 1)</td>
</tr>
<tr>
<td></td>
<td>port_no : Port number (A, B, C, D, E, F, G, H)</td>
</tr>
<tr>
<td>-gno group_no</td>
<td>Specify a host group number.</td>
</tr>
<tr>
<td></td>
<td>group_no: Host group number</td>
</tr>
<tr>
<td>-gname group_name</td>
<td>Specify a host group name.</td>
</tr>
<tr>
<td></td>
<td>group_name: Host group name</td>
</tr>
<tr>
<td></td>
<td>(Less than or equal to 32 ASCII characters (alphabetic characters, numerals, and the</td>
</tr>
<tr>
<td></td>
<td>following symbols) can be used (until AMS or WMS, 16 characters).</td>
</tr>
<tr>
<td></td>
<td>(!, #, $, %, &amp;, ′, +, ‾, =, @, ^, _, {, }, , (, ) (space))</td>
</tr>
<tr>
<td>-hlu hlu</td>
<td>Specify a LUN to be recognized by a host.</td>
</tr>
<tr>
<td>-lu lu</td>
<td>Specify an internal LUN of the disk array subsystem.</td>
</tr>
</tbody>
</table>
Example

The following example displays mapping information of an array 9500.

```bash
% auhgmap -unit 9500 -refer
Mapping Mode = ON
Port Group  H-LUN  LUN
0A 0 0 0
0A 0 1 1
0A 0 2 2
0A 0 3 3
0B 0 0 0
0B 0 1 1
0B 0 2 2
0B 0 3 3
1A 0 0 0
1A 0 1 1
1A 0 2 2
1A 0 3 3
1B 0 0 0
1B 0 1 1
1B 0 2 2
1B 0 3 3
%
```

Referencing/registration/changing/deleting a host group

Command name

`auhgdef`

Format

```
9500V, AMS, WMS, SMS, AMS2000, HUS
auhgdef -unit unit_name --refer
auhgdef -unit unit_name --add
cnt_no port_no [-gno group_no] -gname group_name
auhgdef -unit unit_name --chg
cnt_no port_no
-gno group_no | -gname group_name
-newgname group_name
auhgdef -unit unit_name --rm
cnt_no port_no
-gno group_no ... | -gname group_name ...
auhgdef -unit unit_name --init
cnt_no port_no
```

Description

This command performs a reference of a list, new registration, name change, or deletion of the host group(s).
### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the name of the array unit for which to reference, register, change, or delete the host group(s). Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot;(space)&quot;. Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td><code>-refer</code></td>
<td>Displays a list of the host groups which have been registered and whose host group security has been allocated to valid ports.</td>
</tr>
</tbody>
</table>
| `-add ctl_no port_no` | Registers the host groups, which are permitted to access the specified port, and their names. It is not allowed to register them in the host groups, which have been registered, in overwriting manner.  

\[
\begin{align*}
\text{ctl_no} & : \text{Controller number (0, 1)} \\
\text{port_no} & : \text{Port number (A, B, C, D, E, F, G, H)}
\end{align*}
\]

| `-chg ctl_no port_no` | Changes the host group name that has been registered in the specified port. Specify the object host group using a host group number or host group name.  

\[
\begin{align*}
\text{ctl_no} & : \text{Controller number (0, 1)} \\
\text{port_no} & : \text{Port number (A, B, C, D, E, F, G, H)}
\end{align*}
\]

| `-rm ctl_no port_no` | Deletes the host group registered in the specified port. Specify the object host group using a host group number or host group name. The two or more host groups can be specified. However, the two methods of specification cannot be used at the same time. Incidentally, the Host Group 0 cannot be deleted.  

\[
\begin{align*}
\text{ctl_no} & : \text{Controller number (0, 1)} \\
\text{port_no} & : \text{Port number (A, B, C, D, E, F, G, H)}
\end{align*}
\]

| `-init ctl_no port_no` | Initializes the Host Group 0 of the specified port.  

\[
\begin{align*}
\text{ctl_no} & : \text{Controller number (0, 1)} \\
\text{port_no} & : \text{Port number (A, B, C, D, E, F, G, H)}
\end{align*}
\]
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-gno group_no ...</td>
<td>When the -add option is specified: Specify a host group number to be registered. Only a single host group number can be specified. Besides, the specification for the host group number can be omitted. When the specification is omitted, the least one of unregistered host group numbers is assigned. When the -chg option is specified: Specify a number of the host group whose name is to be changed. Only a single host group number can be specified. When the -rm option is specified: Specify a host group number to be deleted. One or more host group number(s) can be specified. Incidentally, the Host Group 0 cannot be deleted. Single specification : Specifying a single host group number. Example: -gno 3 Multiple specification: Specifying multiple host group numbers. Example: -gno 1 2 3 4 5 8 -gno 1-5 8 When specifying the range using a hyphen (&quot;-&quot;) undefined host group number cannot be included within the range to be specified. group_no: host group number (0 to 127)</td>
</tr>
<tr>
<td>-gname group_name ...</td>
<td>When the -add option is specified: Specify a host group name to be registered. Only a single host group name can be specified. When the -chg option is specified: Specify a host group name to be changed. Only a single host group name can be specified. When the -rm option is specified: Specify a host group name to be deleted. One or more host group name can be specified. Single specification : Specifying a single host group name. Example: -gname solaris Multiple specification: Specifying multiple host group name. Example: -gname irix01 solaris win001 group_name: host group name (See Note 1)</td>
</tr>
<tr>
<td>-newgname group_name</td>
<td>Specify a host group name to be validated after the change when the -chg option is specified. group_name: host group name (See Note 1)</td>
</tr>
</tbody>
</table>

Note 1: Less than or equal to 32 ASCII characters (alphabetic characters, numerals, and the following symbols) can be used (until AMS or WMS, 16 characters). (!, #, $, %, &, ′, †, ‡, †-‡, =, @, ^, {, }, ~, (, ), [ ] (space))
Example

The following example displays host group information of an array ams500.

```
% auhgdef -unit ams500 -refer
Port 0A
  Group  Host Group Name
    0  HG0A-000
Port 0B
  Group  Host Group Name
    0  HG0B-000
Port 1A
  Group  Host Group Name
    0  HG1A-000
Port 1B
  Group  Host Group Name
    0  HG1B-000
%
```

File output of host group information

Command name

auhgout

Format

```
9500V
auhgout -unit unit_name -file file_name
```

Description

This command outputs the contents of the setting for the host group information set in the array in a specified file, in a text format.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of an array unit in which the mapping information to be referenced or set. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;_ (period)&quot; , &quot;@&quot;, or &quot;_ (space)&quot;. Space in front and in the rear of the character string is removed</td>
</tr>
<tr>
<td>-file file_name</td>
<td>Specify the name the file (path) to output the host group information.</td>
</tr>
</tbody>
</table>

Example

The following example outputs the host group information of the array 9500a1 in file: hgprm.txt into the directory where Storage Navigator Modular 2 is installed.

```
% auhgout -unit 9500a1 -file hgprm.txt
Password:
%
```
The format of the output file consists of the following items. The outline of the layout of the output file is shown in the following output.

Configuration Information list

DF Name: 9500
Date: 2009/11/19 16:12:59
Firmware Revision: 065B/F
Array Unit Type: 9500V
Serial Number: 65000026

----CommonInformation----
MappingMode = Off

---- CTL0 ----

----PortA ----

----PortOption----
Reset/LIP Mode (Signal) = OFF
Reset/LIP Mode (Process) = OFF
LIP Port All Reset Mode = OFF
Read Frame Min 128 Byte Mode = OFF

----HostGroupList----

----HostGroupInformation----
HostGroupNumber = 0
HostGroupName = "G000"

----HostSystemConfiguration----
Platform = not specified
Alternate Path = not specified
Failover = not specified
Additional Parameters
None

----HostGroupOption----
Host Connection Mode 1 = Standard Mode
Host Connection Mode 2
SPC-2 Mode = OFF
Same Node Name Mode = OFF
Tru Cluster Connection Mode = OFF
Path Switch Mode (Active/Passive Group) = OFF
Path Switch Mode (Active/Passive) = OFF
Path Switch Mode (Active/Active) = OFF
Port-ID No Report Mode = OFF
Port-ID Conversion Mode = OFF
No_RSV_Conf Mode = OFF
ftServer Connection Mode 2 = OFF
SRC Read Command Reject Mode = OFF
UA(06/2A00) suppress Mode = OFF
HISUP Mode = OFF
CCHS Mode = OFF
HP Connection Mode 2 = OFF
Product ID DF400 Mode = OFF
NACA Mode = OFF
SUN Cluster Connection Mode = OFF
Persistent RSV Cluster Mode = OFF
Target Reset (Bus Device Reset) Mode = OFF
Reserve Mode = OFF
Logical Unit Reset Mode = OFF
Third Party Process Logout Mode = OFF

----LuMapping----
H-LUN LUN
--HostGroupInformationEnd
--HostGroupListEnd

---LUNManagement Information ---
Security = ON
----PermissionList----
--PermissionListEnd

**Setting the host group information with a file**

**Command name**

aubgset
**Format**

9500V
auhgset -unit unit_name -file file_name
        [ -portop ] [ -opt ] [ -map ] [ -wwn ]

**Description**

This command sets the host group information (port option, host group option, mapping information, and host information) described in the file to the array. All information is set up when input classification is omitted.

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of an array unit in which the mapping information to be referenced or set. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_. (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot;. (space)&quot;. Space in front and in the rear of the character string is removed</td>
</tr>
<tr>
<td>-file file_name</td>
<td>Specify the name the file (path) to output the host group information.</td>
</tr>
<tr>
<td>-portop</td>
<td>Specify when setting up the port option.</td>
</tr>
<tr>
<td>-opt</td>
<td>Specify when setting up the host group option.</td>
</tr>
<tr>
<td>-map</td>
<td>Specify when setting up the map information.</td>
</tr>
<tr>
<td>-wwn</td>
<td>Specify when setting up the host information.</td>
</tr>
</tbody>
</table>

**Example**

The following example sets array 9500a1 according to the host group information described in text file: hgprm.txt.

```
% auhgset -unit 9500a1 -file hgprm.txt
Password:
Are you sure you want to set the port and host group information? (y/n [n]): y
When setting starts, the subsystem stops accepting access to the subsystem or the host group from the host.
Before setting, stop access to the subsystem or the host group from the host.
Do you want to continue processing? (y/n [n]): y
The port and host group information has been set successfully.
%```

CLI command list 3-243
**Target information**

This section covers the following commands related to targets:

- Referencing/setting iSCSI target information on page 3-245
- Referencing/setting the initiator information on page 3-249
- Referencing/setting iSCSI target options on page 3-253
- Referencing/setting iSCSI target mapping information on page 3-269
Referencing/setting iSCSI target information

Command name

autargetdef

Format

AMS, WMS, SMS, AMS2000, HUS100
autargetdef -unit unit_name -refer
autargetdef -unit unit_name -add ctl_no port_no
  [-tno target_no] -talias target_alias
  -iname target_iscsi_name | -inamefile file_name
  -authmethod CHAP | None | CHAP None
  [-mutual enable | disable]
  [-tuser target_user_name | -tuserfile file_name]
autargetdef -unit unit_name -chg ctl_no port_no
  [-tno target_no] -talias target_alias
  [-newtalias target_alias]
  [-iname target_iscsi_name | -inamefile file_name]
  [-authmethod CHAP | None | CHAP None]
  [-mutual enable | disable]
  [-tuser target_user_name | -tuserfile file_name]
  [-tsecret]
autargetdef -unit unit_name -rm ctl_no port_no
  [-tno target_no ...] -talias target_alias ...
autargetdef -unit unit_name -init ctl_no port_no

Description

This command references or sets the iSCSI target information.

NOTE: At the Windows 98 MS-DOS prompt, the input buffer is up to 128 characters by default. Use the options, -inamefile and -tuserfile, when a long iSCSI name or target user name is specified. The first line of the specified file is set for iSCSI name or target user name, and the second line and the following are invalid.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of the array unit for which to reference or set the target information. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;,@&quot;, or &quot; (space)&quot;. Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the target information.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| -add ctl_no port_no | Adds the target information.  
  
  _ctl_no_: Controller number (0, 1)  
  _port_no_: Port number (A, B, E, F) |
| -chg ctl_no port_no | Changes the target information.  
  
  _ctl_no_: Controller number (0, 1)  
  _port_no_: Port number (A, B, E, F) |
| -rm ctl_no port_no | Deletes the target information.  
  
  _ctl_no_: Controller number (0, 1)  
  _port_no_: Port number (A, B, E, F) |
| -init ctl_no port_no | Initializes the Target 0.  
  
  _ctl_no_: Controller number (0, 1)  
  _port_no_: Port number (A, B, E, F) |
| -tno target_no | When the -add option is specified:  
  Specify the target number.  
  When the specification is omitted, Navigator assigns the minimum number.  
  When the -chg option is specified:  
  Specify the target number.  
  _target_no_: Target number |
| -tno target_no ... | Specify the target number.  
  Single or multiple target numbers can be specified.  
  Single specification: Specifying a single target number.  
  Example: -tno 3  
  Multiple specification: Specifying multiple target numbers.  
  Example: -tno 1 2 3 4 5 8  
  _target_no_: Target number |
| -talias target_alias | Specify the target alias.  
  Space in front and in the rear of the character string is removed.  
  Cannot specify spaces only.  
  _target_alias_: Target alias (See Note 1) |
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-talias</code></td>
<td>Specify the target alias.</td>
</tr>
<tr>
<td><code>target_alias</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td></td>
<td>Cannot specify spaces only.</td>
</tr>
<tr>
<td></td>
<td>Single or multiple target aliases can be specified.</td>
</tr>
<tr>
<td></td>
<td>Single specification : Specifying a single target alias.</td>
</tr>
<tr>
<td></td>
<td>Example: <code>-talias solaris</code></td>
</tr>
<tr>
<td></td>
<td>Multiple specification : Specifying multiple target aliases.</td>
</tr>
<tr>
<td></td>
<td>Example: <code>-talias irix01 solaris win001</code></td>
</tr>
<tr>
<td></td>
<td><code>target_alias</code>: Target alias (See Note 1)</td>
</tr>
<tr>
<td><code>-iname</code></td>
<td>Specify the target iSCSI name.</td>
</tr>
<tr>
<td><code>target_iscsi_name</code></td>
<td></td>
</tr>
<tr>
<td><code>-inamefile</code></td>
<td>Specify the file (path) name when setting the target iSCSI name using a file.</td>
</tr>
<tr>
<td><code>file_name</code></td>
<td></td>
</tr>
<tr>
<td><code>-authmethod</code></td>
<td>Specify the authentication method.</td>
</tr>
<tr>
<td>CHAP</td>
<td>CHAP: The hosts (as initiators) must with CHAP authentication.</td>
</tr>
<tr>
<td>None</td>
<td>None: The hosts (as initiators) must without CHAP authentication</td>
</tr>
<tr>
<td>CHAP</td>
<td>None: If the hosts (as initiators) required with CHAP authentication, the authentication is done. (Same as &quot;none CHAP&quot;)</td>
</tr>
<tr>
<td><code>-mutual</code></td>
<td>Specify whether to set the mutual effective or ineffective.</td>
</tr>
<tr>
<td>enable</td>
<td>enable : Enables the mutual.</td>
</tr>
<tr>
<td>disable</td>
<td>disable: Disables the mutual.</td>
</tr>
<tr>
<td><code>-tuser</code></td>
<td>Specify the target user name.</td>
</tr>
<tr>
<td><code>target_user_name</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td></td>
<td>Cannot specify spaces only.</td>
</tr>
<tr>
<td></td>
<td><code>target_user_name</code>: Target user name (See Note 3)</td>
</tr>
<tr>
<td><code>-tuserfile</code></td>
<td>Specify the file (path) name when setting the target user name using a file.</td>
</tr>
<tr>
<td><code>file_name</code></td>
<td></td>
</tr>
</tbody>
</table>
Example

The following example displays the target information of an array sms100.

```
% autargetdef -unit sms100 -refer
Port 0A
  Target          Method  CHAP Algorithm  Authentication
  000:T000       CHAP,None   MD5            Disable
  User Name : ---
  iSCSI Name : iqn.1994-04.jp.co.hitachi:rsd.d8a.t.00026.0a000

Port 0B

Port 1A

Port 1B

%
```

The following example displays the target information of an array AMS2300.

```
"
Referencing/setting the initiator information

Command name

autargetini

Format

AMS, WMS, SMS, AMS2000, HUS100
autargetini -unit unit_name -refer
[ ctl_no port_no -tno target_no | -talias target_alias ]
[ ctl_no port_no -login ]
autargetini -unit unit_name -set ctl_no port_no
-tgs on | off
When adding initiator:
autargetini -unit unit_name -add ctl_no port_no
[-tno target_no | -talias target_alias
 -iname initiator_iscsi_name | -inamefile file_name
 -initiator nickname
autargetini -unit unit_name -add ctl_no port_no
[-tno target_no | -talias target_alias
 -iname initiator_iscsi_name | -inamefile file_name
 -initiator nickname
When added initiator is assigned to author target:
autargetini -unit unit_name -chg ctl_no port_no
 -iname initiator_iscsi_name | -inamefile file_name |
 -initiator nickname
[-newiname new_iscsi_name | -newinamefile file_name ]
[-newiname new_initiator nickname ]
autargetini -unit unit_name -rm ctl_no port_no
[-tno target_no | -talias target_alias
 -iname initiator_iscsi_name | -inamefile file_name |
 -initiator nickname
autargetini -unit unit_name -availablelist ctl_no port_no
[-tno target_no | -talias target_alias

Description

This command references or sets the initiator information.
Options

NOTE: At the Windows 98 MS-DOS Prompt, the input buffer is up to 128 characters by default. Use the option, -inamefile or -newinamefile, when a long iSCSI name is specified. The first line of the specified file is set for iSCSI name, and the second line and the following are invalid.
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of the array unit for which to reference or set the target information. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;.&quot; (period), &quot;@&quot;, or &quot;:&quot; (space). Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the target information.</td>
</tr>
</tbody>
</table>
| -set ctl_no port_no | Set the target security.  
  *ctl_no*: Controller number (0, 1)  
  *port_no*: Port number (A, B, E, F) |
| -add ctl_no port_no | Adds the initiator information.  
  *ctl_no*: Controller number (0, 1)  
  *port_no*: Port number (A, B, E, F) |
| -chg ctl_no port_no | Changes the initiator information.  
  *ctl_no*: Controller number (0, 1)  
  *port_no*: Port number (A, B, E, F) |
| -rm ctl_no port_no | Deletes the initiator information.  
  *ctl_no*: Controller number (0, 1)  
  *port_no*: Port number (A, B, E, F) |
| -availablelist ctl_no port_no | Displays the eligible initiator information  
  *ctl_no*: Controller number (0, 1)  
  *port_no*: Port number (A, B, E, F) |
| -tno target_no  | Specify the target number.  
  *target_no*: Target number |
| -talias target_alias | Specify the target alias.  
  Space in front and in the rear of the character string is removed.  
  Cannot specify spaces only.  
  *target_alias*: Target alias (See Note 1) |
| -iname target_iscsi_name | Specify the target iSCSI name.  
  *target_iscsi_name*: Target iSCSI name (See Note 2) |
<p>| -login          | Specify this option when displaying initiator information that is logged in on the specified port.                                              |</p>
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| -tgs on | off | Specify whether to validate or invalidate the target security.  
| on : Enables the target security.  
| off: Disables the target security. |
| -iname initiator_iscsi_name | Specify the initiator iSCSI name.  
| iscsi_name: iSCSI name (See Note 2) |
| -inamefile file_name        | Specify the file (path) name when setting the initiator iSCSI name using a file.  
| file_name: File (path) name |
| -iname initiator_nickname   | Specify the initiator name (Nickname).  
| Space in front and in the rear of the character string is removed.  
| Cannot specify spaces only. |
| initiator_nickname: initiator name (See Note 3) |
| -newiname new_initiator_iscsi_name | Specify the initiator ISCSI name to be changed.  
| new_initiator_iscsi_name: initiator ISCSI name (See Note 2) |
| -newinamefile file_name     | Specify the file (path) name when changing the initiator iSCSI name using a file.  
| file_name: File (path) name |
| -newininame new_initiator_nickname | Specify the initiator name (Nickname) to be changed.  
| Space in front and in the rear of the character string is removed.  
| Cannot specify spaces only. |
| new_initiator_nickname: initiator name (See Note 3) |

Note 1: For target alias, less than or equal to 32 ASCII characters (alphabetic characters, numerals, and the following symbols) can be used.  
(!,#,$,%,&,’,+,-,=,^,_,{,},~,(,),[,<,],(space))

Note 2: Specify the iSCSI name of iqn format or eui format. For iSCSI name, less than or equal to 223 ASCII characters (alphabetic characters, period (.), hyphen (-), and colon (:)) can be used.

Note 3: For initiator name, less than or equal to 32 ASCII characters (alphabetic characters, numerals, and the following symbols) can be used.  
(!,#,$,%,&,’,+,-,=,^,_,{,},~,(,),[,<,],(space))
Example

The following example displays the initiator information of an array ams500.

% autargetini -unit ams500 -refer
Port 0A  Target Security ON
  Detected Initiator
  iSCSI Name
  iqn.2005-08.jp.co.hitachi:111.xxx.x.xxxx.xx.xxx
  Assigned Initiator
  Target       Name             iSCSI Name
  000:T000    windows-00001    iqn.2005-08.jp.co.hitachi:444.xxx.x.xxxx.xx.xxx
  Assignable Initiator
  iSCSI Name
  iqn.2005-08.jp.co.hitachi:555.xxx.x.xxxx.xx.xxx
Port 0B  Target Security OFF
Port 1A  Target Security OFF
Port 1B  Target Security OFF
%

Referencing/setting iSCSI target options

Command name

autargetopt

Format

AMS, WMS, SMS, AMS2000, HUS100
autargetopt -unit unit_name --refer

AMS, WMS
When specifying per target option.
autargetopt -unit unit_name -set
  [-HostConnection    ctl_no port_no target_no
   standard | OpenVMS | TRESPASS | WolfPack ]
  [-HP              ctl_no port_no target_no enable | disable ]
  [-PSUEReadReject  ctl_no port_no target_no enable | disable ]
  [-UASuppress      ctl_no port_no target_no enable | disable ]
  [-NACA            ctl_no port_no target_no enable | disable ]
  [-HISUPOff        ctl_no port_no target_no enable | disable ]
  [-ResetPropagation ctl_no port_no target_no enable | disable ]
  [-UniqueReserve1  ctl_no port_no target_no enable | disable ]
  [-ASLReportAPG    ctl_no port_no target_no enable | disable ]
  [-ASLReportAP     ctl_no port_no target_no enable | disable ]
  [-ASLReportAA     ctl_no port_no target_no enable | disable ]
  [-PIDNoRep        ctl_no port_no target_no enable | disable ]
  [-PIDConv         ctl_no port_no target_no enable | disable ]
  [-TruCluster      ctl_no port_no target_no enable | disable ]
  [-SerialResponse  ctl_no port_no target_no enable | disable ]
  [-SameNodeName    ctl_no port_no target_no enable | disable ]
  [-CCHS            ctl_no port_no target_no enable | disable ]
  [-SPC2            ctl_no port_no target_no enable | disable ]
  [-SvolDisableAdvance ctl_no port_no target_no enable | disable ]

When specifying per target.
autargetopt -unit unit_name -set ctl_no port_no
  [-tno target_no | -talias target_alias ]
  [-HostConnection  standard | OpenVMS | TRESPASS | WolfPack ]
  [-HP              enable | disable ]
  [-PSUEReadReject  enable | disable ]
  [-UASuppress      enable | disable ]
  [-NACA            enable | disable ]
  [-HISUPOff        enable | disable ]
  [-ResetPropagation enable | disable ]

Hitachi Unified Storage Command Line Interface Reference Guide
-UniqueReserve1 enable | disable
-ASLReportAPG enable | disable
-ASLReportAP enable | disable
-ASLReportAA enable | disable
-PIDNoRep enable | disable
-PIDConv enable | disable
-TruCluster enable | disable
-SerialResponse enable | disable
-SameNodeName enable | disable
-CCHS enable | disable
-SPC2 enable | disable
-SvolDisableAdvance enable | disable

**SMS**
When specifying per target option.
```
autargetopt -unit unit_name -set
```
-HostConnection ctl_no port_no target_no
-HP ctl_no port_no target_no enable | disable
-PSUEReadReject ctl_no port_no target_no enable | disable
-ModeParamChanged ctl_no port_no target_no enable | disable
-NACA ctl_no port_no target_no enable | disable
-TaskIsolation ctl_no port_no target_no enable | disable
-UniqueReserve1 ctl_no port_no target_no enable | disable
-PIDConv ctl_no port_no target_no enable | disable
-TruCluster ctl_no port_no target_no enable | disable
-SerialResponse ctl_no port_no target_no enable | disable
-SameNodeName ctl_no port_no target_no enable | disable
-CCHS ctl_no port_no target_no enable | disable
-InquirySerial ctl_no port_no target_no enable | disable
-NOPInSuppress ctl_no port_no target_no enable | disable
-SvolDisableAdvance ctl_no port_no target_no enable | disable
-DiscoveryCHAP ctl_no port_no target_no enable | disable
-ReportFullPortalList ctl_no port_no target_no enable | disable
-UAChange enable | disable

When specifying per target.
```
autargetopt -unit unit_name -set ctl_no port_no
```
-HostConnection standard | OpenVMS | TRESPASS | WolfPack
-HP enable | disable
-PSUEReadReject enable | disable
-ModeParamChanged enable | disable
-NACA enable | disable
-TaskIsolation enable | disable
-UniqueReserve1 enable | disable
-PIDConv enable | disable
-TruCluster enable | disable
-SerialResponse enable | disable
-SameNodeName enable | disable
-CCHS enable | disable
-InquirySerial enable | disable
-NOPInSuppress enable | disable
-SvolDisableAdvance enable | disable
-DiscoveryCHAP enable | disable
-ReportFullPortalList enable | disable
-UAChange enable | disable

```
autargetopt -unit unit_name -set ctl_no port_no
```
-HostConnection standard | OpenVMS | TRESPASS | WolfPack
-HP enable | disable
-PSUEReadReject enable | disable
-ModeParamChanged enable | disable
-NACA enable | disable
-TaskIsolation enable | disable
-UniqueReserve1 enable | disable
-PIDConv enable | disable
-TruCluster enable | disable
-SerialResponse enable | disable
-SameNodeName enable | disable
-CCHS enable | disable
-InquirySerial enable | disable
-NOPInSuppress enable | disable
-SvolDisableAdvance enable | disable
-DiscoveryCHAP enable | disable
-ReportFullPortalList enable | disable
-UAChange enable | disable

AMS2000, HUS100
When specifying per target option.
```
autargetopt -unit unit_name -set
```
-HostConnection standard | OpenVMS | TRESPASS | WolfPack
-HP enable | disable
-PSUEReadReject enable | disable
-ModeParamChanged enable | disable
-NACA enable | disable
-TaskIsolation enable | disable
-UniqueReserve1 enable | disable
-PIDConv enable | disable
-TruCluster enable | disable
-SerialResponse enable | disable
-SameNodeName enable | disable
-CCHS enable | disable
-InquirySerial enable | disable
-NOPInSuppress enable | disable
-SvolDisableAdvance enable | disable
-DiscoveryCHAP enable | disable
-ReportFullPortalList enable | disable
-UAChange enable | disable

**3-254**

**CLI command list**

---

Hitachi Unified Storage Command Line Interface Reference Guide
**Description**

This command references or sets the iSCSI target options.

**Options**

The following options table details the -unit switch.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the target options. When specifying per option (For AMS, WMS, SMS, and AMS2000)</td>
</tr>
</tbody>
</table>
The following option table details options when specifying per option (For AMS, WMS, SMS, and AMS 2000).

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-set</td>
<td>Sets the target options.</td>
</tr>
<tr>
<td>-HP ctl_no port_no</td>
<td>Specify whether to set the HP-UX Mode effective or ineffective.</td>
</tr>
<tr>
<td>target_no enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>port_no : Port number (A, B, E, F).</td>
</tr>
<tr>
<td></td>
<td>target_no: Target number.</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the HP-UX Mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the HP-UX Mode.</td>
</tr>
<tr>
<td>-PSUEReadReject</td>
<td>Specify whether to set the PSUE Read Reject Mode effective or ineffective.</td>
</tr>
<tr>
<td>ctl_no port_no target_no enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>port_no : Port number (A, B, E, F).</td>
</tr>
<tr>
<td></td>
<td>target_no: Target number.</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the PSUE Read Reject Mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the PSUE Read Reject Mode.</td>
</tr>
<tr>
<td>-NACA ctl_no port_no</td>
<td>Specify whether to set the NACA mode effective or ineffective.</td>
</tr>
<tr>
<td>target_no enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>port_no : Port number (A, B, E, F).</td>
</tr>
<tr>
<td></td>
<td>target_no: Target number.</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the NACA Mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the NACA Mode.</td>
</tr>
<tr>
<td>-UniqueReserve1</td>
<td>Specify whether to set the Unique Reserve Mode 1 effective or ineffective.</td>
</tr>
<tr>
<td>ctl_no port_no target_no enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>port_no : Port number (A, B, E, F).</td>
</tr>
<tr>
<td></td>
<td>target_no: Target number.</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the Unique Reserve Mode 1.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the Unique Reserve Mode 1.</td>
</tr>
<tr>
<td>-PIDConv ctl_no port_no</td>
<td>Specify whether to set the Port-ID Conversion mode effective or ineffective.</td>
</tr>
<tr>
<td>target_no enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>port_no : Port number (A, B, E, F).</td>
</tr>
<tr>
<td></td>
<td>target_no: Target number.</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the Port-ID Conversion mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the Port-ID Conversion mode.</td>
</tr>
<tr>
<td>-TruCluster ctl_no port_no</td>
<td>Specify whether to set the Tru Cluster Connection mode effective or ineffective.</td>
</tr>
<tr>
<td>target_no enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>port_no : Port number (A, B, E, F).</td>
</tr>
<tr>
<td></td>
<td>target_no: Target number.</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the Tru Cluster Connection mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the Tru Cluster Connection mode.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>-SerialResponse</td>
<td>Specify whether to set the Product Serial Response Mode effective or ineffective.</td>
</tr>
<tr>
<td>-SameNodeName</td>
<td>Specify whether to set the Same Node Name mode effective or ineffective.</td>
</tr>
<tr>
<td>-CCHS</td>
<td>Specify whether to set the CCHS convert mode effective or ineffective.</td>
</tr>
<tr>
<td>-SvolDisableAdvanced</td>
<td>Specify whether to set the S-VOL Disable Advanced Mode effective or ineffective.</td>
</tr>
</tbody>
</table>
The following option table details options when specifying per option (For AMS and WMS).

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-UASuppress</td>
<td>Specify whether or not to suppress a unit attention (06/2A00).</td>
</tr>
</tbody>
</table>
| ctl_no port_no target_no enable | ctl_no : Controller number (0, 1).  
port_no : Port number (A, B).  
target_no: Target number.  
enable : Suppress the unit attention.  
disable : Does not suppress the unit attention. |
| -HISUPOff            | Specify whether to set the HISUP OFF Mode effective or ineffective.                                                                                                                                          |
| ctl_no port_no target_no enable | ctl_no : Controller number (0, 1).  
port_no : Port number (A, B).  
target_no: Target number.  
enable : Enables the HISUP OFF Mode.  
disable : Disables the HISUP OFF Mode. |
| -ResetPropagation    | Specify whether to set the Reset Propagation Mode effective or ineffective.                                                                                                                                   |
| ctl_no port_no target_no enable | ctl_no : Controller number (0, 1).  
port_no : Port number (A, B).  
target_no: Target number.  
enable : Enables the Reset Propagation Mode.  
disable : Disables the Reset Propagation Mode. |
| -ASLReportAPG        | Specify whether to set the ASL Report Mode (Active/Passive Group) effective or ineffective.                                                                                                                  |
| ctl_no port_no target_no enable | ctl_no : Controller number (0, 1).  
port_no : Port number (A, B).  
target_no: Target number.  
enable : Enables the ASL Report Mode (Active/Passive Group).  
disable : Disables the ASL Report Mode (Active/Passive Group). |
| -ASLReportAA          | Specify whether to set the ASL Report Mode (Active/Passive) effective or ineffective.                                                                                                                     |
| ctl_no port_no target_no enable | ctl_no : Controller number (0, 1).  
port_no : Port number (A, B).  
target_no: Target number.  
enable : Enables the ASL Report Mode (Active/Passive).  
disable : Disables the ASL Report Mode (Active/Passive). |
The following option table details options when specifying per option (For SMS and AMS 2000).

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| -ASLReportAA ctl_no port_no target_no enable | Specify whether to set the ASL Report Mode (Active/Active) effective or ineffective.  
  *ctl_no*: Controller number (0, 1).  
  *port_no*: Port number (A, B).  
  *target_no*: Target number.  
  *enable*: Enables the ASL Report Mode (Active/Active).  
  *disable*: Disables the ASL Report Mode (Active/Active). |
| -PIDNoRep ctl_no port_no target_no enable | Specify whether to set the Port-ID No Report mode effective or ineffective.  
  *ctl_no*: Controller number (0, 1).  
  *port_no*: Port number (A, B).  
  *target_no*: Target number.  
  *enable*: Enables the Port-ID No Report mode.  
  *disable*: Disables the Port-ID No Report mode. |
| -SPC2 ctl_no port_no target_no enable | Specify whether to set the Tru Cluster Connection mode effective or ineffective.  
  *ctl_no*: Controller number (0, 1).  
  *port_no*: Port number (A, B).  
  *target_no*: Target number.  
  *enable*: Enables the SPC-2 Mode.  
  *disable*: Disables the SPC-2 Mode. |
| -ModeParamChanged ctl_no port_no target_no enable | Specify whether to set the Mode Parameters Changed Notification Mode effective or ineffective.  
  *ctl_no*: Controller number (0, 1).  
  *port_no*: Port number (A, B, E, F).  
  *target_no*: Target number.  
  *enable*: Enables the Mode Parameters Changed Notification Mode.  
  *disable*: Disables the Mode Parameters Changed Notification Mode. |
| -TaskIsolation ctl_no port_no target_no enable | Specify whether to set the Task Management Isolation Mode effective or ineffective.  
  *ctl_no*: Controller number (0, 1).  
  *port_no*: Port number (A, B, E, F).  
  *target_no*: Target number.  
  *enable*: Enables the Task Management Isolation Mode.  
  *disable*: Disables the Task Management Isolation Mode. |
The following option table details options when specifying per target
(For AMS 2000 only). 

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-InquirySerial  ctl_no</td>
<td>Specify whether to set the Inquiry Serial Number</td>
</tr>
<tr>
<td>port_no target_no</td>
<td>Conversion Mode effective or ineffective.</td>
</tr>
<tr>
<td>enable</td>
<td>disable</td>
</tr>
<tr>
<td>-NOPInSuppress   ctl_no</td>
<td>Specify whether to set the NOP-In Suppress Mode</td>
</tr>
<tr>
<td>port_no target_no</td>
<td>effective or ineffective.</td>
</tr>
<tr>
<td>enable</td>
<td>disable</td>
</tr>
<tr>
<td>-DiscoveryCHAP  ctl_no</td>
<td>Specify whether to set the Discovery CHAP Mode</td>
</tr>
<tr>
<td>port_no target_no</td>
<td>effective or ineffective.</td>
</tr>
<tr>
<td>enable</td>
<td>disable</td>
</tr>
<tr>
<td>-platform</td>
<td>Specify the Platform</td>
</tr>
<tr>
<td>NotSpecified</td>
<td>HP</td>
</tr>
<tr>
<td>NotSpecified: not specified</td>
<td>HP : HP-UX</td>
</tr>
<tr>
<td>-middleware</td>
<td>Specify the Middleware.</td>
</tr>
<tr>
<td>NotSpecified</td>
<td>VCS</td>
</tr>
<tr>
<td>NotSpecified: not specified</td>
<td>VCS : VCS</td>
</tr>
</tbody>
</table>
### CLI command list

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>-UniqueWriteSame</strong>&lt;br&gt;**ctl_no port_no target_no enable</td>
<td>disable**&lt;br&gt;&lt;br&gt;Specify whether to set the Unique Write Same Mode effective or ineffective.&lt;br&gt;&lt;br&gt;- <code>ctl_no</code>: Controller number (0, 1).&lt;br&gt;- <code>port_no</code>: Port number (A, B, E, F).&lt;br&gt;- <code>target_no</code>: Target number.&lt;br&gt;- <code>enable</code>: Enables the Unique Extended COPY Mode.&lt;br&gt;- <code>disable</code>: Disables the Unique Extended COPY Mode.</td>
</tr>
<tr>
<td><strong>-set ctl_no port_no</strong>&lt;br&gt;&lt;br&gt;Sets the target options.&lt;br&gt;- <code>ctl_no</code>: Controller number (0, 1).&lt;br&gt;- <code>port_no</code>: Port number (A, B, E, F).</td>
<td></td>
</tr>
<tr>
<td><strong>-tno target_no</strong>&lt;br&gt;&lt;br&gt;Specify the target number.&lt;br&gt;- <code>target_no</code>: Target number</td>
<td></td>
</tr>
<tr>
<td><strong>-talias target_alias</strong>&lt;br&gt;&lt;br&gt;Specify the target alias.&lt;br&gt;Space in front and in the rear of the character string is removed.&lt;br&gt;Cannot specify spaces only.</td>
<td></td>
</tr>
<tr>
<td><strong>-HostConnection</strong>&lt;br&gt;- <code>standard</code>: Open system emulation mode&lt;br&gt;- <code>OpenVMS</code>: Open VMS mode&lt;br&gt;- <code>TRESPASS</code>: TRESPASS mode&lt;br&gt;- <code>WolfPack</code>: WolfPack mode&lt;br&gt;&lt;br&gt;Specify the mode to be emulated.</td>
<td></td>
</tr>
<tr>
<td>**-HP enable</td>
<td>disable**&lt;br&gt;&lt;br&gt;Specify whether to set the HP-UX Mode effective or ineffective.&lt;br&gt;- <code>enable</code>: Enables the HP-UX Mode.&lt;br&gt;- <code>disable</code>: Disables the HP-UX Mode.</td>
</tr>
<tr>
<td>**-PSUEReadReject enable</td>
<td>disable**&lt;br&gt;&lt;br&gt;Specify whether to set the PSUE Read Reject Mode effective or ineffective.&lt;br&gt;- <code>enable</code>: Enables the PSUE Read Reject Mode.&lt;br&gt;- <code>disable</code>: Disables the PSUE Read Reject Mode.</td>
</tr>
<tr>
<td>**-NACA enable</td>
<td>disable**&lt;br&gt;&lt;br&gt;Specify whether to set the NACA mode effective or ineffective.&lt;br&gt;- <code>enable</code>: Enables the NACA Mode.&lt;br&gt;- <code>disable</code>: Disables the NACA mode.</td>
</tr>
<tr>
<td>**-ResetPropagation enable</td>
<td>disable**&lt;br&gt;&lt;br&gt;Specify whether to set the Reset Propagation Mode effective or ineffective.&lt;br&gt;- <code>enable</code>: Enables the Reset Propagation Mode.&lt;br&gt;- <code>disable</code>: Disables the Reset Propagation Mode.</td>
</tr>
<tr>
<td>**-UniqueReserve1 enable</td>
<td>disable**&lt;br&gt;&lt;br&gt;Specify whether to set the Unique Reserve Mode 1 effective or ineffective.&lt;br&gt;- <code>enable</code>: Enables the Unique Reserve Mode 1.&lt;br&gt;- <code>disable</code>: Disables the Unique Reserve Mode 1.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| -PIDConv enable | disable | Specify whether to set the Port-ID Conversion mode effective or ineffective.  
|                        | enable  | Enables the Port-ID Conversion mode.                                      |
|                        | disable | Disables the Port-ID Conversion mode.                                     |
| -TruCluster enable | disable | Specify whether to set the Tru Cluster Connection mode effective or ineffective.  
|                        | enable  | Enables the Tru Cluster Connection mode.                                  |
|                        | disable | Disables the Tru Cluster Connection mode.                                 |
| -SerialResponse enable | disable | Specify whether to set the Product Serial Response Mode effective or ineffective.  
|                        | enable  | Enables the Product Serial Response Mode.                                 |
|                        | disable | Disables the Product Serial Response Mode.                                |
| -SameNodeName enable | disable | Specify whether to set the Same Node Name mode effective or ineffective.  
|                        | enable  | Enables the Same Node Name mode.                                          |
|                        | disable | Disables the Same Node Name mode.                                         |
| -CCHS enable | disable | Specify whether to set the Same Node Name mode effective or ineffective.  
|                        | enable  | Enables the Same Node Name mode.                                          |
|                        | disable | Disables the Same Node Name mode.                                         |
| -SvolDisableAdvance enable | disable | Specify whether to set the S-VOL Disable Advanced Mode effective or ineffective.  
|                        | enable  | Enables the S-VOL Disable Advanced Mode.                                  |
|                        | disable | Disables the S-VOL Disable Advanced Mode.                                 |
| -UASuppress enable | disable | Specify whether or not to suppress a unit attention (06/2A00).             
|                        | enable  | Suppress the unit attention.                                              |
|                        | disable | Does not suppress the unit attention.                                     |

The following option table details options when specifying per target (For AMS and WMS).
The following option table details options when specifying per target (For SMS and AMS 2000).

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-HISUOff enable</td>
<td>Specify whether to set the HISUP OFF Mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the HISUP OFF Mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the HISUP OFF Mode.</td>
</tr>
<tr>
<td>-ASLReportAPG</td>
<td>Specify whether to set the ASL Report Mode (Active/Passive Group) effective or ineffective.</td>
</tr>
<tr>
<td>enable</td>
<td>enable : Enables the ASL Report Mode (Active/Passive Group).</td>
</tr>
<tr>
<td>disable</td>
<td>disable : Disables the ASL Report Mode (Active/Passive Group).</td>
</tr>
<tr>
<td>-ASLReportAP</td>
<td>Specify whether to set the ASL Report Mode (Active/Passive) effective or ineffective.</td>
</tr>
<tr>
<td>enable</td>
<td>enable : Enables the ASL Report Mode (Active/Passive).</td>
</tr>
<tr>
<td>disable</td>
<td>disable : Disables the ASL Report Mode (Active/Passive).</td>
</tr>
<tr>
<td>-ASLReportAA</td>
<td>Specify whether to set the ASL Report Mode (Active/Active) effective or ineffective.</td>
</tr>
<tr>
<td>enable</td>
<td>enable : Enables the ASL Report Mode (Active/Active).</td>
</tr>
<tr>
<td>disable</td>
<td>disable : Disables the ASL Report Mode (Active/Active).</td>
</tr>
<tr>
<td>-PIDNoRep enable</td>
<td>Specify whether to set the Port-ID No Report mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the Port-ID No Report mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the Port-ID No Report mode.</td>
</tr>
<tr>
<td>-SPC2 enable</td>
<td>Specify whether to set the SPC-2 Mode effective or ineffective.</td>
</tr>
<tr>
<td>disable</td>
<td>enable : Enables the SPC-2 Mode.</td>
</tr>
<tr>
<td></td>
<td>disable : Disables the SPC-2 Mode.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><code>ModeParamChange</code> enable</td>
<td>Specify whether to set the Mode Parameters Changed Notification Mode effective or ineffective.</td>
</tr>
<tr>
<td><code>TaskIsolation</code> enable</td>
<td>Specify whether to set the Task Management Isolation Mode effective or ineffective.</td>
</tr>
<tr>
<td><code>InquirySerial</code> enable</td>
<td>Specify whether to set the Inquiry Serial Number Conversion Mode effective or ineffective.</td>
</tr>
<tr>
<td><code>NOPInSuppress</code> enable</td>
<td>Specify whether to set the NOP-In Suppress Mode effective or ineffective.</td>
</tr>
<tr>
<td><code>Discovery/CHAP</code> enable</td>
<td>Specify whether to set the Discovery CHAP Mode effective or ineffective.</td>
</tr>
<tr>
<td><code>ReportFullPortalList</code> <code>ctl_no</code> <code>port_no</code> <code>target_no</code> enable</td>
<td>Specify whether to set the Report (iSCSI Full Portal List Mode effective or ineffective.</td>
</tr>
</tbody>
</table>
The following option table details options when specifying per target (AMS 2000 only)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-UACchange ctl_no port_no group_no</td>
<td>Specify whether to set the Unit Attention Change Mode effective or ineffective.</td>
</tr>
<tr>
<td>enable</td>
<td>disable</td>
</tr>
<tr>
<td>ctl_no : Controller number (0, 1).</td>
<td></td>
</tr>
<tr>
<td>port_no : Port number (A, B, E, F).</td>
<td></td>
</tr>
<tr>
<td>group_no : Host group number.</td>
<td></td>
</tr>
<tr>
<td>enable : Enables the Unit Attention Change Mode.</td>
<td></td>
</tr>
<tr>
<td>disable : Disables the Unit Attention Change Mode.</td>
<td></td>
</tr>
<tr>
<td>-UniqueExtendedCOPY enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>-UniqueWriteSame enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>-set ctl_no port_no</td>
<td>Sets the target options.</td>
</tr>
<tr>
<td>ctl_no : Controller number (0, 1).</td>
<td></td>
</tr>
<tr>
<td>port_no : Port number (A, B, E, F).</td>
<td></td>
</tr>
<tr>
<td>-tno target_no</td>
<td>Specify the target number.</td>
</tr>
<tr>
<td>target_no: Target number</td>
<td></td>
</tr>
<tr>
<td>-talias target_alias</td>
<td>Specify the target alias. Space in front and in the rear of the character string is removed. Cannot specify spaces only.</td>
</tr>
<tr>
<td>target_alias: Target alias (See Note 1)</td>
<td></td>
</tr>
<tr>
<td>-HostConnection standard</td>
<td>OpenVMS</td>
</tr>
<tr>
<td>standard: Open system emulation mode</td>
<td></td>
</tr>
<tr>
<td>OpenVMS: Open VMS mode</td>
<td></td>
</tr>
<tr>
<td>TRESPASS: TRESPASS mode</td>
<td></td>
</tr>
<tr>
<td>WolfPack: WolfPack mode</td>
<td></td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| -HP enable | disable | Specify whether to set the HP-UX Mode effective or ineffective. | enable : Enables the HP-UX Mode.  
disable : Disables the HP-UX Mode. |
| -PSUEReadReject enable | disable | Specify whether to set the PSUE Read Reject Mode effective or ineffective. | enable : Enables the PSUE Read Reject Mode.  
disable : Disables the PSUE Read Reject Mode. |
| -NACA enable | disable | Specify whether to set the NACA mode effective or ineffective. | enable : Enables the NACA mode.  
disable : Disables the NACA mode. |
| -UniqueReserve1 enable | disable | Specify whether to set the Unique Reserve Mode 1 effective or ineffective. | enable : Enables the Unique Reserve Mode 1.  
disable : Disables the Unique Reserve Mode 1. |
| -PIDConv enable | disable | Specify whether to set the Port-ID Conversion mode effective or ineffective. | enable : Enables the Port-ID Conversion mode.  
disable : Disables the Port-ID Conversion mode. |
| -TruCluster enable | disable | Specify whether to set the Tru Cluster Connection mode effective or ineffective. | enable : Enables the Tru Cluster Connection mode.  
disable : Disables the Tru Cluster Connection mode. |
| -SerialResponse enable | disable | Specify whether to set the Product Serial Response Mode effective or ineffective. | enable : Enables the Product Serial Response Mode.  
disable : Disables the Product Serial Response Mode. |
| -SameNodeName enable | disable | Specify whether to set the Same Node Name mode effective or ineffective. | enable : Enables the Same Node Name mode.  
disable : Disables the Same Node Name mode. |
| -CCHS enable | disable | Specify whether to set the CCHS convert mode effective or ineffective. | enable : Enables the CCHS convert mode.  
disable : Disables the CCHS convert mode. |
The following option table details options when specifying per target (For AMS and WMS).

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-SvolDisableAdvanced</td>
<td>Specify whether to set the S-VOL Disable Advanced Mode effective or ineffective.</td>
</tr>
</tbody>
</table>
| enable | disable | enable : Enables the S-VOL Disable Advanced Mode.  
disable : Disables the S-VOL Disable Advanced Mode. |
| -HISUPOff              | Specify whether to set the HISUP OFF Mode effective or ineffective.          |
| enable | disable | enable : Enables the HISUP OFF Mode.  
disable : Disables the HISUP OFF Mode. |
| -ResetPropagation      | Specify whether to set the Reset Propagation Mode effective or ineffective.  |
| enable | disable | enable : Enables the Reset Propagation Mode.  
disable : Disables the Reset Propagation Mode. |
| -ASLReportAPG          | Specify whether to set the ASL Report Mode (Active/Passive Group) effective or ineffective. |
| enable | disable | enable : Enables the ASL Report Mode (Active/Passive Group).  
disable : Disables the ASL Report Mode (Active/Passive Group). |
| -ASLReportAP           | Specify whether to set the ASL Report Mode (Active/Passive) effective or ineffective. |
| enable | disable | enable : Enables the ASL Report Mode (Active/Passive).  
disable : Disables the ASL Report Mode (Active/Passive). |
| -ASLReportAA           | Specify whether to set the ASL Report Mode (Active/Active) effective or ineffective. |
| enable | disable | enable : Enables the ASL Report Mode (Active/Active).  
disable : Disables the ASL Report Mode (Active/Active). |
| -PIDNoRep              | Specify whether to set the Port-ID No Report mode effective or ineffective. |
| enable | disable | enable : Enables the Port-ID No Report mode.  
disable : Disables the Port-ID No Report mode. |
Example

The following example displays the target options of an array ams500.

```
% autargetopt -unit ams500 -refer
Port 0A Target  000:T000
  Host Connection Mode 1 = Standard Mode
  Host Connection Mode 2
  HP-UX Mode = OFF
  PSUE Read Reject Mode = OFF
  UA(06/2A00) suppress Mode = OFF
  NACA Mode = OFF
  HISUP OFF Mode = ON
  Reset Propagation Mode = OFF
  Unique Reserve Mode 1 = OFF
  ASL Report Mode(Active/Passive Group) = OFF
  ASL Report Mode(Active/Active) = OFF
  Port-ID No Report Mode = OFF
  Tru Cluster Mode = OFF
  Product Serial Response Mode = OFF
  Same Node Name Mode = OFF
  CCHS Mode = OFF
  SPC-2 Mode = OFF
  S-VOL Disable Advanced Mode = OFF

Port 0B Target  000:T000
  ...

Port 1A Target  000:T000
  ...

Port 1B Target  000:T000
  ...

%```

Note 1: For target alias, less than or equal to 32 ASCII characters (alphabetic characters, numerals, and the following symbols) can be used.

(,!,$,%,&,+,.,-,=,@,^,_,{,},~,(,),[,[,],(space))

Note 2: -platform and -middleware option and each target group option can also be specified at the same time.
Referencing/setting iSCSI target mapping information

Command name

autargetmap

Format

AMS, WMS, SMS, AMS2000, HUS100
autargetmap -unit unit_name -refer
When specifying target number.
autargetmap -unit unit_name -add ctl_no port_no target_no hlu lu
autargetmap -unit unit_name -chg ctl_no port_no target_no hlu lu
autargetmap -unit unit_name -rm ctl_no port_no target_no hlu lu
When specifying target number or target alias.
autargetmap -unit unit_name -add ctl_no port_no
-tno target_no | -talias target_alias -hlu hlu -lu lu
autargetmap -unit unit_name -chg ctl_no port_no
-tno target_no | -talias target_alias -hlu hlu -lu lu
autargetmap -unit unit_name -rm ctl_no port_no
-tno target_no | -talias target_alias -hlu hlu -lu lu
autargetmap -unit unit_name -MappingMode on | off
autargetmap -unit unit_name -availablelist ctl_no port_no
-tno target_no | -talias target_alias -hlu | -lu

Description

This command references or sets the iSCSI target mapping information.

NOTE: At the Windows 98 MS-DOS prompt, the input buffer is up to 128 characters by default. Use the options, -inamefile and -tuserfile, when a long iSCSI name or target user name is specified. The first line of the specified file is set for iSCSI name or target user name, and the second line and the following are invalid.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of the array unit for which to reference or set the NAS user LU. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the NAS user LU.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>-MappingMode on</td>
<td>Specifies whether to set the Mapping mode effective or ineffective.</td>
</tr>
<tr>
<td>-MappingMode on</td>
<td>A list of LUNs or H-LUNs, each of which is eligible for the mapping is displayed within the specified controller number, a port number, and a target.</td>
</tr>
<tr>
<td>-hlu</td>
<td>Specify when displaying a list of H-LUNs, each of which is eligible for the mapping.</td>
</tr>
<tr>
<td>-lu</td>
<td>Specify when displaying a list of LUNs, each of which is eligible for the mapping.</td>
</tr>
<tr>
<td>-add ctl_no</td>
<td>Adds the mapping information.</td>
</tr>
<tr>
<td>port_no target_no</td>
<td>Adds the mapping information.</td>
</tr>
<tr>
<td>hlu lu</td>
<td>Adds the mapping information.</td>
</tr>
<tr>
<td>-chg ctl_no</td>
<td>Changes the mapping information.</td>
</tr>
<tr>
<td>port_no target_no</td>
<td>Changes the mapping information.</td>
</tr>
<tr>
<td>hlu lu</td>
<td>Changes the mapping information.</td>
</tr>
<tr>
<td>-rm ctl_no</td>
<td>Deletes the mapping information.</td>
</tr>
<tr>
<td>port_no target_no</td>
<td>Deletes the mapping information.</td>
</tr>
<tr>
<td>hlu lu</td>
<td>Deletes the mapping information.</td>
</tr>
</tbody>
</table>

**Option**

- **-MappingMode on | off**
  Specifies whether to set the Mapping mode effective or ineffective.
  - on: Enables the Mapping mode
  - off: Disables the Mapping mode

- **-MappingMode on | off**
  A list of LUNs or H-LUNs, each of which is eligible for the mapping is displayed within the specified controller number, a port number, and a target.
  - `ctl_no`: Controller number (0, 1)
  - `port_no`: Port number (A, B, E, F)

- **-hlu**
  Specify when displaying a list of H-LUNs, each of which is eligible for the mapping.

- **-lu**
  Specify when displaying a list of LUNs, each of which is eligible for the mapping.

When specifying target number

- **-add ctl_no**
  Adds the mapping information.
  - `ctl_no`: Controller number (0, 1)
  - `port_no`: Port number (A, B, E, F)
  - `target_no`: Target number
  - `hlu`: LU number recognized by the host
  - `lu`: LU number of the array unit

- **-chg ctl_no**
  Changes the mapping information.
  - `ctl_no`: Controller number (0, 1)
  - `port_no`: Port number (A, B, E, F)
  - `target_no`: Target number
  - `hlu`: LU number recognized by the host
  - `lu`: LU number of the array unit

- **-rm ctl_no**
  Deletes the mapping information.
  - `ctl_no`: Controller number (0, 1)
  - `port_no`: Port number (A, B, E, F)
  - `target_no`: Target number
  - `hlu`: LU number recognized by the host
  - `lu`: LU number of the array unit

When specifying target number or target alias

- **-add ctl_no**
  - `ctl_no`: Controller number (0, 1)
  - `port_no`: Port number (A, B, E, F)

- **-chg ctl_no**
  - `ctl_no`: Controller number (0, 1)
  - `port_no`: Port number (A, B, E, F)
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-rm ctl_no port_no</td>
<td>Deletes the mapping information.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ctl_no : Controller number (0, 1)</td>
</tr>
<tr>
<td></td>
<td>port_no : Port number (A, B, E, F)</td>
</tr>
<tr>
<td>-tno target_no</td>
<td>Specify the target number.</td>
</tr>
<tr>
<td></td>
<td>target_no: Target number</td>
</tr>
<tr>
<td>-talias target_alias</td>
<td>Specify the target alias.</td>
</tr>
<tr>
<td></td>
<td>Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td></td>
<td>Cannot specify spaces only.</td>
</tr>
<tr>
<td></td>
<td>target_alias: Target alias (See Note 1)</td>
</tr>
<tr>
<td>-hlu hlu</td>
<td>Specify a LUN to be recognized by a host.</td>
</tr>
<tr>
<td>-lu lu</td>
<td>Specify an internal LUN of the disk array subsystem.</td>
</tr>
</tbody>
</table>

Note 1: For target alias, less than or equal to 32 ASCII characters (alphabetic characters, numerals, and the following symbols) can be used. (!,#,$,%,&,’+,−,=,@,^,_,{,},~,(,),[,(space))

Note 2: -platform and -middleware options and each target option can also be specified at the same time.
Example

The following example displays mapping information of an array ams500.

% autargetmap -unit ams500 -refer
Mapping Mode = ON
Port Target      H-LUN LUN
  0A  000:T000   0  0
  0A  000:T000   1  100
  :  
  0B  000:T000   0  0
  0B  000:T000   1  100
  :  
%

3-272 CLI command list

Hitachi Unified Storage Command Line Interface Reference Guide
NNC parameters

This section covers the following commands related to NNC and MAS parameters:

- Referencing/setting NNC LAN information on page 3-274
- Displaying/setting NAS system volume on page 3-275
- Referencing/setting NAS user volume on page 3-279
- Referencing/shutdown/booting/rebooting NNC on page 3-281

Figure 3-10 shows an example of a connection of the host computer, in which Storage Navigator Modular 2 is installed, and AMS/WMS array to which the NNC option has been added.

Figure 3-10: Example of host computer connection
Referencing/setting NNC LAN information

Command name

\texttt{aunnclan}

Format

AMS, WMS
\texttt{aunnclan -unit unit\_name \{-refer\} \{-set\ -nnc nnc\_no \[-addr inet\_addr \] \[-mask netmask \] \[-mtu num \] \[-nego auto | 100mh | 100mf | 1000m \]}

Description

This command references or sets the NNC LAN information.

\textbf{NOTE:} A cluster becomes a stop state when you change an IP address or subnet mask.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit \texttt{unit_name}</td>
<td>Specify the name of the array unit for which to reference or set the NNC LAN information. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the NNC LAN information.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the NNC LAN information.</td>
</tr>
<tr>
<td>-nnc \texttt{nnc_no}</td>
<td>Specify the NNC number.</td>
</tr>
<tr>
<td>-mask \texttt{netmask}</td>
<td>Specify the subnet masks.</td>
</tr>
<tr>
<td>-mtu \texttt{num}</td>
<td>Specify the MTU.</td>
</tr>
<tr>
<td>-nego auto</td>
<td>Specify the negotiations.</td>
</tr>
<tr>
<td>100mh</td>
<td>100 Mbps/Half</td>
</tr>
<tr>
<td>100mf</td>
<td>100 Mbps/Full</td>
</tr>
<tr>
<td>1000m</td>
<td>1000 Mbps/Full</td>
</tr>
</tbody>
</table>
Example

The following example displays the NNC LAN information of an array ams500.

```bash
% aunnclan -unit ams500 -refer
Password:
Current
NNC IP Address   Subnet Mask   MTU Negotiation Result
0 125.0.9.98     255.255.255.0 16100 Auto Normal
2 125.0.9.99     255.255.255.0 16100 Auto Normal
```

Setting

```bash
% aunnclan -unit ams500 -set -nnc 0 -addr 192.168.100.100 –mtu 16000
Password:
Are you sure you want to set the LAN information of management NNC port?
(y/n [n]): y
This process may affect the providing service of cluster system.
Please note: When the service is provided in management network interface, the service is deleted.
When setting completes, the clustering is stopped. Please contact the system administrator.
Do you want to continue the processing? (y/n [n]): y
The LAN information of management NNC port has been set successfully.
```

Displaying/setting NAS system volume

Command name

`aunassyslu`

Format

AMS, WMS

```bash
aunassyslu -unit unit_name -refer
```

When connecting NNCTYPE1.

```bash
aunassyslu -unit unit_name -set -nnc nnc_no
[ -sys0 lun ] [ -sys1 lun ] [ -dump0 lun ] [ -dump1 lun ]
[ -cmddev lun ] [ -dumpwk lun ] [ -syscom lun ]
[ -backup lun ] [ -backup2 lun ]
```

```bash
aunassyslu -unit unit_name -rm -nnc nnc_no
[ -sys0 ] [ -sys1 ] [ -dump0 ] [ -dump1 ]
[ -cmddev ] [ -dumpwk ] [ -syscom ] [ -backup ] [ -backup2 ]
```

```bash
aunassyslu -unit unit_name -availablelist -nnc nnc_no
-sys0 | -sys1 | -dump0 | -dump1 | -cmddev | -dumpwk | -syscom | -backup | -backup2
```

When connecting NNCTYPE2.

```bash
aunassyslu -unit unit_name -set -nnc nnc_no
[ -sys0 lun ] [ -sys1 lun ] [ -dump0 lun ] [ -dump1 lun ]
[ -cmddev lun ] [ -cmddev2 lun ] [ -syscom lun ]
[ -backup lun ] [ -backup2 lun ]
```

```bash
aunassyslu -unit unit_name -rm -nnc nnc_no
[ -sys0 ] [ -sys1 ] [ -dump0 ] [ -dump1 ]
[ -cmddev ] [ -cmddev2 ] [ -syscom ]
[ -backup ] [ -backup2 ]
```

CLI command list 3-275
**Description**

This command references or sets the NAS system LU.

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of the array unit for which to reference or set the NAS system LU. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the NAS system LU.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the NAS system LU.</td>
</tr>
<tr>
<td>-rm</td>
<td>Releases the NAS system LU.</td>
</tr>
<tr>
<td>-availablelist</td>
<td>Displays a list of LUNs that can be assigned to the NAS system LU.</td>
</tr>
<tr>
<td>-nnc nnc_no</td>
<td>Specify the NNC numbers separating them with a slash (/). Example: -nnc 0/2</td>
</tr>
<tr>
<td>-sys0 lun</td>
<td>Specify an LU number to be assigned to the system disk(CTL0).</td>
</tr>
<tr>
<td>-sys1 lun</td>
<td>Specify an LU number to be assigned to the system disk(CTL1).</td>
</tr>
<tr>
<td>-dump0 lun</td>
<td>Specify an LU number to be assigned to the volume(CTL0) for storing a dump.</td>
</tr>
<tr>
<td>-dump1 lun</td>
<td>Specify an LU number to be assigned to the volume(CTL1) for storing a dump.</td>
</tr>
<tr>
<td>-cmddev lun</td>
<td>Specify an LU number to be assigned to the command device.</td>
</tr>
<tr>
<td>-cmddev2 lun</td>
<td>Specify an LU number to be assigned to the command device (Secondary).</td>
</tr>
<tr>
<td>-dumpwk lun</td>
<td>Specify an LU number to be assigned to the work area for storing a result of the dump edition.</td>
</tr>
<tr>
<td>-syscom lun</td>
<td>Specify an LU number to be assigned to the common volume of the NAS system.</td>
</tr>
<tr>
<td>-backup lun</td>
<td>Specify an LU number to be assigned to a volume for backing up the common volume.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>-backup2 lun</code></td>
<td>When the <code>-rm</code> option is specified: Replaces a volume for backing up 2 the common volume. When the <code>-availablelist</code> option is specified: Displays a list of LUNs that can be assigned to a volume for backing up 2 the common volume.</td>
</tr>
<tr>
<td><code>-sys0</code></td>
<td>When the <code>-rm</code> option is specified: Releases the system disk (CTL0). When the <code>-availablelist</code> option is specified: Displays a list of LUNs that can be assigned to the system disk (CTL0).</td>
</tr>
<tr>
<td><code>-sys1</code></td>
<td>When the <code>-rm</code> option is specified: Releases the system disk (CTL1). When the <code>-availablelist</code> option is specified: Displays a list of LUNs that can be assigned to the system disk (CTL1).</td>
</tr>
<tr>
<td><code>-dump0</code></td>
<td>When the <code>-rm</code> option is specified: Releases the volume (CTL0) for storing a dump. When the <code>-availablelist</code> option is specified: Displays a list of LUNs that can be assigned to the volume (CTL0) for storing a dump.</td>
</tr>
<tr>
<td><code>-dump1</code></td>
<td>When the <code>-rm</code> option is specified: Releases the volume (CTL1) for storing a dump. When the <code>-availablelist</code> option is specified: Displays a list of LUNs that can be assigned to the volume (CTL1) for storing a dump.</td>
</tr>
<tr>
<td><code>-cmddev</code></td>
<td>When the <code>-rm</code> option is specified: Releases the command device. When the <code>-availablelist</code> option is specified: Displays a list of LUNs that can be assigned to the command device.</td>
</tr>
<tr>
<td><code>-cmddev2</code></td>
<td>When the <code>-rm</code> option is specified: Releases the command device (Secondary). When the <code>-availablelist</code> option is specified: Displays a list of LUNs that can be assigned to the command device (Secondary).</td>
</tr>
<tr>
<td><code>-dumpwk</code></td>
<td>When the <code>-rm</code> option is specified: Releases the work area for storing a result of the dump edition. When the <code>-availablelist</code> option is specified: Displays a list of LUNs that can be assigned to the work area for storing a result of the dump edition.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| -syscom | When the `-rm` option is specified:  
Release the common volume of the NAS system.  
When the `-availablelist` option is specified:  
Displays a list of LUNs that can be assigned to the  
common volume of the NAS system. |
| -backup | When the `-rm` option is specified:  
Release a volume for backing up the common volume.  
When the `-availablelist` option is specified:  
Displays a list of LUNs that can be assigned to a volume  
for backing up the common volume. |
| -backup2 | When the `-rm` option is specified:  
Release a volume for backing up 2 the common volume.  
When the `-availablelist` option is specified:  
Displays a list of LUNs that can be assigned to a volume  
for backing up 2 the common volume. |

**Examples**

The following example displays the NAS system LU of an array ams500.

```bash
% aunassyslu -unit ams500 -refer
NNC0/2
System Disk(CTL0) : 0
System Disk(CTL1) : 100
Volume for Dump(CTL0) : 1
Volume for Dump(CTL1) : 101
Command Device : 5
Working Area for Dump : 6
System Common Volume : 8
Backup Volume for Common : 9
Backup Volume for Common 2 : 10
%
```

The following example sets the NAS system LU of an array ams500.

```bash
% aunassyslu -unit ams500 -set -nnc 0/2 -sys0 0 -dump0 1 -sys1 100 -dump1 101 -cmddev 5
 -dumpwk 6 -syscom 8 -backup 9 -backup2 10
Password:
Are you sure you want to set the system LU? (y/n [n]): y
The system LU has been set successfully.
%
```

The following example displays the NAS system LU of an array ams500.

```bash
% aunassyslu -unit ams500 -availablelist -nnc 0/2 -sys0
Password:
Available Logical Units
LUN Capacity   RAID Group RAID Level D-CTL C-CTL Type Status
 0 11.0 Gbyte   0 5(4D+1P) 0 0 FC Normal
 22 20.0 Gbyte   0 5(4D+1P) 0 0 FC Normal
%
```
Referencing/setting NAS user volume

Command name

aunasuserlu

Format

AMS, WMS
aunasuserlu -unit unit_name -refer
aunasuserlu -unit unit_name -add -nnc nnc_no hlu lu
aunasuserlu -unit unit_name -chg -nnc nnc_no hlu lu
aunasuserlu -unit unit_name -rm -nnc nnc_no hlu lu
aunasuserlu -unit unit_name -availablelist -nnc nnc_no -hlu | -lu

Description

This command references or sets the NAS user LU.
Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <em>unit_name</em></td>
<td>Specify the name of the array unit for which to reference or set the NAS user LU. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the NAS user LU.</td>
</tr>
<tr>
<td>-add</td>
<td>Sets the NAS user LU.</td>
</tr>
<tr>
<td>-chg</td>
<td>Changes the NAS user LU.</td>
</tr>
<tr>
<td>-rm</td>
<td>Deletes the NAS user LU.</td>
</tr>
<tr>
<td>-availablelist</td>
<td>Displays a list of H-LUNs or LUNs that can be assigned to the NAS user LU.</td>
</tr>
</tbody>
</table>
| -nnc nnc_no hlu lu | When the -add option is specified: Specify the H-LUN and LU to be set. When the -chg option is specified: Specify the H-LUN and LU to be changed. When the -rm option is specified: Specify the H-LUN and LU to be deleted. 
- *nnc_no*: Specify the NNC numbers separating them with a slash (/). Example: -nnc 0/2 
- *hlu*: Specify a LUN to be recognized by a host. 
- *lu*: Specify an internal LUN of the disk array subsystem. |
| -nnc nnc_no        | Specify the NNC numbers. 
- *nnc_no*: Specify the NNC numbers separating them with a slash (/). Example: -nnc 0/2 |
| -hlu               | Displays a list of H-LUNs that can be assigned to the NAS user LU. |
| -lu                | Displays a list of LUNs that can be assigned to the NAS user LU. |

Examples

The following example displays the NAS user LU of an array ams500.

```
% aunasuserlu -unit ams500 -refer
NNCO/2
H-LUN LUN
  0  20
  0  21
%
```

The following example sets the NAS user LU of an array ams500.
% aunasuserlu -unit ams500 -add -nnc 0/2 0 100
Password:
Are you sure you want to add the user LU?
(y/n [n]): y
The user LU has been set successfully.
%
The following example changes the NAS user LU of an array ams500.

% aunasuserlu -unit ams500 -chg -nnc 0/2 0 100
Password:
Are you sure you want to change the user LU?
(y/n [n]): y
The user LU has been changed successfully.
%
The following example deletes the NAS user LU of an array ams500.

% aunasuserlu -unit ams500 -rm -nnc 0/2 0 100
Password:
Are you sure you want to release the user LU?
(y/n [n]): y
The user LU has been released successfully.
%
The following example displays the NAS host LU of an array ams500.

% aunasuserlu -unit ams500 -availablelist -nnc 0/2 -hlu
Password:
Available H-LUN
  2   3   4   5   6   7   8   9   10   11   12   13   14   15
  248 249 250 251 252 253 254 255
%
The following example displays the NAS LU of an array ams500.

% aunasuserlu -unit ams500 -availablelist -nnc 0/2 -lu
Password:
Available Logical Units
  LUN Capacity     RAID Group RAID Level  D-CTL C-CTL Type Status
  22  20.0 Gbyte      0     5( 4D+1P)     0     0 FC  Normal
%

Referencing/shutdown/booting/rebooting NNC

Command name

aunnc

Format

AMS, WMS
  aunnc  -unit unit_name  --refer
  aunnc  -unit unit_name  --shutdown  -nnc  nnc_no
  aunnc  -unit unit_name  --boot  -nnc nnc_no
  aunnc  -unit unit_name  --reboot  -nnc nnc_no

Description

This command references the status of the NNC or Shutdown/Booting/Rebooting the NNC.
### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of the array unit for which to reference the status of the NNC or shutdown/booting/rebooting the NNC. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus), &quot;_ (underline), &quot;. (period), &quot;@&quot;, or &quot; (space)&quot;. Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the status of the NNC.</td>
</tr>
<tr>
<td>-shutdown</td>
<td>Shut downs the NNC.</td>
</tr>
<tr>
<td>-boot</td>
<td>Boots the NNC.</td>
</tr>
<tr>
<td>-reboot</td>
<td>Reboots the NNC.</td>
</tr>
<tr>
<td>-nnc nnc_no</td>
<td>Specify the NNC number.</td>
</tr>
</tbody>
</table>
Examples

The following example displays the status of the NNC of an array ams500.

```
% aunnc -unit ams500 -refer
NNC Status
 0  ACTIVE
 2  WARN
%
```

Table 3-17: Status of NNC

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTIVE</td>
<td>NAS OS is active and the Node is in operation.</td>
</tr>
<tr>
<td>BOOT</td>
<td>NAS OS is in boot process.</td>
</tr>
<tr>
<td>DISUSE</td>
<td>Controller is blocked.</td>
</tr>
<tr>
<td>DOWN</td>
<td>NAS OS has abnormally stopped.</td>
</tr>
<tr>
<td>DUMP</td>
<td>A NAS Dump is being collected.</td>
</tr>
<tr>
<td>HUNGUP</td>
<td>NAS OS is hung-up.</td>
</tr>
<tr>
<td>INACTIVE</td>
<td>NAS OS is in operation and the Node is stopped.</td>
</tr>
<tr>
<td>INST</td>
<td>NAS OS is in installation process.</td>
</tr>
<tr>
<td>NEW</td>
<td>NAS OS is not installed.</td>
</tr>
<tr>
<td>SHUTDOWN</td>
<td>NAS OS is in shutdown process.</td>
</tr>
<tr>
<td>STOP</td>
<td>NAS OS is normally stopped.</td>
</tr>
<tr>
<td>WARN</td>
<td>NAS Manager is not installed, or NAS OS is in operation and the status of the Node is unknown.</td>
</tr>
</tbody>
</table>

NOTE: When you shutdown or reboot the NNC, just after the array powers ON or cluster starts from the NAS Manager, you must shutdown or reboot the NNC after the following confirmation.

The cluster status is “ACTIVE”, and the resource group status is “Online” or “Offline”.

When shutting down or rebooting the NNC and the NNC is not in the above situation, it is possible that the cluster setting and resource group setting cannot be execute normally.
(Example: When executing the cluster stop from the NAS Manager that is connected to the NNC, which has not shut down or rebooted the NNC, it is possible that the cluster stop is not finished.) In this case, reboot the NNC, which has not shut down or rebooted the NNC from Storage Navigator Modular 2.
The following example shuts down the NNC of an array ams500.

```
% aunnc -unit ams500 -shutdown -nnc 0
Password:
Are you sure want to shut down the NNC0?
(y/n [n]): y
Please confirm the status of the cluster and resource group after the cluster is starting.
If you execute this operation when the cluster and resource group are not available, it is possible to not set the cluster and resource group after that.
Do you want to continue processing? (y/n [n]): y
While NAS OS is active, this setting may affect the provided service.
Do you want to continue processing? (y/n [n]): y
After the clustering, this setting may affect the provided service.
Do you want to continue processing? (y/n [n]): y
The shutdown of NNC0 has been required.
%
```

There is no difference between boot and reboot operations.

Do not specify anything for the boot option.

The following example boots the NNC of an array ams500.

```
% aunnc -unit ams500 -boot -nnc 0
Password:
Are you sure want to boot the NNC0?
(y/n [n]): y
The boot of NNC0 has been required.
%
```

The following example reboots the NNC of an array ams500.

```
% aunnc -unit ams500 -reboot -nnc 0
Password:
Are you sure want to reboot the NNC0?
(y/n [n]): y
Please confirm the status of the cluster and resource group after the cluster is starting.
If you execute this operation when the cluster and resource group are not available, it is possible to not set the cluster and resource group after that.
Do you want to continue processing? (y/n [n]): y
While NAS OS is active, this setting may affect the provided service.
Do you want to continue processing? (y/n [n]): y
After the clustering, this setting may affect the provided service.
Do you want to continue processing? (y/n [n]): y
The reboot of NNC0 has been required.
%
```
Monitoring errors

This section covers the following commands related to monitoring errors:

- Setting the starting of the application on page 3-286
- Monitoring errors on page 3-287
- Referencing/setting the monitoring error options on page 3-295
Setting the starting of the application

Command name

auextprog

Format

9500V, AMS, WMS, SMS, AMS2000, HUS100
auextprog -refer
auextprog -set command
auextprog -test

Description

This command sets up an external program that is executed when an error is detected while monitoring errors.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-refer</td>
<td>Displays (references) the external program setup.</td>
</tr>
<tr>
<td>-set command</td>
<td>Sets up an external program that is executed when an error is detected while monitoring errors.</td>
</tr>
<tr>
<td>-test</td>
<td>Starts an external program specified by the -set option.</td>
</tr>
</tbody>
</table>

Examples

The following example sets up the application “go” to be executed.

% auextprog -set go
%

The following example displays the application setup to be executed.

% auextprog -refer
Application Name : go
%

3-286 CLI command list

Hitachi Unified Storage Command Line Interface Reference Guide
Monitoring errors

Command name

auerroralert

Format

9500V, AMS, WMS, SMS, AMS2000,HUS100
auerroralert [-time uptime] [-prog every | once] [-nodisp]
[-item [ alert | dpconsumed ]]

Description

This command monitors an array subject to monitoring (an array registered by specifying the -watch option) for errors. While monitoring the errors, the word “Executing” indicating that the monitoring is in execution, and the information on failures that are detected by the error monitor are displayed. The contents of failure information displayed are the same as those of messages output to a log file. The word “Executing” indicating that the monitoring is in execution is displayed repeatedly, and the time for which monitoring is in execution is updated and will be displayed on the same line.

To stop monitoring for errors, forcibly terminate the process (e.g. press the Ctrl + c keys).

In the case of the AMS/WMS, a failure that occurs in a different part is treated as a different failure though the model of the part is the same.

Error monitoring starts the monitoring from the status at the time of the start. When error monitoring is restarted, the status of the previous error monitoring is not retained.

The target OS of the event log output is Windows, and target array unit of the event log output is AMS2000/HUS100.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-time uptime</td>
<td>Specify the time interval at which to monitor the errors. Specify the value in the range of 1 to 720 minutes. If omitted, the error is monitored only once.</td>
</tr>
</tbody>
</table>
The following example monitors errors at an interval of 10 minutes. During error monitoring, a battery failure was detected in an array 9500a1.

% auerroralert  -time 1
Mon, May 01 10:10:00 2002 Executing.
Mon, May 01 10:30:00 2002 /9500a1/ARRAY Battery Alarm.
Mon, May 01 10:40:00 2002 Executing.

When a failure is detected in the array and error monitoring is executed, the function outputs the failure information to a log file.

When you want to test an event log on Windows, specify the -test and -eventlog options.

% auerroralert  -test -eventlog
Confirm test log in Event Viewer.
The log file is output with file name: `errlog.txt` and in a text file format, onto a path setup by the `STONAVM_HOME` environmental variable. The file format is shown in the following example.

The log file is output with file name: `errlog.txt` and in a text file format, onto a path setup by the `STONAVM_HOME` environmental variable. The file format is shown in the following example.

The output size of a log file is up to 520 k bytes. When the log information exceeds the limit, the log file is renamed to "errlog.txt.pre" and a log file "errlog.txt" is newly created.

The string "--- end ---" comes at the end of log information output. If the log information surpasses its limit again, the existing log file "errlog.txt" is replaced with "errlog.pre.txt" and then a new log file "errlog.txt" is created again.

**NOTE:** The failure detection time is a time of the clock on a personal computer or Server/Workstation in which Storage Navigator Modular 2 has been installed.

The log information to be output reports the failure part using a message text. The format of message text is shown below.

```
Day, Mon.dd hh:mm:ss yyyy/DF name/message text
```

- **Day:** Day of the week
- **hh:mm:ss:** Hours, minutes, and seconds
- **Mon:** Month
- **yyyy:** Year
- **dd:** Date
The following table details message text and meaning for the HUS 100. Note that numbers 18 to 20 are output when Dynamic Provisioning is installed and set to the -early_alert, -depletion_alert, and -notification_alert Enable command options during creating a DP pool.

**Table 3-18: Message Text and Meaning for the HUS 100**

<table>
<thead>
<tr>
<th>No.</th>
<th>Message text</th>
<th>Meaning of message</th>
<th>Erlog.txt</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ARRAY Alert Started.</td>
<td>The error monitoring is started.</td>
<td>O</td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td>ARRAY Drive Detached. Unit No. X HDU No. Y</td>
<td>A drive blockade occurred. (The blocked drive is indicated with a set of a Unit No. and an HDU No.)</td>
<td>O</td>
<td>x</td>
</tr>
<tr>
<td>3</td>
<td>ARRAY Drive Detached. Position Unit No. X HDU No. Y</td>
<td>A drive blockade occurred.</td>
<td>O</td>
<td>x</td>
</tr>
<tr>
<td>4</td>
<td>ARRAY Battery Alarm. Position Battery No. X</td>
<td>A battery voltage error occurred.</td>
<td>x</td>
<td>O</td>
</tr>
<tr>
<td>5</td>
<td>ARRAY Fan Alarm. CONTROLLER No.X Fan No.X</td>
<td>A CTU fan failure occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6</td>
<td>ARRAY CONTROLLER Detached. Position CONTROLLER No.X</td>
<td>A controller blockade occurred. (This occurs only in the dual controller configuration.)</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>7</td>
<td>ARRAY AC Power Supply Failure. Position Unit No.X AC Power No. X</td>
<td>An AC power supply error occurs.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>8</td>
<td>ARRAY DC Power Supply Failure Position Unit No. X DC Power No. X</td>
<td>A DC power supply error occurs</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>9</td>
<td>ARRAY Cache Memory Alarm.</td>
<td>A cache failure occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>10</td>
<td>ARRAY Cache Backup Circuit Alarm.</td>
<td>A backup circuit failure occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>12</td>
<td>ARRAY Path Alarm.</td>
<td>A path blockade occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>13</td>
<td>ARRAY Host Connector Alarm. Position CONTROLLER No.X Host Connector No.X</td>
<td>A host connector error occurs</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>14</td>
<td>ARRAY Warning.</td>
<td>The array unit entered the warning state.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>16</td>
<td>ARRAY Hitachi Storage Navigator Modular 2 Interface error occurred.</td>
<td>A failure occurred in the connection with the array unit.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>ARRAY</td>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------</td>
<td>-------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>17</td>
<td>Hitachi Storage Navigator Modular 2 Interface error recovered.</td>
<td>A failure recovered in the connection with the array unit.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>18</td>
<td>Pool Consumed Capacity Early Alert Pool No.XX</td>
<td>A DP pool early alert occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>19</td>
<td>Pool Consumed Capacity Depletion Alert Pool No.XX</td>
<td>A DP pool depletion alert occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>20</td>
<td>Pool Consumed Capacity Over Pool No.XX</td>
<td>A DP pool depletion occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>21</td>
<td>I/F Module Alarm.</td>
<td>An I/F module failure occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>22</td>
<td>CONTROLLER Detached (Related Parts Alarm). Position CONTROLLER No.X X</td>
<td>A controller blockade occurred by related parts. (This occurs only in the dual controller configuration.)</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>23</td>
<td>Side Card Alarm.</td>
<td>A side card failure occurred.</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
The following table details message text and meaning for the AMS 2000.

### Table 3-19: Message text and meaning (AMS2000)

<table>
<thead>
<tr>
<th>No.</th>
<th>Message text</th>
<th>Meaning of message</th>
<th>Erlog.txt</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ARRAY Alert Started.</td>
<td>The error monitoring is started.</td>
<td>O</td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td>ARRAY Drive Detached. ARRAY Detached Drive Position Unit No.X HDU No.Y.</td>
<td>A drive blockade occurred. (The blocked drive is indicated with a set of a Unit No. and an HDU No.)</td>
<td>O</td>
<td>x</td>
</tr>
<tr>
<td>3</td>
<td>ARRAY Drive Detached. Position Unit No.X HDU No.Y.</td>
<td>A drive blockade occurred.</td>
<td>x</td>
<td>O</td>
</tr>
<tr>
<td>4</td>
<td>ARRAY Battery Alarm. Position Battery No.X.</td>
<td>A battery voltage error occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5</td>
<td>ARRAY Additional Battery Alarm. Position Battery No.X.</td>
<td>An additional battery voltage error occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6</td>
<td>ARRAY Fan Alarm. Position Unit No.X Fan No.X.</td>
<td>A fan failure occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>7</td>
<td>ARRAY CONTROLLER Detached. Position CONTROLLER No.X.</td>
<td>A controller blockade occurred. (This occurs only in the dual controller configuration.)</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>8</td>
<td>ARRAY AC Power Supply Failure. Position Unit No.X AC Power No.X.</td>
<td>An AC power supply error occurs.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>9</td>
<td>ARRAY DC Power Supply Failure. Position Unit No.X DC Power No.X.</td>
<td>A DC power supply error occurs.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>10</td>
<td>ARRAY Cache Memory Alarm.</td>
<td>A cache failure occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>11</td>
<td>ARRAY Cache Backup Circuit Alarm.</td>
<td>A backup circuit failure occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>12</td>
<td>ARRAY ENC Alarm. Position Unit No.X ENC No.X.</td>
<td>An enclosure error occurs.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>13</td>
<td>ARRAY SENC Alarm. Position Unit No.X SENC No.X.</td>
<td>An SENC error occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>14</td>
<td>ARRAY Path Alarm.</td>
<td>A path blockade occurred.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>15</td>
<td>ARRAY Host Connector Alarm. Position CONTROLLER No.X Host Connector No.X.</td>
<td>A host connector error occurs.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>16</td>
<td>ARRAY Warning.</td>
<td>The array unit entered the warning state.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>17</td>
<td>ARRAY Hitachi Storage Navigator Modular 2 Interface error occurred.</td>
<td>A failure occurred in the connection with the array unit. A power OFF or a failure occurred in the array unit.</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
The following table details message texts and meaning for the SMS 100.

**Table 3-20: Message text and meaning (SMS100)**

<table>
<thead>
<tr>
<th>No.</th>
<th>Message text</th>
<th>Meaning of message</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ARRAY Alert Started.</td>
<td>The error monitoring is started.</td>
</tr>
<tr>
<td>2</td>
<td>ARRAY Warning.</td>
<td>The array unit entered the warning state.</td>
</tr>
<tr>
<td>3</td>
<td>ARRAY Hitachi Storage Navigator Modular 2 Interface error occurred.</td>
<td>A failure occurred in the connection with the array unit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A power OFF or a failure occurred in the array unit.</td>
</tr>
<tr>
<td>4</td>
<td>ARRAY replacement is requested (Original Array).</td>
<td>Exchange request of Unit 0 occurred.</td>
</tr>
<tr>
<td>5</td>
<td>ARRAY replacement is requested (New Array).</td>
<td>Exchange request of Unit 1 occurred.</td>
</tr>
<tr>
<td>6</td>
<td>Repair HDU insertion is requested (1st time).</td>
<td>First time mount request of repair slot drive occurred.</td>
</tr>
<tr>
<td>7</td>
<td>Repair HDU insertion is requested (2nd time).</td>
<td>Second time mount request of repair slot drive occurred.</td>
</tr>
<tr>
<td>8</td>
<td>Repair HDU insertion is requested (3rd time).</td>
<td>Third time mount request of repair slot drive occurred.</td>
</tr>
</tbody>
</table>

The following table details message text and meaning for the AMS/WMS.

**Table 3-21: Message text and meaning (AMS/WMS)**

<table>
<thead>
<tr>
<th>No.</th>
<th>Message text</th>
<th>Meaning of message</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ARRAY Alert Started.</td>
<td>The error monitoring is started.</td>
</tr>
<tr>
<td>2</td>
<td>ARRAY FC Drive Detached. ARRAY Detached FC Drive Position Unit No.X HDU No.Y.</td>
<td>An FC drive blockade occurred. (The blocked drive is indicated with a set of a Unit No. and an HDU No.)</td>
</tr>
</tbody>
</table>
### Table 3-21: Message text and meaning (AMS/WMS)

<table>
<thead>
<tr>
<th>No.</th>
<th>Message text</th>
<th>Meaning of message</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ARRAY Alert Started.</td>
<td>The error monitoring is started.</td>
</tr>
<tr>
<td>2</td>
<td>ARRAY FC Drive Detached. ARRAY Detached FC Drive Position Unit No. X HDU No. Y.</td>
<td>An FC drive blockade occurred. (The blocked drive is indicated with a set of a Unit No. and an HDU No.)</td>
</tr>
<tr>
<td>3</td>
<td>ARRAY SATA Drive Detached. ARRAY Detached SATA Drive Position Unit No. X HDU No. Y.</td>
<td>A SATA drive blockade occurred. (The blocked drive is indicated with a set of a Unit No. and an HDU No.)</td>
</tr>
<tr>
<td>4</td>
<td>ARRAY DC Power Supply Failure.</td>
<td>A DC power supply error occurs.</td>
</tr>
<tr>
<td>5</td>
<td>ARRAY Battery Alarm.</td>
<td>A battery voltage error occurred.</td>
</tr>
<tr>
<td>6</td>
<td>ARRAY Fan Alarm.</td>
<td>A fan failure occurred.</td>
</tr>
<tr>
<td>7</td>
<td>ARRAY CONTROLLER Detached. ARRAY CONTROLLER No.X.</td>
<td>A controller blockade occurred. (This occurs only in the dual controller configuration.)</td>
</tr>
<tr>
<td>9</td>
<td>ARRAY Cache Memory Alarm.</td>
<td>A cache failure occurred.</td>
</tr>
<tr>
<td>10</td>
<td>ARRAY Cache Backup Circuit Alarm.</td>
<td>A backup circuit failure occurred.</td>
</tr>
<tr>
<td>12</td>
<td>ARRAY Loop Alarm.</td>
<td>A loop error occurs.</td>
</tr>
<tr>
<td>13</td>
<td>ARRAY Path Alarm.</td>
<td>A path blockade occurred.</td>
</tr>
<tr>
<td>14</td>
<td>ARRAY Host Connector Alarm. Position CONTROLLER No.X Host Connector No.X.</td>
<td>A host connector error occurs.</td>
</tr>
<tr>
<td>15</td>
<td>ARRAY Warning.</td>
<td>The array unit entered the warning state.</td>
</tr>
<tr>
<td>16</td>
<td>ARRAY Hitachi Storage Navigator Modular 2 Interface error occurred.</td>
<td>A failure occurred in the connection with the array unit. A power OFF or a failure occurred in the array unit.</td>
</tr>
<tr>
<td>17</td>
<td>ARRAY NNC Detached. Position NNC No.X.</td>
<td>An NNC blockade occurred.</td>
</tr>
<tr>
<td>18</td>
<td>ARRAY NNC Warning. Position NNC No.X.</td>
<td>An NNC partial blockade occurred.</td>
</tr>
</tbody>
</table>

### Table 3-22: Message text and meaning (9500V)

<table>
<thead>
<tr>
<th>No.</th>
<th>Message text</th>
<th>Meaning of message</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ARRAY Alert Started.</td>
<td>The error monitoring is started.</td>
</tr>
<tr>
<td>2</td>
<td>ARRAY FC Drive Detached. ARRAY Detached FC Drive Position Unit No. X HDU No. Y.</td>
<td>An FC drive blockade occurred. (The blocked drive is indicated with a set of a Unit No. and an HDU No.)</td>
</tr>
<tr>
<td>3</td>
<td>ARRAY SATA Drive Detached. ARRAY Detached SATA Drive Position Unit No. X HDU No. Y.</td>
<td>A SATA drive blockade occurred. (The blocked drive is indicated with a set of a Unit No. and an HDU No.)</td>
</tr>
<tr>
<td>4</td>
<td>ARRAY DC Power Supply Failure.</td>
<td>A DC power supply error occurs.</td>
</tr>
<tr>
<td>5</td>
<td>ARRAY Battery Alarm.</td>
<td>A battery voltage error occurred.</td>
</tr>
<tr>
<td>6</td>
<td>ARRAY Fan Alarm.</td>
<td>A fan failure occurred.</td>
</tr>
<tr>
<td>7</td>
<td>ARRAY CONTROLLER Detached.</td>
<td>A controller blockade occurred. (This occurs only in the dual controller configuration.)</td>
</tr>
<tr>
<td>8</td>
<td>ARRAY AC Power Supply Failure.</td>
<td>An AC power supply error occurs.</td>
</tr>
<tr>
<td>9</td>
<td>ARRAY Cache Memory Alarm.</td>
<td>A cache failure occurred.</td>
</tr>
<tr>
<td>10</td>
<td>ARRAY Cache Backup Circuit Alarm.</td>
<td>A backup circuit failure occurred.</td>
</tr>
<tr>
<td>11</td>
<td>ARRAY ENC Alarm.</td>
<td>An enclosure error occurs.</td>
</tr>
</tbody>
</table>
Referencing/setting the monitoring error options

**Command name**

`auerralertopt`

**Format**

```
9500V, AMS, WMS, SMS, AMS2000, HUS100
auerralertopt  -refer -account

When the monitoring account is not set or changed.
  auerralertopt  -set -account enable
    -uid user_id | -uidfile file_name | -askuid
    [ -passwdfile file_name ]

When setting the monitoring account to enable.
  auerralertopt  -set -account enable
When setting the monitoring account to disable.
  auerralertopt  -set -account disable

auerralertopt  -test -account [ -unit unit_name ... ]
```

**Description**

This command references or sets the monitoring error options.

---

**Table 3-22: Message text and meaning (9500V)**

<table>
<thead>
<tr>
<th>No.</th>
<th>Message Text</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>ARRAY SENC Alarm.</td>
<td>An SENC error occurred.</td>
</tr>
<tr>
<td>13</td>
<td>ARRAY Loop Alarm.</td>
<td>A loop error occurs.</td>
</tr>
<tr>
<td>14</td>
<td>ARRAY Path Alarm.</td>
<td>A path blockade occurred.</td>
</tr>
<tr>
<td>15</td>
<td>ARRAY Warning.</td>
<td>The array unit entered the warning state.</td>
</tr>
<tr>
<td>16</td>
<td>ARRAY Storage Navigator Modular</td>
<td>A failure occurred in the connection with the array unit. A power OFF or a failure occurred in the array unit.</td>
</tr>
<tr>
<td></td>
<td>Interface error occurred.</td>
<td></td>
</tr>
</tbody>
</table>

---

CLI command list 3-295
## Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-refer</td>
<td>Displays the monitoring error options.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the monitoring error options.</td>
</tr>
<tr>
<td>-test</td>
<td>Tests the monitoring error options.</td>
</tr>
<tr>
<td>-account</td>
<td>When the -refer option is specified: Displays the monitoring account information. When the -test option is specified: Authentication tests by the monitoring account.</td>
</tr>
<tr>
<td>-account enable</td>
<td>Specify whether to set the monitoring account effective or ineffective. enable: Enables the monitoring account. disable: Disables the monitoring account.</td>
</tr>
<tr>
<td>-account disable</td>
<td></td>
</tr>
<tr>
<td>-uid user_id</td>
<td>Specify the user ID.</td>
</tr>
<tr>
<td>-uidfile file_name</td>
<td>Specify the file(path) name when setting the user ID using a file.</td>
</tr>
<tr>
<td>-askuid</td>
<td>Specify this option when inputting the user ID for a request.</td>
</tr>
<tr>
<td>-passwdfile file_name</td>
<td>Specify the file(path) name when setting the password using a file.</td>
</tr>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of the array unit for which to test. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-(minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot;(space)&quot;. Space in front and in the rear of the character string is removed. If omitted, all array unit subject to monitoring will be tested. Single or multiple array unit names can be specified. Single specification: Specifying a single array unit name. Multiple specification: Specifying multiple array unit names. Example: -unit ams2000a1 ams2000a2</td>
</tr>
</tbody>
</table>

Note 1: For User ID, less than or equal to 256 ASCII characters (alphabetic characters, numerals, and the following symbols) can be used. (!,#,$,%,&,'*,+,-,.,/=,?,@,^,_,`,{,|,},~,(space))

## Examples

The following example displays the monitoring errors account information.

```
% auerralertopt –refer –account
Monitoring Account : Enable
USER id : user-acc
%
```
The following example sets the monitoring errors account information.

% auerralertopt –set –account –uid User001
Are you sure you want to set the account for monitoring unit? (y/n [n]): y
Please input the password.
Password:
The account for monitoring unit has been set successfully.
%

The following example tests the monitoring errors account information.

% auerralertopt –test –account

<table>
<thead>
<tr>
<th>Unit Name</th>
<th>Type</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ams500</td>
<td>AMS500</td>
<td>OK</td>
</tr>
<tr>
<td>9500</td>
<td>9500V</td>
<td>OK</td>
</tr>
<tr>
<td>ams500m</td>
<td>AMS500</td>
<td>OK</td>
</tr>
</tbody>
</table>
%


Tuning parameters

This section covers the following commands related to tuning parameters:

- Referencing/setting system tuning parameters on page 3-299
- Referencing/setting volume tuning parameters on page 3-303
- Referencing/setting prefetch tuning parameters on page 3-305
- Referencing/setting multi-stream tuning parameters on page 3-308
- Referencing/setting volume ownership tuning parameters on page 3-311
- Setting/deleting the account information for scripts on page 3-312
Referencing/setting system tuning parameters

Command name

ausystuning

Format

9500V

ausystuning -unit unit_name -refer

When setting the Multi Streaming
ausystuning -unit unit_name -set
[ -mspfcouint num ]
[ -msnextpf on | off ]
[ -mspfsizet 64 | 128 | 256 | 512 | 1024 ]
[ 2048 | 3072 ]
[ 4096 | 5120 | 6144 | 7168 ]
[ 8192 | 9216 | 10240 ]

ausystuning -unit unit_name -default MultiStreaming

When setting the other configurations
ausystuning -unit unit_name -set
[ -dtystart num ]
[ -dtystop num ]
[ -rnbfsizet enable | disable ]
[ -rnbfsizet num ]

ausystuning -unit unit_name -default

AMS, WMS
ausystuning -unit unit_name -refer

ausystuning -unit unit_name -set
[ -dtystart num ]
[ -dtystop num ]
[ -cachetcontrol FIFO | LRU ]
[ -detailedtrace on | off ]

ausystuning -unit unit_name -default

SMS, AMS2000
ausystuning -unit unit_name -refer

ausystuning -unit unit_name -set
[ -dtystart num ]
[ -dtystop num ]
[ -cachetcontrol FIFO | LRU ]
[ -detailedtrace on | off ]
[ -loadbalancing enable | disable ]
[ -loadbalancingtime 3 | 5 | 10 | 15 | 30 | 60 | 120 | 180 ]
[ -dtynumlimit enable | disable ]
[ -loadreductionchigonf enable | disable ]

ausystuning -unit unit_name -default

HUS100
ausystuning -unit unit_name -refer

ausystuning -unit unit_name -set
[ -dtystart num ]
[ -dtystop num ]
[ -cachecontrol FIFO | LRU ]
[ -detailedtrace on | off ]
[ -loadbalancing enable | disable ]
[ -loadbalancingtime 3 | 5 | 10 | 15 | 30 | 60 | 120 | 180 ]
[ -dtynumlimit enable | disable ]
[ -loadreductionchgconf enable | disable ]
[ -xcopylowspeed enable | disable ]
[ -iooverloadreport enable | disable ]
ausystuning -unit unit_name -default
[ -iscsitimeoutresettime num ]

**Description**

This command refers to or sets the system tuning parameters.
# Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <em>unit_name</em></td>
<td>Specify the name of an array unit to which the system tuning parameters is referred or set. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-(minus)&quot;, &quot;_ (underline)&quot;. Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the system tuning parameters that has been set and reserved.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the system tuning parameters.</td>
</tr>
<tr>
<td>-mspfcoun* num</td>
<td>Specify the condition to make a pre-fetch in the multi-streaming (1 to 10). The setting can be made only when the Multiple Stream Mode is validated.</td>
</tr>
<tr>
<td>-msnextsize on</td>
<td>off</td>
</tr>
<tr>
<td></td>
<td>Specify the time when the next pre-fetch of the multi-streaming is to be made. The setting can be made only when the Multiple Stream Mode is validated.</td>
</tr>
<tr>
<td></td>
<td>on : Starts the next pre-fetch when the reading is done up to the specified percentage.</td>
</tr>
<tr>
<td></td>
<td>off: The next pre-fetch is not started as long as a read hit is made.</td>
</tr>
<tr>
<td>-mspsize 64</td>
<td>128</td>
</tr>
<tr>
<td></td>
<td>Specify an amount of data to be pre-fetched in the multi-streaming. The setting can be made only when the Multiple Stream Mode is validated.</td>
</tr>
<tr>
<td>-dtystart num</td>
<td>Specify an occasion to de-stage dirty data. (0 to 50)</td>
</tr>
<tr>
<td>-dtystop num</td>
<td>Specify an occasion to stop the de-staging of dirty data. (0 to 50)</td>
</tr>
<tr>
<td>-rndbufsize0 enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>Set whether to validate or invalidate the specification of the random simple buffer size as 0%.</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the specification of the random simple buffer size as 0%.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the specification of the random simple buffer size as 0%.</td>
</tr>
<tr>
<td>-rndbuf num</td>
<td>Specify a size of the random simplified buffer. (0 to 100) When specifying this option, the disk array subsystem must be restarted in order to validate the setting.</td>
</tr>
<tr>
<td>-cachecontrol FIFO</td>
<td>LRU</td>
</tr>
<tr>
<td></td>
<td>Specify a cache control mode.</td>
</tr>
<tr>
<td></td>
<td>FIFO: First-in First-out</td>
</tr>
<tr>
<td></td>
<td>LRU : Least Recently Used</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>-detailedtrace on</td>
<td>off</td>
</tr>
<tr>
<td></td>
<td>on : Enables the detailed trace mode.</td>
</tr>
<tr>
<td></td>
<td>off: Disables the detailed trace mode.</td>
</tr>
<tr>
<td>-loadbalancing enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable : Enables the specification of the load balancing.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the specification of the load balancing.</td>
</tr>
<tr>
<td>-loadbalancingtime 3</td>
<td>5</td>
</tr>
<tr>
<td>-default MultiStreaming</td>
<td>Return the parameter for tuning the performance of multi-streaming to the default value. The setting can be made only when the Multiple Stream Mode is validated.</td>
</tr>
<tr>
<td>-default</td>
<td>Returns the parameters for performance tuning to their default value.</td>
</tr>
<tr>
<td>-dtynumlimit enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable: Enables the specification of the dirty data flush number limit.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the specification of the dirty data flush number limit.</td>
</tr>
<tr>
<td>-loadreductionchgc onf enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable: Enables the specification of the load reduction for changing configuration mode.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables the specification of the load reduction for changing configuration mode.</td>
</tr>
<tr>
<td>-iooverloadreport enable</td>
<td>disable</td>
</tr>
<tr>
<td></td>
<td>enable: Enables report generation for loads higher than the port threshold for I/O loads.</td>
</tr>
<tr>
<td></td>
<td>disable: Disables report generation for loads higher than the port threshold for I/O loads.</td>
</tr>
</tbody>
</table>

Note 1: For User ID, less than or equal to 256 ASCII characters (alphabetic characters, numerals, and the following symbols) can be used. (!,#,$,%,&,'*,+,−,.,/=,?,^,_,`,{,|,},~,(space))

**Examples**

The following example displays the system tuning parameters of an array 9500a1.

3-302 CLI command list

Hitachi Unified Storage Command Line Interface Reference Guide
The following example displays the system tuning parameters of an array ams500a1.

```
% ausystuning -unit ams500a1 -refer
Password:
Dirty Data Opportunity [%]      : 10
Dirty Data Stop Opportunity [%] : 0
Cache Control Mode              : FIFO
Detailed Trace Mode             : ON

%```

The following example displays the system tuning parameters of an array ams2300a1.

```
% ausystuning -unit ams2300a1 -refer
Password:
Dirty Data Opportunity [%]      : 10
Dirty Data Stop Opportunity [%] : 0
Cache Control Mode              : FIFO
Detailed Trace Mode             : ON
Load Balancing                  : Enable
Load Balancing Monitoring Time [min.] : 3
Dirty Data Flush Number Limit   : Disable
Load Reduction for Changing Configuration Mode : Disable

%```

The following example displays the system tuning parameters of an array unit hus150a1.

```
% ausystuning -unit hus150a1 -refer
Dirty Data Opportunity [%]      : 5
Dirty Data Stop Opportunity [%] : 5
Cache Control Mode              : FIFO
Detailed Trace Mode             : ON
Load Balancing                  : Enable
Load Balancing Monitoring Time [min.] : 3
Dirty Data Flush Number Limit   : Enable
Load Reduction for Changing Configuration Mode : Disable
I/O Overload Report Mode:        : Disable
iSCSI Timeout Reset Time (sec.) : 45

%```

The following example sets the I/O Overload Report Mode of an array unit hus150a1.

```
% ausystuning -unit hus150a1 -set -iscsitimeoutresettime 20
Are you sure you want to set the system tuning parameter? (y/n [n]): y
The system tuning parameter has been set successfully.

%```

Referencing/setting volume tuning parameters

Command name

aulutuning
Format

9500V
aulutuning -unit unit_name -refer

aulutuning -unit unit_name -set -lu lun ...
    -pfdata disable | num

aulutuning -unit unit_name -default [ -lu lun ]

Description

This command refers to or sets the LU tuning parameters.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of an array unit to which the LU tuning parameters is referred or set. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the LU tuning parameters.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the LU tuning parameters.</td>
</tr>
<tr>
<td>-default</td>
<td>Returns the parameter for tuning the performance to the default value.</td>
</tr>
<tr>
<td>-lu lun ...</td>
<td>Specify number(s) of LU(s) for which to be set the LU tuning parameters. One or more LU number(s) can be specified. However, only a single logical unit can be specified when the -default has been specified. Single or multiple LU numbers can be specified. Single specification : Specifying a single LU number. Example: -lu 3 Multiple specification: Specifying multiple LU numbers. Example: -lu 0 1 2 3 4 5 8 -lu 0-5 8</td>
</tr>
<tr>
<td>-pfdata disable</td>
<td>Specify the time to start the pre-fetch.</td>
</tr>
<tr>
<td>num</td>
<td>disable: The pre-fetch is not started. num : Specify the condition to start the next pre-fetch, that is, a percentage of data to be pre-fetched that has been read (0 to 100).</td>
</tr>
</tbody>
</table>

Example

The following example displays the logical unit tuning parameters of an array 9500a1.
Referencing/setting prefetch tuning parameters

Command name

autuningprefetch

Format

AMS, WMS
autuningprefetch  -unit unit_name -refer

When the multi stream of LU is effective.
autuningprefetch  -unit unit_name -set
[ -seqcount num ]
[ -fixedsize num ]
[ -basesize num ]
[ -lu lun ... ]

When the multi stream of LU is ineffective.
autuningprefetch  -unit unit_name -set
[ -multistreamread enable | disable ]
[ -multistreamwrite enable | disable ]
[ -multistreamnext on | off ]
[ -seqcount num ]
[ -criteria fixed | base ]
[ -size num -lu lun ... ]

autuningprefetch  -unit unit_name -default

Description

This command refers to or sets the performance tuning parameters (enable/disable of the multi-stream mode (read/write), decided sequential number, criteria for the pre-fetch, and size of data to be pre-fetched per logical unit).
### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of the array unit to which the performance tuning parameters is referred or set. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;,&quot; (comma), or &quot;@&quot;, or &quot; (space)&quot;. Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the performance tuning parameters.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the performance tuning parameters.</td>
</tr>
<tr>
<td>-default</td>
<td>Returns the performance tuning parameters to the default value.</td>
</tr>
<tr>
<td>-multistreamread enable</td>
<td>disable</td>
</tr>
<tr>
<td>-multistreamwrite enable</td>
<td>disable</td>
</tr>
<tr>
<td>-multistreamnext on</td>
<td>off</td>
</tr>
<tr>
<td>-seqcount num</td>
<td>Specify the decided sequential number (0 to 10).</td>
</tr>
<tr>
<td>-criteria fixed</td>
<td>base</td>
</tr>
<tr>
<td></td>
<td>fixed: Use the fixed size of data to be pre-fetched as the criteria.</td>
</tr>
<tr>
<td></td>
<td>base: Use the base size of data to be pre-fetched as the criteria.</td>
</tr>
<tr>
<td></td>
<td>The specification can be made only when the multi-stream mode (read) is invalid.</td>
</tr>
</tbody>
</table>
The following example displays the pre-fetch tuning parameters of an array ams500a1.

```
% autuningprefetch -unit ams500a1 -refer
Password:
Count of Judgment Sequential : 2
  Prefetch Size
    LUN  Fixed    Base     RAID Level
    0    256KB    128KB    5( 4D+1P)
    :     :        :         :
%```

Example

The following example displays the pre-fetch tuning parameters of an array ams500a1.

```
% autuningprefetch -unit ams500a1 -refer
Password:
Count of Judgment Sequential : 2
  Prefetch Size
    LUN  Fixed    Base     RAID Level
    0    256KB    128KB    5( 4D+1P)
    :     :        :         :
%```
Referencing/setting multi-stream tuning parameters

Command name

autuningmultistream

Format

AMS, WMS, SMS, AMS2000, HUS100
autuningmultistream -unit unit_name -refer

AMS, WMS
autuningmultistream -unit unit_name -set
  -scope system | lu
  [ -lu lun ... ]
  [ -read enable | disable ]
  [ -write enable | disable ]
  [ -next enable | disable ]
  [ -criteria fixed | base ]

SMS, AMS2000, HUS100
autuningmultistream -unit unit_name -set
  -scope system | lu
  [ -lu lun ... ]
  [ -readwrite enable | disable ]
  [ -next enable | disable ]
  [ -criteria fixed | base ]
  [ -seqcount num ]
  [ -fixedsize num ]
  [ -basesize num ]

AMS, WMS, SMS, AMS2000, HUS100
autuningmultistream -unit unit_name -default

Description

This command refers to or sets the multi stream tuning parameters (enable/disable of the read/write mode, following pre-fetch, and criteria for the pre-fetch).
### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <em>unit_name</em></td>
<td>Specify the name of the array unit to which the multi stream tuning parameters is referred or set. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-(minus)&quot;, &quot;_ (underline)&quot;, &quot;.(period)&quot;, &quot;@&quot;, or &quot;(space)&quot;. Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>References the multi stream tuning parameters.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the multi stream tuning parameters.</td>
</tr>
<tr>
<td>-default</td>
<td>Returns the multi stream tuning parameters to the default value.</td>
</tr>
<tr>
<td>-scope system</td>
<td>Specify the scope. System: system</td>
</tr>
<tr>
<td>-scope lu</td>
<td>Specify logical unit: logical unit</td>
</tr>
<tr>
<td>-lu <em>lun</em> ...</td>
<td>Specify a number of an LU. Single or multiple LU numbers can be specified.</td>
</tr>
<tr>
<td>-read enable</td>
<td>Sets whether to validate or invalidate the specification of the read mode.</td>
</tr>
<tr>
<td>-write enable</td>
<td>Sets whether to validate or invalidate the specification of the write mode.</td>
</tr>
<tr>
<td>-readwrite enable</td>
<td>Sets whether to validate or invalidate the specification of the read/write mode.</td>
</tr>
<tr>
<td>-disable</td>
<td>Sets whether to validate or invalidate the specification of the read mode.</td>
</tr>
<tr>
<td>-disable</td>
<td>Sets whether to validate or invalidate the specification of the write mode.</td>
</tr>
<tr>
<td>-disable</td>
<td>Sets whether to validate or invalidate the specification of the read/write mode.</td>
</tr>
</tbody>
</table>

**Single specification**: Specifying a single LU number.
Example: `-lu 3`

**Multiple specification**: Specifying multiple LU numbers.
Example: `-lu 0 1 2 3 4 5 8`

When the read/write mode is invalid, the mode is the read mode.
Example

The following example displays the multi-stream tuning parameters of an array ams500a1.

```
% autuningmultistream -unit ams500a1 -refer
Password:  
Scope : System
```
Referencing/setting volume ownership tuning parameters

Command name

autuningluown

Format

SMS, AMS2000, HUS100

autuningluown  -unit unit_name -refer [ -lu lun ... ]

autuningluown  -unit unit_name -set -lu lun

-ctl0 | -ctl1[ -coreX | -coreY ]

Description

This command references or sets the LU ownership tuning parameters.

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| -unit unit_name | Specify the name of the array unit for which to reference or set the LU ownership tuning parameters. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols "-" (minus), "_" (underline), "." (period), "," (comma), or " 

|                  | (space)". Space in front and in the rear of the character string is removed. |
| -set             | Sets the LU ownership tuning parameters. |
| -lu lun ...      | Specify an LU number. Single or multiple LU numbers can be specified. Single specification: Specifying a single LU number. Example: -lu 3 Multiple specification: Specifying multiple LU numbers. Example: -lu 0 1 2 3 4 5 8 -lu 0-5 8 |
| -ctl0 | -ctl1 | Specify the controller. |
| coreX | -ctl1 | Specify this option when changing the core. |

Examples

The following example displays the logical unit ownership tuning parameters of an array sms100a1.

% autuningluown  -unit sms100a1 -refer
LU  CTL  Core  RAID Group  DP Pool  Cache Partition  Type
0    0   N/A           0       N/A                0  SAS
The following example sets the logical unit ownership tuning parameters of an array sms100a1.

```bash
% autuningluown -unit sms100a1 -set -lu 0 -ctl0
Are you sure you want to set the LU ownership?
(y/n [n]): y
The LU ownership has been set successfully.
%
```

Setting/deleting the account information for scripts

**Command name**

`auaccountenv`

**Format**

```
AMS, WMS, SMS, AMS2000, HUS100
auaccountenv -set -uid user_id | -uidfile file_name | -askuid [ -passwdfile file_name ] [ -authentication [ -unit unit_name ... ] ]
```

**Description**

This command set deletes or tests the account information for the registered storage system unit.

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-set</td>
<td>Sets the account information.</td>
</tr>
<tr>
<td>-rm</td>
<td>Deletes the account information.</td>
</tr>
<tr>
<td>-test</td>
<td>Tests the account information</td>
</tr>
<tr>
<td>-uid user_id</td>
<td>Specify the user ID.</td>
</tr>
<tr>
<td>user_id: User ID (See Note 1)</td>
<td></td>
</tr>
<tr>
<td>-uidfile file_name</td>
<td>Specify the file(path) name when setting the user ID using a file.</td>
</tr>
<tr>
<td>file_name: file (path) name</td>
<td></td>
</tr>
<tr>
<td>-askuid</td>
<td>Specify this option when inputting the user ID for a request.</td>
</tr>
<tr>
<td>-passwdfile file_name</td>
<td>Specify the file (path) name when setting the password using a file.</td>
</tr>
<tr>
<td>file_name: file (path) name</td>
<td></td>
</tr>
<tr>
<td>-authentication</td>
<td>Tests the account information for the registered array unit.</td>
</tr>
</tbody>
</table>
When executing this command for an array whose Account Authentication function is valid, the input request at the time of the command execution can make the input unnecessary by executing this command. However, to make the input unnecessary, it is required to set the STONAVM_ACT environment variable to “on” before actually executing the command with the prerequisite that this command is executed.

**Examples**

The following example sets the account information.

```
% auaccountenv –set –uid User001
Are you sure you want to set the account information? (y/n [n]): y
Please input password.
Password: 
The account information has been set successfully.
```

The following example sets the account information using the password file.

```
% auaccountenv –set –uid User001 –passwdfile pass.txt
Are you sure you want to set the account information? (y/n [n]): y
The account information has been set successfully.
Are you sure you want to delete the password file? (y/n [n]): y
The password file has been deleted successfully.
```

The following example sets the account information specifying the storage system unit.

```
% auaccountenv –set –uid User001 –unit ams2000a1
```

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of the array unit for which to test. Space in front and in the rear of the character string is removed. If omitted, all array unit subject to registering will be tested. Single or multiple array unit names can be specified. Single specification: Specifying a single array unit name. Example: -unit ams2000a1 Multiple specification: Specifying multiple array unit names. Example: -unit ams2000a1 ams2000a2</td>
</tr>
</tbody>
</table>

Note 1: For User ID, less than or equal to 256 ASCII characters (alphabetic characters, numerals, and the following symbols) can be used. (!,#,$,%,&,'*,+,-,/,=,?,@,^,_,`,{,|,},~,(space))

**NOTE:** There are the characters that cannot be used in the command line. When using "!", "#", "$", "&", ",","","","","","","","","","","","","","","","", or "~" for the –uid option, set the file by using the –uidfile option. When "!", ",","","","","","","","","","", or "~" is used for the –uid option, the command may terminate abnormally or the illegal user ID may be set.
% auaccountenv –set –uid User001 –authentication -unit sms100a1
Are you sure you want to test the account information? [y/n] [n]: y
Please input password.
Password: 
Unit Name:  Result 
sms100a1  Failed(DMEC0022) 
09: The Account Authentication is done lock or disable.
Are you sure you want to set the account information? [y/n] [n]: y
The account information has been set successfully.
%

The following example deletes the account information.

% auaccountenv –rm
Are you sure you want to delete the account information? (y/n) [n]: y
The account information has been deleted successfully.
%

The following example tests the account information specifying the storage system unit.

% auaccountenv –test –authentication -unit sms1000a1
Are you sure you want to test for account information? (y/n) [n]: y
Unit Name:  Result 
sms100a1  Failed(DMEC0022) 
09: The Account Authentication is done lock or disable.
%

Miscellaneous commands
This section covers miscellaneous commands for the following topics:

- Displaying statistical information on page 3-316
- Outputting performance information file on page 3-317
- Referencing/setting the collection state of performance statistics on page 3-345
- Downloading/updating firmware on page 3-347
Setting a password in administration mode

Command name

`aupasswd`

Format

```
9500V, AMS, WMS
aupasswd
```

Description

This command sets a new password used in administration mode to execute administration commands. This command also changes passwords.

The administration commands are used when operating the 9500V and AMS/WMS.

When setting a new password, enter the new password twice. When changing the password, enter an already-set password and then enter a new password.

Specify the password in less than or equal to 12 characters using alphanumeric characters or the following symbols. (!,#,$,%,&,'*,+,-,/,.@,^,_,`,
,,:,;,<,>,[\,])

Examples

The following example sets a new password used in administration mode.

```
% aupasswd
New password: (Enters a password to be set newly.)
Retype new password: (Enters the same password as above.)
%
```

The following example changes a password used in administration mode.

```
% aupasswd
Old password: (Enters an already-set password.)
New password: (Enters a new password.)
Retype new password: (Enters the same password as above.)
%
```
Displaying statistical information

Command name

austatistics

Format

9500V
austatistics -unit unit_name -memory | -drive

AMS, WMS
austatistics -unit unit_name

Description

This command displays the statistical information that has been accumulated in the array. The following items will be displayed.

- Controller use condition
- Number of host commands received
- Command execution condition
- Cache load condition

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of an array unit in which the statistical information is to be displayed. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; (space). Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-memory</td>
<td>Specify the location of the statistical information to be displayed. -memory: The statistical information (the current information) in the current memory will be displayed. -drive: The statistical information stored in the system drive (the information at the time of activating the array unit) will be displayed.</td>
</tr>
</tbody>
</table>
Example

The following example displays the statistical information of an array 9500a1.

```
% austatistics -unit 9500a1 -memory
Controller
  Array Time
  Controller Acting Time (Integrated) [minute(s)]: 4676
  Controller Acting Time (Work) [m second]: 256969390
CTL0
  Power On Times: 22
CTL1
  Power On Times: 22

Host Commands
CTL   LU   READ   WRITE
  0 0    2677   3261
  0 1    2752   2835
  : :    : :    :
  1 511  0      0

Execution
  Reads   Writes  Sequential Sequential  Prefetch  Write Through
  CTL   LU  Cache Hits Cache Hits Reads  Writes  Stagings  Operation
  0 0    1067   2904    384     424    31229     0
  0 1    969    2651    387     386    30291     0

Cache Load
  Number of Inflow Threshold Reached
  CTL0: 0
  CTL1: 0
%
```

Outputting performance information file

Command name

```
auperform

Format

9500V
  auperform -unit unit_name -manual [ -cat ] [ -lu lun ... ]
    [ -path path_name ]
  auperform -unit unit_name -manual -pfmstatis
    [ -cat ]
    [ -portinfo ]
    [ -rginfo [ rg_no ... ] ]
    [ -luinfo [ lun ... ] ]
    [ -cacheinfo ]
    [ -processorinfo ]
    [ -driveinfo [ unit_no.hdu_no ... ] ]
    [ -driveoprinfo [ unit_no.hdu_no ... ] ]
    [ -backendinfo [ path_no.loop_no ... ] ]
    [ -path path_name ]
  auperform -unit unit_name -auto time [ -count n ] [ -cat ]
    [ -lu lun ... ]
    [ -path path_name ]
  auperform -unit unit_name -auto time -pfmstatis
    [ -count n ]
    [ -cat ]
```
[ -portinfo ]
[ -rginfo [ rg_no ... ] ]
[ -luinfo [ lun ... ] ]
[ -cacheinfo ]
[ -processorinfo ]
[ -driveinfo [ unit_no.hdu_no ... ] ]
[ -driveoprinfo [ unit_no.hdu_no ... ] ]
[ -backendinfo [ path_no.loop_no ... ] ]
[ -path path_name ]

AMS, WMS
auperform -unit unit_name -manual -pfmstatis
[ -cat ]
[ -portinfo ctl_no [ port_no ... ] ]
[ -rginfo ctl_no [ rg_no ... ] ]
[ -luinfo ctl_no [ lun ... ] ]
[ -cacheinfo ctl_no ]
[ -processorinfo ctl_no ]
[ -driveinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -driveoprinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -backendinfo ctl_no [ path_no.loop_no ... ] ]
[ -path path_name ]

auperform -unit unit_name -auto time -pfmstatis
[ -count n ]
[ -cat ]
[ -portinfo ctl_no [ port_no ... ] ]
[ -rginfo ctl_no [ rg_no ... ] ]
[ -luinfo ctl_no [ lun ... ] ]
[ -cacheinfo ctl_no ]
[ -processorinfo ctl_no ]
[ -driveinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -driveoprinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -backendinfo ctl_no [ path_no.loop_no ... ] ]
[ -path path_name ]

SMS
auperform -unit unit_name -manual -pfmstatis
[ -cat ]
[ -portinfo ctl_no [ port_no ... ] ]
[ -rginfo ctl_no [ rg_no ... ] ]
[ -luinfo ctl_no [ lun ... ] ]
[ -cacheinfo ctl_no ]
[ -processorinfo ctl_no ]
[ -driveinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -driveoprinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -backendinfo ctl_no [ path_no ... ] ]
[ -path path_name ]

auperform -unit unit_name -auto time -pfmstatis
[ -count n ]
[ -cat ]
[ -portinfo ctl_no [ port_no ... ] ]
[ -rginfo ctl_no [ rg_no ... ] ]
[ -luinfo ctl_no [ lun ... ] ]
[ -cacheinfo ctl_no ]
[ -processorinfo ctl_no ]
[ -driveinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -driveoprinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -backendinfo ctl_no [ path_no ... ] ]
AMS2000
auperform -unit unit_name -manual -pfmstatis
[-cat ]
[ -portinfo ctl_no [ port_no ... ] ]
[ -rginfo ctl_no [ rg_no ... ] ]
[ -dppoolinfo ctl_no [ pool_no ... ] ]
[ -luninfo ctl_no [ lun ... ] ]
[ -cacheinfo ctl_no ]
[ -processorinfo ctl_no ]
[ -driveinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -backendinfo ctl_no [ path_no ... ] ]
[ -path path_name ]

HUS100
auperform -unit unit_name -manual -pfmstatis
[-cat ]
[ -portinfo ctl_no [ port_no ... ] ]
[ -rginfo ctl_no [ rg_no ... ] ]
[ -dppoolinfo ctl_no [ pool_no ... ] ]
[ -luninfo ctl_no [ lun ... ] ]
[ -cacheinfo ctl_no ]
[ -processorinfo ctl_no ]
[ -driveinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -driveoprinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -backendinfo ctl_no [ path_no ... ] ]
[ -mngareainfo ctl_no [ core ] ]
[ [ -mngrginfo [ rg_no ... ] ]
[ [ -mngdppoolinfo [ pool_no ... ] ]
[ [ -mngdmluinfo ] ]
[ -path path_name ]
auperform -unit unit_name -auto time -pfmstatis
[-count n ]
[ -cat ]
[ -portinfo ctl_no [ port_no ... ] ]
[ -rginfo ctl_no [ rg_no ... ] ]
[ -dppoolinfo ctl_no [ pool_no ... ] ]
[ -luninfo ctl_no [ lun ... ] ]
[ -cacheinfo ctl_no ]
[ -processorinfo ctl_no ]
[ -driveinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -driveoprinfo ctl_no [ unit_no.hdu_no ... ] ]
[ -backendinfo ctl_no [ path_no ... ] ]
[ -mngareainfo ctl_no [ core ] ]
[ [ -mngrginfo [ rg_no ... ] ]
Description

This command acquires the command operational condition and performance statistics information in an array, and outputs their respective information in a text-file format into the current or specified directory. When displaying an output file, a warning message may be reported depending on the editor. However, the contents will be displayed correctly.

The following information will be acquired:

When the -pfmstatis option is absent:
- Number of Read commands received (Read CMD Count)
- Number of the cache-hit Read commands received within the Read command (Read CMD Hit Count)
- Rate of cache-hitting within the received Read command (Rate/Read Hit)
- Number of Write commands received (Write CMD Count)
- Number Write commands that had been cache-hit within the received Write command (Write CMD Hit Count)
- Rate of cache-hitting within the received Write command (Rate/Write Hit)

When the -pfmstatis option is present:

In addition to the six above information, the following performance statistics information is acquired.
- Received number of Read/Write commands per second (IO Rate)
- Received number of Read commands per second (Read Rate)
- Received number of Write commands per second (Write Rate)
- Transfer size of Read/Write commands per second (Trans. Rate)
- Transfer size of Read commands per second (Read Trans. Rate)
- Transfer size of Write commands per second (Write Trans. Rate)
- Transfer size of Read commands (Read Trans. Size)
- Transfer size of Write commands (Write Trans. Size)
- Rate of cache usage capacity within the cache capacity (Cache Write Pending Rate)
- Number of Online Verify commands per second (Online Verify Rate)
- Number of Online Verify commands (Online Verify CMD Count)
- Operation rate of the processor (Usage)
• Operation rate of the drive (HDU Operating Rate)
• Tag count (Tag Count)
• Clean cache usage rate (Cache Clean Queue Usage Rate)
• Middle cache usage rate (Cache Middle Queue Usage Rate)
• Physical cache usage rate (Cache Physical Queue Usage Rate)
• Total cache usage rate (Cache Total Queue Usage Rate)
• Received number of Initiator Control commands per second (CTL CMD IO Rate)
• Received number of Initiator Data commands per second (Data CMD IO Rate)
• Transfer size of Initiator Control commands per second (CTL CMD Trans. Rate)
• Transfer size of Initiator Data commands per second (Data CMD Trans. Rate)
• Response time of Initiator Control commands (CTL CMD Time)
• Response time of Initiator Data commands (Data CMD Time)
• Max response time of Initiator Control commands (CTL CMD Max Time)
• Max response time of Initiator Data commands (Data CMD Max Time)
• Received number of Initiator Control commands (CTL CMD Count)
• Received number of Initiator Data commands (Data CMD Count)
• Transfer size of Initiator Control commands (CTL CMD Trans. Size)
• Transfer size of Initiator Data commands (Data CMD Trans. Size)
• Average Tag Count (Average Tag Count)
• Total Tag Count (Total Tag Count)
• Read Tag Count (Read Tag Count)
• Write Tag Count (Write Tag Count)
• Average Total Tag Count (Average Total Tag Count)
• Average Read Tag Count (Average Read Tag Count)
• Average Write Tag Count (Average Write Tag Count)
• Timeout error count (TimeoutError Count)
• Read/Write commands hit information (Read/Write CMD Hit)
• Read/Write commands miss information (Read/Write CMD Miss)
• Read/Write commands job information (Read/Write CMD Job)
• Unload time (Unload Time)
• Received number of Random Read/Write commands per second (Random IO Rate)
• Received number of Random Read commands per second (Random Read Rate)
• Received number of Random Write commands per second (Random Write Rate)
• Transfer size of Random Read/Write commands per second (Random Trans. Rate)
• Transfer size of Random Read commands per second (Random Read Trans. Rate)
• Transfer size of Random Write commands per second (Random Write Trans. Rate)
• Received number of Rand Read commands (Random Read CMD Count)
• Received number of Random Write commands (Random Write CMD Count)
• Transfer size of Random Read commands (Random Read Trans. Size)
• Transfer size of Random Write commands (Random Write Trans. Size)
• Received number of Sequential Read/Write commands per second (Sequential IO Rate)
• Received number of Sequential Read commands per second (Sequential Read Rate)
• Received number of Sequential Write commands per second (Sequential Write Rate)
• Transfer size of Sequential Read/Write commands per second (Sequential Trans. Rate)
• Transfer size of Sequential Read commands per second (Sequential Read Trans. Rate)
• Transfer size of Sequential Write commands per second (Sequential Write Trans. Rate)
• Received number of Sequential Read commands (Sequential Read CMD Count)
• Received number of Sequential Write commands (Sequential Write CMD Count)
• Transfer size of Sequential Read commands (Sequential Read Trans. Size)
• Transfer size of Sequential Write commands (Sequential Write Trans. Size)
• Received number of XCOPY commands per second (XCOPY Rate)
• Received number of XCOPY Read commands per second (XCOPY Read Rate)
• Received number of XCOPY Write commands per second (XCOPY Write Rate)
• Transfer size of XCOPY Read commands per second (XCOPY Read Trans. Rate)
• Transfer size of XCOPY Write commands per second (XCOPY Write Trans. Rate)
• Response time of XCOPY commands (XCOPY Time)
• Max response time of XCOPY commands (XCOPY Max Time)
• Total tag count (Total Tag Count) (See Note 1)
• Read/Write tag count (Read/Write Tag Count)
• Total average tag count (Total Average Tag Count) (See Note 1)
• Read/Write average tag count (Read/Write Average Tag Count)
• Rate of cache-hitting within the management area (Cache Hit Rate)
• Access count of management area (Access Count)

The output file names are as follows:

When the -pfmstatis option is absent:

When the -cat option is present:
• “pfms.txt” for a single configuration
• “pfmd.txt” for a dual configuration

When the -cat option is absent:
• For acquiring manually: “pfmXXXXX.txt” for a single configuration, and “pfmdXXXXX.txt” for a dual configuration
• For acquiring automatically: “pfmsXXXXX.txt” for a single configuration, and “pfmdXXXXX.txt” for a dual configuration
• (“XXXXX” is a number from 00000 to 19999.)

When the -pfmstatis option is present:

When the -cat option is present: “pfm.txt”

When the -cat option is absent:
• For acquiring manually: “pfmXXXXX.txt”
• For acquiring automatically: “pfmXXXXX.txt”
• (“XXXXX” is a number from 00000 to 19999.)
**NOTE:** The tag count and the total tag count output are the same value. The average tag count and the total average tag count output are the same value.

**NOTE:** All information it output to the files at once if the `--pfmstatis` option is specified, without the following options:
- `-portinfo`
- `-rginfo`
- `-dppoolinfo`
- `-luinfo`
- `-cacheinfo`
- `-processorinfo`
- `-driveinfo`
- `-driveoprinfo`
- `-backendinfo`
- `-tapelibraryinfo`
- `-mngareainfo`

The data size varies in proportion to the number of times of the output is specified. Required disk capacity: The following data size x the number of times the output is specified.
- AMS2500: 25.1 MB
- AMS2300: 24.9 MB
- AMS2100/AMS2010: 12.5 MB
- AMS1000: 16.5 MB
- AMS500: 8.26 MB
- AMS200/WMS100: 2.11 MB
- 9580V: 3.92 MB
- 9500V: 1.07 MB
- HUS 150: 24.7 MB
- HUS 130: 23.9 MB
- HUS110: 12.0 MB
- AMS2100/AMS2010: 12.5 MB
- AMS1000: 16.5 MB
- AMS500: 8.26 MB
- AMS200/WMS100: 2.11 MB
- 9580V: 3.92 MB
- 9500V: 1.07 MB

When the -mngarea info option is issued without the -mngrg info, -mngdppoolinfo, and -mngdmuinfo options, the console displays all the management area information of RAID group, DP pool, DM-LU.
## Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the name of an array unit in which the performance information is to be acquired. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;:&quot;, or &quot; (space)&quot;. Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td><code>-manual</code></td>
<td>Acquires the performance information manually.</td>
</tr>
<tr>
<td><code>-auto time</code></td>
<td>Automatically acquires the performance information at specified interval of time (1 to 1439 minutes).</td>
</tr>
<tr>
<td><code>-count n</code></td>
<td>If automatically acquisition is specified, specify the number of times to repeat the acquisition (1 to 20000).</td>
</tr>
<tr>
<td><code>-cat</code></td>
<td>Specify this option when outputting files making them concatenated as one file.</td>
</tr>
<tr>
<td><code>-path path_name</code></td>
<td>Specify the directory in which the performance information is to be acquired. If omitted, the information is outputted into the current directory.</td>
</tr>
<tr>
<td><code>-pfmstats</code></td>
<td>Specify this option when outputting the performance statistics information.</td>
</tr>
</tbody>
</table>

### 9500V only

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-lu lun ...</code></td>
<td>When outputting performance information of an optional logical unit, specify the logical unit number to be output. When doing that, enter the logical unit number using numerals or a hyphen(s) (-). If the specification is omitted, the information about all logical units is output. Single or multiple logical unit numbers can be specified.</td>
</tr>
<tr>
<td></td>
<td>Single specification : Specifying a single logical unit number.</td>
</tr>
<tr>
<td></td>
<td>Example: <code>-lu 3</code></td>
</tr>
<tr>
<td></td>
<td>Multiple specification: Specifying multiple logical unit numbers.</td>
</tr>
<tr>
<td></td>
<td>Example: <code>-lu 0 1 2 3 4 5 8</code></td>
</tr>
<tr>
<td></td>
<td><code>-lu 0-5 8</code></td>
</tr>
<tr>
<td><code>-portinfo</code></td>
<td>Specify this option when outputting the performance statistics information of port.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| -rginfo [ rg_no ... ] | When outputting performance statistics information of RAID group, specify the RAID group number to be output. When doing that, enter the RAID group number using numerals or hyphen(s) (-). If the specification of RAID group number is omitted, the information about all RAID group is output. Single or multiple RAID group numbers can be specified.  
Single specification : Specifying a single RAID group number.  
Example: -rginfo 3  
Multiple specification: Specifying multiple RAID group numbers.  
Example: -rginfo 0 1 2 3 4 5 8  
-rginfo 0-5 8 |
| -luinfo [ lun ... ] | When outputting performance statistics information of logical unit, specify the logical unit number to be output. When doing that, enter the logical unit number using numerals or a hyphen(s) (-). If the specification of logical unit number is omitted, the information about all logical units is output. Single or multiple logical unit numbers can be specified.  
Single specification : Specifying a single logical unit number.  
Example: -luinfo 3  
Multiple specification: Specifying multiple logical unit numbers.  
Example: -luinfo 0 1 2 3 4 5 8  
-luinfo 0-5 8 |
| -cacheinfo        | Specify this option when outputting the performance statistics information of cache.                                                           |
| -processorinfo    | Specify this option when outputting the performance statistics information of processor.                                                     |
| -driveinfo [ unit_no,hdru_no ... ] | When outputting statistical information on the drive performance, specify the Unit number and HDU number punctuating them with a period.  
When doing that, enter the Unit number and HDU number using numerals or hyphen(s) (-).  
If the specification of Unit number and HDU number is omitted, the information about all the drives is output. Single or multiple Unit numbers and HDU numbers can be specified.  
Single specification : Specifying a single drive number.  
Example: -driveinfo 1.0  
Multiple specification: Specifying multiple drives numbers.  
Example: -driveinfo 1.0 2.3 3.1  
-driveinfo 1.0-2.2 2.8 |
### Drive Operation Information

- **Option:** `-driveoprinfo [unit_no.hdu_no ...]`
  - **Description:** When outputting statistical information on the drive operation performance, specify the Unit number and HDU number punctuating them with a period. When doing that, enter the Unit number and HDU number using numerals or hyphen(s) (-). If the specification of Unit number and HDU number is omitted, the information about all the drives operation is output.
  - Single or multiple Unit numbers and HDU numbers can be specified.
    - Single specification: Specifying a single drive number.
      - Example: `-driveoprinfo 1.0`
    - Multiple specification: Specifying multiple drives numbers.
      - Example: `-driveoprinfo 1.0 2.3 3.1 `-driveoprinfo 1.0-2.2 2.8`

- **Option:** `-backendinfo [path_no.loop_no ...]`
  - **Description:** When outputting statistical information on the back-end performance, specify the path number and loop number punctuating them with a period. When doing that, enter the path number and loop number using numerals or hyphen(s) (-). If the specification of path number and loop number is omitted, the information about all the back-end is output.
  - Single or multiple path numbers and loop numbers can be specified.
    - Single specification: Specifying a single path number and loop number.
      - Example: `-backendinfo 0.0`
    - Multiple specification: Specifying multiple path numbers and loop number.
      - Example: `-backendinfo 0.0 1.0 `-backendinfo 0.0-1.0`

### Port Information

- **Option:** `-portinfo ctl_no [port_no ...]`
  - **Description:** Specify this option when outputting the performance statistics information of port. If the specification of port number is omitted, the information about all ports is output.
    - `ctl_no`: Controller number (0, 1)
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| -rginfo *ctl_no* [ *rg_no* ... ] | When outputting performance statistics information of RAID group, specify the RAID group number to be output.  
  
  \[ctl_no\] : Controller number (0, 1)  
  
  When doing that, enter the RAID group number using numerals or hyphen(s) (-).  
  
  If the specification of RAID group number is omitted, the information about all defined RAID group is output.  
  
  Single or multiple RAID group numbers can be specified.  
  
  Single specification : Specifying a single RAID group number.  
  
  Example: -rginfo 0 3  
  
  Multiple specification: Specifying multiple RAID group numbers.  
  
  Example: -rginfo 0 0 1 2 3 4 5 8  
  
  -rginfo 0 0-5 8                                                                                                                                                                                                                                                                   |
| -luinfo *ctl_no* [ *lun* ... ] | When outputting performance statistics information of logical unit, specify the logical unit number to be output.  
  
  \[ctl_no\] : Controller number (0, 1)  
  
  When doing that, enter the logical unit number using numerals or a hyphen(s) (-). If the specification of logical unit number is omitted, the information about all defined logical units is output.  
  
  Single or multiple logical unit numbers can be specified.  
  
  Single specification : Specifying a single logical unit number.  
  
  Example: -luinfo 0 3  
  
  Multiple specification: Specifying multiple logical unit numbers.  
  
  Example: -luinfo 0 0                                                                                                                                                                                                 |
| -cacheinfo *ctl_no*    | Specify this option when outputting the performance statistics information of cache.  
  
  \[ctl_no\] : Controller number (0, 1)                                                                                                                                                                                                                                           |
| -processorinfo *ctl_no* | Specify this option when outputting the performance statistics information of processor.  
  
  \[ctl_no\] : Controller number (0, 1)                                                                                                                                                                                                                                           |
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| -driveinfo ctl_no [ unit_no.hdu_no ... ] | When outputting statistical information on the drive performance, specify the Unit number and HDU number punctuating them with a period.  
\[ctl_no\] : Controller number (0, 1)  
When doing that, enter the Unit number and HDU number using numerals or hyphen(s) (-). If the specification of Unit number and HDU number is omitted, the information about all the drives is output.  
Single or multiple Unit numbers and HDU numbers can be specified.  
- Single specification : Specifying a single drive number.  
  Example: -driveinfo 0 1.0  
- Multiple specification: Specifying multiple drives numbers.  
  Example: -driveinfo 0 1.0 2.3 3.1  
  -driveinfo 0 1.0-2.2 2.8 |
| -driveoprinfo ctl_no [ unit_no.hdu_no ... ] | When outputting statistical information on the drive operation performance, specify the Unit number and HDU number punctuating them with a period.  
\[ctl_no\] : Controller number (0, 1)  
When doing that, enter the Unit number and HDU number using numerals or hyphen(s) (-). If the specification of Unit number and HDU number is omitted, the information about all the drives operation is output.  
Single or multiple Unit numbers and HDU numbers can be specified.  
- Single specification : Specifying a single drive number.  
  Example: -driveoprinfo 0 1.0  
- Multiple specification: Specifying multiple drives numbers.  
  Example: -driveoprinfo 0 1.0 2.3 3.1  
  -driveoprinfo 0 1.0-2.2 2.8 |
For AMS and WMS:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| -backendinfo ctl_no [ path_no.loop_no ... ] | When outputting statistical information on the back-end performance, specify the path number and loop number punctuating them with a period. 

\[ctl\_no\] : Controller number (0, 1) 

When doing that, enter the path number and loop number using numerals or hyphen(s) (-). If the specification of path number and loop number is omitted, the information about all the back-end is output. Single or multiple path numbers and loop numbers can be specified.

Single specification : Specifying a single path number and loop number.

Example: -backendinfo 0 0.0 

Multiple specification: Specifying multiple path numbers and loop numbers.

Example: -backendinfo 0 0.0 1.0 
-backendinfo 0 0.0-1.0

For SMS and AMS2000:
The tag count and the total tag count output a same value. The average tag count and the total average tag count output the same value.

When the `pfmstatics` option is present and the `portinfo`, `-rginfo`, `-dppoolinfo`, `-luinfo`, `-cacheinfo`, `-processorinfo`, `-driveinfo`, `-driveoprinfo`, `-backendinfo`, `-tapelibraryinfo`, and `-mngareainfo` options are absent, all the information of port, logical unit, cache, RAID group, processor, drive, drive operation, back-end, tape library, management area are outputted. (For AMS, WMS, and SMS, defined RAID group and logical unit are outputted. For AMS2000, defined RAID group, DP pool and logical unit are outputted.)

For AMS2000:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| `-backendinfo` `<ctl_no [path_no.loop_no ...]>` | When outputting statistical information on the back-end performance, specify the path number and loop number punctuating them with a period.  
  
  `ctl_no` : Controller number (0, 1)  
  
  When doing that, enter the path number and loop number using numerals or hyphen(s) (-). If the specification of path number and loop number is omitted, the information about all the back-end is output. Single or multiple path numbers and loop numbers can be specified.  
  
  Single specification : Specifying a single path number and loop number.  
  
  Example: `-backendinfo 0 0.0`  
  
  Multiple specification: Specifying multiple path numbers and loop numbers.  
  
  Example: `-backendinfo 0 0.0 1.0` `-backendinfo 0 0.0-1.0` |
When the -pfmstatics option is present and the -portinfo, -rginfo, -dppoolinfo, -luinfo, -cacheinfo, -processorinfo, -driveinfo, -driveoprinfo, and -backendinfo options are absent, all the information of port, logical unit, cache, RAID group, processor, drive, drive operation, back-end is outputted. (For AMS, WMS and SMS, defined RAID group and logical unit are outputted. For AMS2000, defined RAID group, DP pool and logical unit are outputted.)

If the information cannot be acquired in the interval time by the -auto specification, the "skipped" string displays for the file acquired with the timestamp and the file which could not be acquired in the interval time.

No. 1
2012/11/20 13:01:00 skipped - SN: 93000001

If a communication error has occurred by the -neterrorskip option, an error message "error skipped" displays with the timestamp and file acquired.

No. 1
2012/11/20 13:01:00 skipped - SN: 93000001

error message

**Example**

The following example acquires the performance information of an array ams500a1 only once at an interval of 10 minutes.

```bash
% auperform -unit ams500a1 -auto 10 --count 1 --pfmstatis
Day yy mm hh:mm:ss yyyy Start
Day yy mm hh:mm:ss yyyy Output File Name : pfm00000.txt Output Count : 1/1Turn..
```
The performance statistics information file(s) have been outputted successfully.

<table>
<thead>
<tr>
<th>No.</th>
<th>LU</th>
<th>CTL</th>
<th>Read CMD Count</th>
<th>Read CMD Hit Count</th>
<th>Rate</th>
<th>Write CMD Count</th>
<th>Write CMD Hit Count</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>1</td>
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<tr>
<td></td>
<td>TOTAL</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>LU</th>
<th>CTL</th>
<th>Read CMD Count</th>
<th>Read CMD Hit Count</th>
<th>Rate</th>
<th>Write CMD Count</th>
<th>Write CMD Hit Count</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>2</td>
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<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

- **No.**: Output number
- **Information getting time**: Time and date information is obtained
- **LU**: Logical unit number
- **CTL**: Controller number
- **Read CMD Count**: Number of received Read commands
- **Read CMD Hit Count**: Number of cache-hit Read commands to received Read commands
- **Rate**: Rate (%) of cache-hit Read commands to received Read commands
- **Write CMD Count**: Number of received Write commands
- **Write CMD Hit Count**: Number of cache-hit Write commands to received Write commands
- **Rate**: Rate (%) of cache-hit Write commands to received Write commands
- **Total**: Entire controller
<table>
<thead>
<tr>
<th>CLI command list</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-335</td>
</tr>
</tbody>
</table>
• Generally, when the array is structured so that the load on each controller and the load on each disk are leveled, its performance is improved. The higher the cache-hit rate, the higher the performance becomes.
<table>
<thead>
<tr>
<th>No.</th>
<th>Information getting time</th>
<th>CTL</th>
<th>Port</th>
<th>IO Rate (IOPS)</th>
<th>Write Rate (IOPS)</th>
<th>Read Rate (IOPS)</th>
<th>Write Hit (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time and date information is acquired</td>
<td>1</td>
<td>1</td>
<td>223</td>
<td>12</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Time and date information is acquired</td>
<td>2</td>
<td>1</td>
<td>223</td>
<td>12</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

**CLI command list**

- **No.**: Output number
- **Information getting time**: Time and date information is acquired
- **CTL**: Controller number
- **Port**: Port number
- **IO Rate (IOPS)**: Number of Read/Write commands received per second
- **Read Rate (IOPS)**: Number of Read commands received per second
- **Write Rate (IOPS)**: Number of Write commands received per second
- **Read Hit (%)**: Rate of the number of the Read commands, which could cache-hitting, out of the Read commands received in the specified period
• **Write Hit (%):** Rate of the number of the Write commands, which could write data immediately to the cache, out of the Write commands received in the specified period

• **Trans. Rate (MB/S):** Transfer size of Read/Write commands per second

• **Read Trans. Rate (MB/S):** Transfer size of Read commands per second

• **Write Trans. Rate (MB/S):** Transfer size of Write commands per second

• **Read CMD Count:** Received number of Read commands

• **Write CMD Count:** Received number of Write command

• **Read CMD Hit Count:** Number of the Read commands that had been cache-hit

• **Write CMD Hit Count:** Number of the Write commands, which could write data immediately to the cache

• **Read Trans. Size (MB):** Transfer size of Read commands

• **Write Trans. Size (MB):** Transfer size of Write commands

• **CTL CMD IO Rate (IOPS):** Received number of Initiator Control commands per second (acquired local side only)

• **CTL CMD Trans. Rate (KB/S):** Transfer size of Initiator Control commands per second (acquired local side only)

• **CTL CMD Count:** Number of Initiator Control commands (acquired local side only)

• **CTL CMD Trans. Size (KB):** Transfer size of Initiator Control commands (acquired local side only)

• **CTL CMD Time (microsec.):** Response time of Initiator Control commands

• **CTL CMD Max Time (microsec.):** Max response time of Initiator Control commands

• **Data CMD IO Rate (IOPS):** Received number of Initiator Data commands per second (acquired local side only)

• **Data CMD Trans. Rate (MB/S):** Transfer size of Initiator Data commands per second (acquired local side only)

• **Data CMD Count:** Number of Initiator Data commands (acquired local side only)

• **Data CMD Trans. Size (MB):** Transfer size of Initiator Data commands (acquired local side only)

• **Data CMD Time (microsec.):** Response time of Initiator Data commands

• **Data CMD Max Time (microsec.):** Max response time of Initiator Data commands

• **Timeout Error Count:** Timeout error count
- **Random IO Rate (IOPS):** Received number of Random Read/Write commands per second
- **Random Read Rate (IOPS):** Received number of Random Read commands per second
- **Random Write Rate (IOPS):** Received number of Random Write commands per second
- **Random Trans. Rate (MB/S):** Transfer size of Random Read/Write commands per second
- **Random Read Trans. Rate (MB/S):** Transfer size of Random Read commands per second
- **Random Write Trans. Rate (MB/S):** Transfer size of Random Write commands per second
- **Random Read CMD Count:** Received number of Random Read commands
- **Random Write CMD Count:** Received number of Random Write commands
- **Random Read Trans. Size (MB):** Transfer size of Random Read commands
- **Random Write Trans. Size (MB):** Transfer size of Random Write commands
- **Sequential IO Rate (IOPS):** Received number of Sequential Read/Write commands per second
- **Sequential Read Rate (IOPS):** Received number of Sequential Read commands per second
- **Sequential Write Rate (IOPS):** Received number of Sequential Write commands per second
- **Sequential Trans. Rate (MB/S):** Transfer size of Sequential Read/Write commands per second
- **Sequential Read Trans. Rate (MB/S):** Transfer size of Sequential Read commands per second
- **Sequential Write Trans. Rate (MB/S):** Transfer size of Sequential Write commands per second
- **Sequential Read CMD Count:** Received number of Sequential Read commands
- **Sequential Write CMD Count:** Received number of Sequential Write commands
- **Sequential Read Trans. Size (MB):** Transfer size of Sequential Read commands
- **Sequential Write Trans. Size (MB):** Transfer size of Sequential Write commands
- **XCOPY Rate (IOPS):** Received number of XCOPY commands per second
• **XCOPY Read Rate (IOPS):** Received number of XCOPY Read commands per second

• **XCOPY Write Rate (IOPS):** Received number of XCOPY Write commands per second

• **XCOPY Read Trans. Rate (MB/S):** Transfer size of XCOPY Read commands per second

• **XCOPY Write Trans. Rate (MB/S):** Transfer size of XCOPY Write commands per second

• **XCOPY Time (microsec.):** Response time of XCOPY commands

• **XCOPY Max Time (microsec.):** Max response time of XCOPY commands

• **RG:** RAID group number

• **LU:** Logical unit number

• **Read CMD Hit Count2:** Number of the Hit Read Special Path commands out of the read commands that made cache hits

• **Read CMD Hit Time(microsec.):** The average response time of the Hit Read Special Path command

• **Read CMD Hit Max Time(microsec.):** The maximum response time of the Hit Read Special Path command

• **Write CMD Hit Count2:** Number of the Write Special Path commands out of the Write commands, which could write data immediately to the cache

• **Write CMD Hit Time(microsec.):** The average response time of the Write Special Path command

• **Write CMD Hit Max Time(microsec.):** The maximum response time of the Write Special Path command

• **Read CMD Miss Count:** The number of the Miss Read Special Path commands out of the Read commands that made no cache hits

• **Read CMD Miss Time(microsec.):** The average response time of the Miss Read Special Path command

• **Read CMD Miss Max Time(microsec.):** The maximum response time of the Miss Read Special Path command

• **Write CMD Miss Count:** The number of the Random Write Special Path commands that could complete the high-speed process up to the parity generation that is an extended process of the Write command

• **Write CMD Miss Time(microsec.):** The average response time of the Random Write Special Path command

• **Write CMD Miss Max Time(microsec.):** The maximum response time of the Random Write Special Path command
- **Read CMD Job Count**: The number of the Read commands that could not perform the high-speed process
- **Read CMD Job Time (microsec.)**: The average response time of the Read command job
- **Read CMD Job Max Time (microsec.)**: The maximum response time of the Read command job
- **XCOPY Read Trans. Rate (MB/S)**: Transfer size of XCOPY Read commands per second.
- **XCOPY Write Trans. Rate (MB/S)**: Transfer size of XCOPY Write commands per second.
- **XCOPY time (microsec.)**: Response time of XCOPY commands.
- **XCOPY Max Time (microsec.)**: Max response time of XCOPY commands.
- **Write CMD Job Count**: The number of the Write commands that could not perform the high-speed process
- **Write CMD Job Time (microsec.)**: The average response time of the Write command job
- **Write CMD Job Max Time (microsec.)**: The maximum response time of the Write command job
- **Read Hit Delay CMD Count (<300ms)**: The number of commands, whose response time is less than 300 ms, out of the Hit Read Special Path commands
- **Read Hit Delay CMD Count (300-499ms)**: The number of commands, whose response time is in a range of 300 ms to 499 ms, out of the Hit Read Special Path commands
- **Read Hit Delay CMD Count (500-999ms)**: The number of commands, whose response time is in a range of 500 ms to 999 ms, out of the Hit Read Special Path commands
- **Read Hit Delay CMD Count (1000ms-)**: The number of commands, whose response time is 1000 ms or more, out of the Hit Read Special Path commands
- **Write Hit Delay CMD Count (<300ms)**: The number of commands, whose response time is less than 300 ms, out of the Write Special Path commands
- **Write Hit Delay CMD Count (300-499ms)**: The number of commands, whose response time is in a range of 300 ms to 499 ms, out of the Write Special Path commands
- **Write Hit Delay CMD Count (500-999ms)**: The number of commands, whose response time is in a range of 500 ms to 999 ms, out of the Write Special Path commands
- **Write Hit Delay CMD Count (1000ms-)**: The number of commands, whose response time is 1000 ms or more, out of the Write Special Path commands
- **Read Miss Delay CMD Count(<300ms):** The number of commands, whose response time is less than 300 ms, out of the Miss Read Special Path commands

- **Read Miss Delay CMD Count(300-499ms):** The number of commands, whose response time is in a range of 300 ms to 499 ms, out of the Miss Read Special Path commands

- **Read Miss Delay CMD Count(500-999ms):** The number of commands, whose response time is in a range of 500 ms to 999 ms, out of the Miss Read Special Path commands

- **Read Miss Delay CMD Count(1000ms-):** The number of commands, whose response time is 1000 ms or more, out of the Miss Read Special Path commands

- **Write Miss Delay CMD Count(<300ms):** The number of commands, whose response time is less than 300 ms, out of the Random Write Special Path commands

- **Write Miss Delay CMD Count(300-499ms):** The number of commands, whose response time is in a range of 300 ms to 499 ms, out of the Random Write Special Path commands

- **Write Miss Delay CMD Count(500-999ms):** The number of commands, whose response time is in a range of 500 ms to 999 ms, out of the Random Write Special Path commands

- **Write Miss Delay CMD Count(1000ms-):** The number of commands, whose response time is 1000 ms or more, out of the Random Write Special Path commands

- **Read Job Delay CMD Count(<300ms):** The number of commands, whose response time is less than 300 ms, out of the Read command job

- **Read Job Delay CMD Count(300-499ms):** The number of commands, whose response time is in a range of 300 ms to 499 ms, out of the Read command job

- **Read Job Delay CMD Count(500-999ms):** The number of commands, whose response time is in a range of 500 ms to 999 ms, out of the Read command job

- **Read Job Delay CMD Count(1000ms-):** The number of commands, whose response time is 1000 ms or more, out of the Read command job

- **Write Job Delay CMD Count(<300ms):** The number of commands, whose response time is less than 300 ms, out of the Write command job

- **Write Job Delay CMD Count(300-499ms):** The number of commands, whose response time is in a range of 300 ms to 499 ms, out of the Write command job
- **Write Job Delay CMD Count(500-999ms):** The number of commands, whose response time is in a range of 500 ms to 999 ms, out of the Write command job

- **Write Job Delay CMD Count(1000ms-):** The number of commands, whose response time is 1000 ms or more, out of the Write command job

- **Total Tag Count:** Total tag count

- **Read Tag Count:** Read tag count

- **Write Tag Count:** Write tag count

- **Average Total Tag Count:** Average total tag count

- **Average Read Tag Count:** Average read tag count

- **Average Write Tag Count:** Average write tag count

- **Tag Count:** The maximum number of tags in the specified period

- **Cache Write Pending Rate (%):** Rate of cache usage capacity (middle+physical) within the cache capacity

- **Cache Clean Queue Usage Rate (%):** Rate of clean cache usage

- **Cache Middle Queue Usage Rate (%):** Rate of middle cache usage

- **Cache Physical Queue Usage Rate (%):** Rate of physical cache usage

- **Cache Total Queue Usage Rate (%):** Rate of total cache usage

- **Partition:** Partition number

- **Usage (%):** Operation rate of the processor

- **Host-Cache Bus Usage Rate (%):** The use rate of the bus between the host and the cache

- **Drive-Cache Bus Usage Rate (%):** The use rate of the bus between the drive and the cache

- **Processor-Cache Bus Usage Rate (%):** The use rate of the bus between the processor and the cache

- **Cache (DRR) Bus Usage Rate (%):** The use rate of the bus between the parity generation circuit (DRR) and the cache

- **Dual Bus Usage Rate (%):** The use rate of the bus between the controllers

- **Total Bus Usage Rate (%):** The total use rate of the cache bus

- **Unit:** Unit number

- **HDD:** HDD number
• **Online Verify, Rate (IOPS):** Number of Online Verify commands per second

• **Online Verify CMD Count:** Number of Online Verify commands

• **Operating Rate (%):** Operation rate of the drive

• **Tag Count:** Number of Tag

• **Unload Time (min.):** Unload time of the drive

• **Path:** Path number

• **Cache Hit Rate (%):** Rate of cache-hitting within the management area

• **Access Count:** Access count of the management area

When the Tape replication option is attached, the following information is outputted.

• **TG:** Tape group number

• **Total counts:** Data prefetch counts or cache segment secured counts

• **Miss counts:** Data miss prefetch counts or cache segment miss secured counts

• **Read Rate (MB/S):** Received number of Read commands per second

• **Write Rate (MB/S):** Transfer size of Write commands per second

• **LIB:** Library number

• **DRV:** Tape drive number

• **Read int (microsec.) AVE:** Average time of Read commands
  MAX: Maximum time of Read commands
  MIN: Minimum time of Read commands

• **Write int (microsec.) AVE:** Average time of Write commands
  MAX: Maximum time of Write commands
  MIN: Minimum time of Write commands

**High-speed process:** There are two types of paths which execute the read/write command process: normal path and high-speed path. The high-speed process performs the command process in the high speed path.
Referencing/setting the collection state of performance statistics

Command name

aupfmstatiscfg

Format

9500V, AMS, WMS, SMS, AMS2000, HUS100
aupfmstatiscfg -unit unit_name -refer

9500V, AMS, WMS, SMS
aupfmstatiscfg -unit unit_name -set
[ -port start | stop ]
[ -rglu start | stop ]
[ -cache start | stop ]
[ -processor start | stop ]
[ -drive start | stop ]
[ -driveopr start | stop ]
[ -backend start | stop ]

AMS2000
aupfmstatiscfg -unit unit_name -set
[ -port start | stop ]
[ -rglu start | stop ]
[ -cache start | stop ]
[ -processor start | stop ]
[ -drive start | stop ]
[ -driveopr start | stop ]
[ -backend start | stop ]
[ -tapelibrary start | stop ]

HUS100
aupfmstatiscfg -unit unit_name -set
[ -port start | stop ]
[ -rglu start | stop ]
[ -cache start | stop ]
[ -processor start | stop ]
[ -drive start | stop ]
[ -driveopr start | stop ]
[ -backend start | stop ]
[ -managementarea start | stop ]

Description

This command refers to or sets the collection state of performance statistics information.
### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of the array unit to which the collection state of performance statistics information is referred or set. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Refers to the collection state of performance statistics information.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the collection state of performance statistics information.</td>
</tr>
</tbody>
</table>
| -port start | stop | Specify whether to start or stop collection of information for port.  
  start: Starts collecting information for port.  
  stop: Stops collecting information for port. |
| -rglu start | stop | Specify whether to start or stop collection of information for RAID group and Logical Unit.  
  start: Starts collecting information for RAID group and Logical Unit.  
  stop: Stops collecting information for RAID group and Logical Unit. |
| -cache start | stop | Specify whether to start or stop collection of information for cache.  
  start: Starts collecting information for cache.  
  stop: Stops collecting information for cache. |
| -processor start | stop | Specify whether to start or stop collection of information for processor.  
  start: Starts collecting information for processor.  
  stop: Stops collecting information for processor. |
| -drive start | stop | Specify whether to start or stop collection of information for drives.  
  start: Starts collecting information for drives.  
  stop: Stops collecting information for drives. |
| -driveopr start | stop | Specify whether to start or stop collection of information for drive operations.  
  start: Starts collecting information for drive operations.  
  stop: Stops collecting information for drive operations. |
### Examples

The following example displays the collection state of performance statistics information of an array 9500a1.

```
% aupfmstatiscfg -unit 9500a1 -refer
Password:
Port Information : Stop
RAID Group/Logical Unit Information : Stop
Cache Information : Stop
Processor Information : Stop
Drive Information : Stop
Drive Operating Information : Stop
Back-end Information : Stop
%
```

The following example illustrates starting the capacity of cache and usage rate, then stopping it.

```
% aupfmstatiscfg -unit 9500a1 -set -cache start
Password:
When performance statistics is collected, access from the host is influenced.
Do you want to continue processing? (y/n [n]): y
The collection state of performance statistics information has been set success fully.
%
% aupfmstatiscfg -unit 9500a1 -set -cache stop
Password:
The collection state of performance statistics information has been set success fully.
%
```

The following example displays the collection state of performance statistics information for array unit hus110a1.

```
% aupfmstatiscfg -unit hus110a1 -refer
Password:
Port Information : Start
RAID Group/DP Pool/Logical Unit Information : Start
Cache Information : Start
Processor Information : Start
Drive Information : Start
Drive Operating Information : Start
Back-end Information : Start
Management Area Information : Start
%
```

### Downloading/updating firmware

#### Command name

*aumicro*

#### Format

- **9500V**
  
  ```
  aumicro -unit unit_name -read -fpath disk01
  aumicro -unit unit_name -read -path disk01 disk02 disk03 ...
  ```
This command downloads a firmware into the array. Additionally, it updates the current firmware with a downloaded firmware.

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of an array unit whose firmware to download and update. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;/&quot; (underline), &quot;.&quot; (period), &quot;+&quot;, or &quot; &quot; (space). Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-read</td>
<td>Reads a firmware onto the Navigator.</td>
</tr>
</tbody>
</table>
Examples

The following example downloads the firmwares into an array 9500h and afterward performs the firmwares updating.

This example checks the revision of the firmwares of an array 9500h when downloading it.

% aurev -unit 9500h
Serial Number : 01234567
Firmware Revision : 1654
%

This example first reads in the firmwares to be downloaded. The firmwares are stored in several floppy disks or CD-R. This example shows that the contents of the floppy disk are stored in directories disk01, disk02, disk03, disk04, disk05, and disk06.

% aumicro -unit 9500h -read -fpath C:\Storage Navigator Modular 2 CLI\micro\disk01
Password:

---

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CLI command list 3-349
This example checks the revision of the read-in firmwares.

```
% aumicro -revision
Password:
New Revision : 1654
%
```

This example downloads the read-in firmwares into an array 9500h. It sets the time interval to 3 seconds, and specifies the checking of the firmwares revision. While downloading, the number of files that are already downloaded: mmm, and the total number of files to be downloaded: nnn are will be displayed.

```
% aumicro -unit 9500h -download -time 3 -check on
Password:
Are you sure you want to download the firmware to the subsystem?
(y/n [n]): y
When firmware update starts, the controller stops accepting any access from the host until the update completes.
If you press the 'y' key, access from the host will be again possible right after you press the return key on the message that will be displayed when update is completed.
If you press the 'n' key, access from the host will be possible as soon as the firmware update completes and pressing the return key on the message will have no action. (y/n [n]): n
9500h: mmm/nnn done.
The download has completed.
%
```

NOTE: When the AMS/WMS array is used connecting to the NAS, make sure the fail over of a NAS unit and stop NAS OS of the NAS unit connected to the controller for which a firmware is updated, before updating firmware. If you update a firmware, during a period from an issue of a power down instruction to the completion of the power down when Power Saving, which is a priced option of the array, is used together, the power down may fail because the array receives a command from a host immediately after the array restarts. When the power down fails, execute the power down again. Check that the power down instruction has not been issued or has been completed (no RAID in the Power Saving Status of Normal (Command Monitoring) exists) before update a firmware.

```
% aumicro -unit 9500h -change -ctl0
Password:
It updates the firmware of Controller 0.
This process will cause controller to stop communicating with all attached Hosts
Are you sure? (y/n [n]): y
The access from the host will be accepted if you press the return key and if you have pressed the option 'y' key on the message that was displayed in download. If you have pressed the 'n' key on the message, the controller is already accepting accesses from host and pressing the return key will have no action.
The firmware is updated successfully.
%
% aumicro -unit 9500h -change -ctl1
Password:
```

This example updates the current firmwares with the downloaded firmwares. Updating takes place in the order of controller 0 and then controller 1.

```
% aumicro -unit 9500h -change -ctl0
Password:
It updates the firmware of Controller 0.
This process will cause controller to stop communicating with all attached Hosts
Are you sure? (y/n [n]): y
The access from the host will be accepted if you press the return key and if you have pressed the option 'y' key on the message that was displayed in download. If you have pressed the 'n' key on the message, the controller is already accepting accesses from host and pressing the return key will have no action.
The firmware is updated successfully.
%
% aumicro -unit 9500h -change -ctl1
Password:
```
It updates the firmware of Controller 1.
This process will cause controller to stop communicating with all attached Hosts

Are you sure? (y/n [n]): y
The access from the host will be accepted if you press the return key and if you
have pressed the option ‘y’ key on the message that was displayed in download.
If you have pressed the ‘n’ key on the message, the controller is already accept
ing accesses from host and pressing the return key will have no action.
The firmware is updated successfully.
%

NOTE: It may take time for an array to respond, depending on the condition of
the array. If the array does not respond after 15 minutes or more, check the
condition of the array. When downloading and updating the firmwares have
completed, the read-in firmwares in Storage Navigator Modular 2 is be removed.
%

% aumicro  -clean
Password:
Are you sure you want to delete the firmware?
(y/n [n]): y
%

NOTE: When the firmwares are updated, if the firmware of only one of the
controllers is updated, the array is placed in a warning state. When the firmware
of the other controller is updated, the array recovers from the warning state.
When updating the firmwares, update the firmwares for both controllers. If the
firmwares are read during the firmwares download, errors will occur during the
download processing. When you read firmwares, perform after the download.

Examples of using commands

This section provides several examples of how to use the CLI
commands.

The following is an example of how to configure RAID and set up a
logical unit after connecting to a storage system.

The following is an example of how to set up a RAID and logical unit
after connecting to an array.

1. Register an SMS100 array with a dual configuration by unit name
SMS100. The connection interface is LAN connection for both
controllers.

   % auunitadd -unit SMS100 -LAN -ctl0 125.0.9.98 -ctl1 125.0.9.99
   Unit SMS100 has been registered.
%

2. Check whether the registration has completed.

   % auunitref
Name                      Type       Construction Connection Type Error Monitoring Communication Type IP Ad
dress/Host Name/Device Name SMS100          SMS100 Dual   TCP/IP(LAN)   Enable   Non-secure  125.0.9.98  125.0.9.99
%

CLI command list 3-351
3. Check whether the RAID has been configured.

```
% aurgref -unit SMS100 -t
RAID  RAID   Parity
Group  Level   Groups  Type  Total Capacity  Free Capacity Priority  Status  Resconstruction
Progress
0   6 (9D+2P 1 SAS 1.3 TB  1.3 TB (100%)RAID Group Expansion
Normal   N/A
```

4. Add LU 100 (size 1 GB).

```
% auluadd -unit SMS100 -lu 100 -rg 0 -size 1g
Are you sure you want to set the logical unit? (y/n [n]): y
The logical unit has been set successfully.
The format was started.
```

5. Check whether the logical unit has been configured.

```
% auluref -unit SMS100 -g
Stripe   RAID    DP    RAID
LU       Capacity        Size    Group    Pool  Level        Type  Status
100           1.0 GB       256KB      0     N/A    6( 9D+2P)  SAS   Normal
```

**CLI Commands for Local Replication**

This section covers the following commands related to local replication parameters:

- Display pair and pool information on page 3-352
- Display volumes available for use in pairs on page 3-355
- Display or define the SnapShot volume (V-VOL) on page 3-356
- Display or set up the data pool on page 3-358
- Create pairs on page 3-359
- Split pairs on page 3-362
- Resynchronize pairs on page 3-364
- Restore pairs on page 3-366
- Delete pairs on page 3-367
- Edit pairs on page 3-368
- Monitor pair status—event wait on page 3-370
- CLI, CCI commands for local-replication on page 3-376

**Display pair and pool information**

**Command name**

```
aureplicationlocal -refer
```

**Description**

The `-refer` option displays the specified pairs or all the pairs in the group.
**Syntax**

- To display pair information in a list:
  ```
  aureplicationlocal -unit unit_name -refer [-si] [-ss] [-pvol lun ] [-svol lun ]
  ```
- To display pair information in detail for each pair, include the -detail option:
  ```
  aureplicationlocal -unit unit_name -refer -detail -pairname pair_name -gno group_no | -gname group_name
  ```
- To display pair information in detail for a specified P-VOL and S-VOL:
  ```
  aureplicationlocal -unit unit_name -refer -detail -pvol lun -svol lun
  ```
- To display the pool list used by a pair:
  ```
  aureplicationlocal -unit unit_name -refer -poolinfo
  ```
- To display the split time and the characters string added at the time of the split:
  ```
  aureplicationlocal -unit unit_name -refer -splitinfo
  ```

**Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the array unit name. Must 64 characters or fewer, with alphanumeric and special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; (space). A space in front and back of the character string is removed.</td>
</tr>
<tr>
<td><code>-refer</code></td>
<td>Displays the pair information.</td>
</tr>
<tr>
<td><code>-si</code></td>
<td>Specify for ShadowImage pair.</td>
</tr>
<tr>
<td><code>-ss</code></td>
<td>Specify for SnapShot pair.</td>
</tr>
<tr>
<td><code>-pvol lun</code></td>
<td>Specify the logical unit number of the P-VOL.</td>
</tr>
<tr>
<td><code>-svol lun</code></td>
<td>Specify the logical unit number of the ShadowImage S-VOL or SnapShot V-VOL.</td>
</tr>
<tr>
<td><code>-detail</code></td>
<td>Specify to display detailed pair information.</td>
</tr>
<tr>
<td><code>-splitinfo</code></td>
<td>Specify to display split information.</td>
</tr>
<tr>
<td><code>-poolinfo</code></td>
<td>Specify to display pool information.</td>
</tr>
<tr>
<td><code>-pairname pair_name</code></td>
<td>Specify the pair name (see note).</td>
</tr>
<tr>
<td><code>-gno group_no</code></td>
<td>Specify the group number.</td>
</tr>
<tr>
<td><code>-gname group_name</code></td>
<td>Specify the group name (see note).</td>
</tr>
</tbody>
</table>
NOTE: A pair name and group name must be fewer than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols: %, *, +, -, /, =, @, _, :, [, ]. When specifying a pair name that doesn't belong to a group, use “Ungrouped” in the group name.

Returned values
- Normal termination: 0.
- Abnormal termination: Other than 0

Examples

```
% aureplicationlocal -unit array1 -refer
Pair Name                         LUN   Pair LUN  Status
Copy Type   Group                    
SI_LU0001_LU0002                    1       2  Paired(100%)
    ShadowImage ---:Ungrouped         
SI_LU0003_LU0004                    3       4  Paired(100%)
    ShadowImage ---:Ungrouped         
SS_LU0005_LU0015                    5       15 Split(100%)
    SnapShot    ---:Ungrouped          
SS_LU0006_LU0016                    6       16 Paired(100%)
    SnapShot    ---:Ungrouped          
%
```

```
% aureplicationlocal -unit array1 -refer -detail -pvol 1 -svol 2
Pair Name                      : SI_LU0001_LU0002
LUN                            : 1
Pair LUN                       : 2
Capacity                       : 1.0 GB
Status                         : Paired(100%)
Copy Type                      : ShadowImage
Group                          : ---:Ungrouped
Data Pool                      : N/A
Data Pool Usage Rate           : N/A
Split Time                     : ---
Split String                   : backupdata1
Copy Pace                      : Normal
%
```

```
% aureplicationlocal -unit array1 -refer -splitinfo -ss
Pair Name                          LUN   Pair LUN  Split Time           Split String
SS_LU0005_LU0015                     5       15  2011/09/11 18:06:47  backupdata1
SS_LU0006_LU0016                     6       16  ---
%
```
Display volumes available for use in pairs

Command name

aureplicationlocal -availablelist

Description

The -availablelist option displays a list of volumes that are available for use in a pair.

Syntax

To display a list of available P-VOLs or S-VOLs:

aureplicationlocal -unit unit_name -availablelist
-si | -ss
-pvol lun | -svol lun

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed</td>
</tr>
<tr>
<td>-availablelist</td>
<td>Displays a list of the volumes that can be used in a pair.</td>
</tr>
<tr>
<td>-si</td>
<td>Specify for a ShadowImage pair.</td>
</tr>
<tr>
<td>-ss</td>
<td>Specify for a SnapShot pair.</td>
</tr>
<tr>
<td>-pvol lun</td>
<td>Specify to display the luns available for use as a P-VOL.</td>
</tr>
<tr>
<td>-svol lun</td>
<td>Specify to indicate luns available for use as an S-VOL.</td>
</tr>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed</td>
</tr>
</tbody>
</table>

Returned values

- Normal termination: 0.
Abnormal termination: Other than 0

Example

```bash
% aureplicationlocal -unit array1 -availablelist -si -pvol
Available Logical Units

<table>
<thead>
<tr>
<th>LUN</th>
<th>Capacity</th>
<th>RAID Group</th>
<th>DP Pool</th>
<th>RAID Level</th>
<th>Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.0 GB</td>
<td>0</td>
<td>N/A</td>
<td>6( 4D+2P)</td>
<td>SAS</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>1.0 GB</td>
<td>0</td>
<td>N/A</td>
<td>6( 4D+2P)</td>
<td>SAS</td>
<td>Normal</td>
</tr>
<tr>
<td>3</td>
<td>1.0 GB</td>
<td>0</td>
<td>N/A</td>
<td>6( 4D+2P)</td>
<td>SAS</td>
<td>Normal</td>
</tr>
<tr>
<td>4</td>
<td>1.0 GB</td>
<td>0</td>
<td>N/A</td>
<td>6( 4D+2P)</td>
<td>SAS</td>
<td>Normal</td>
</tr>
<tr>
<td>5</td>
<td>1.0 GB</td>
<td>0</td>
<td>N/A</td>
<td>6( 4D+2P)</td>
<td>SAS</td>
<td>Normal</td>
</tr>
<tr>
<td>6</td>
<td>1.0 GB</td>
<td>0</td>
<td>N/A</td>
<td>6( 4D+2P)</td>
<td>SAS</td>
<td>Normal</td>
</tr>
</tbody>
</table>
```

Display or define the SnapShot volume (V-VOL)

Command name

aureplicationvvol

Description

Use the `aureplicationvvol` command to display SnapShot logical unit (V-VOL) information, or to set up the V-VOL.

Syntax

- To display SnapShot logical units in a list:
  ```bash
  aureplicationvvol -unit unit_name -refer [ -m | -g | -t | -auto ]
  ```
- To create a new SnapShot logical unit:
  ```bash
  aureplicationvvol -unit unit_name -add [ -lu lun ]
  -size num[ m | g | t ]
  ```
- To delete a SnapShot logical unit:
  ```bash
  aureplicationvvol -unit unit_name -rm -lu lun
  ```
Options

Table 3-25: Options for aureplicationvvol

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the SnapShot logical unit (V-VOL).</td>
</tr>
<tr>
<td>-add</td>
<td>Creates the SnapShot logical unit (V-VOL).</td>
</tr>
<tr>
<td>-rm</td>
<td>Deletes the SnapShot logical unit (V-VOL).</td>
</tr>
<tr>
<td>-lu lun</td>
<td>Specify the logical unit number to be used or deleted. When this options is omitted when create SnapShot logical unit, Navigator 2 will be assigned the lowest number of the available LUNs.</td>
</tr>
<tr>
<td>-size num[ m</td>
<td>g</td>
</tr>
<tr>
<td>-m</td>
<td>-g</td>
</tr>
</tbody>
</table>

Returned values

- Normal termination: 0
- Abnormal termination: Other than 0

Example

```bash
% aureplicationvvol -unit Array1 -add -lu 20 -size 1g
Are you sure you want to create the SnapShot logical unit 20? (y/n [n]): y
The SnapShot logical unit has been successfully created.
```

3-357
Display or set up the data pool

Command name

aupool

Description

Use the `aupool` command to display data pool or available LU information, to create or delete a data pool, add LU’s to a data pool, or delete a data pool.

Syntax

- To display current data pool information:
  
aupool -unit unit_name -refer [ -poolno pool_no ]

- To display logical units that are available for use in a data pool:
  
aupool -unit unit_name -availablelist -poolno pool_no

- To add a logical unit to a data pool, or to create a data pool:
  
aupool -unit unit_name -add -poolno pool_no -lu lun ...

- To delete a data pool:
  
aupool -unit unit_name -rm -poolno pool_no

- To change the threshold value:
  
aupool -unit unit_name -chg -poolno pool_no -thres num

Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the name of the array unit. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “- (minus), &quot; (underline)”, &quot;. (period)”, ”@”, or ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays data pool information.</td>
</tr>
<tr>
<td>-add</td>
<td>Adds an LU to the data pool.</td>
</tr>
<tr>
<td>-rm</td>
<td>Deletes the LU from the data pool.</td>
</tr>
<tr>
<td>-chg</td>
<td>Changes the threshold of the data pool usage rate.</td>
</tr>
<tr>
<td>-poolno pool_no</td>
<td>Specify the data pool number.</td>
</tr>
<tr>
<td>-availablelist</td>
<td>Displays a list of LU numbers available for use in a data pool.</td>
</tr>
</tbody>
</table>
Table 3-26: Options for aupool (Continued)

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-lu lun ...</td>
<td>Specify the LU number to be added to the data pool. Single or multiple LU numbers can be specified.</td>
</tr>
<tr>
<td></td>
<td>Examples:</td>
</tr>
<tr>
<td></td>
<td>• -lu 3</td>
</tr>
<tr>
<td></td>
<td>• -lu 0 1 2 3 4 5 8</td>
</tr>
<tr>
<td></td>
<td>• -lu 0-5 8</td>
</tr>
<tr>
<td>-thres num</td>
<td>Specify the threshold percentage for data pool usage rate. 70-percent is the default.</td>
</tr>
</tbody>
</table>

Returned values

- Normal termination: 0
- Abnormal termination: Other than 0

Example

```
% aupool -unit Array1 -refer
Data Pool    : 0
Data Pool Usage Rate: 0% (0.0/10240.0 MB)
Threshold           : 70%
Usage Status        : Normal
LUN  Capacity      RAID Group  DP Pool RAID Level   Type  Status
100   10.0 GB               0 N/A 6( 4D+2P)  SAS   Normal
%
```

Create pairs

Command name

```
aureplicationlocal -create
```

Description

Use the `aureplicationlocal -create` command to create a pair.

Syntax

- **ShadowImage**
  - To create a pair that is not in a group:
    ```
aureplicationlocal -unit unit_name -create -si
    -pvol lun -svol lun [ -pairname pair_name ]
    [ -pace prior | normal | slow ]
    [ -noread ]
    [ -nocopy ]
    [ -muno mu_no ]
    ```
  - To create a new group and create a pair belonging to the group:
    ```
aureplicationlocal -unit unit_name -create -si
    ```
-pvol lun -svol lun [ -pairname pair_name ]
-gno group_no
[ -pace prior | normal | slow ]
[ -noread ]
[ -nocopy ]
[ -muno mu_no ]

- To create a pair and add the pair to an existing group:
  aureplicationlocal -unit unit_name -create -si
  -pvol lun -svol lun [ -pairname pair_name ]
  -gno group_no | -gname group_name
  [ -pace prior | normal | slow ]
  [ -noread ]
  [ -nocopy ]
  [ -muno mu_no ]

- SnapShot
  - To create a pair that is not in a group:
    aureplicationlocal -unit unit_name -create -ss
    -pvol lun -svol lun [ -pairname pair_name ]
    [ -localpoolno pool_no ]
    [ -pace prior | normal | slow ]
    [ -compsplit ]
    [ -muno mu_no ]

  - To create a new group and create a pair belonging to the group:
    aureplicationlocal -unit unit_name -create -ss
    -pvol lun -svol lun [ -pairname pair_name ]
    -gno group_no
    [ -localpoolno pool_no ]
    [ -pace prior | normal | slow ]
    [ -muno mu_no ]

  - To create a pair and add the pair to an existing group:
    aureplicationlocal -unit unit_name -create -ss
    -pvol lun -svol lun [ -pairname pair_name ]
    -gno group_no | -gname group_name
    [ -localpoolno pool_no ]
    [ -pace prior | normal | slow ]
    [ -muno mu_no ]
    [ -muno mu_no ]
### Options

**Table 3-27: Options for aureplicationlocal -create**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <strong>unit_name</strong></td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-create</td>
<td>Specify this option to create pairs.</td>
</tr>
<tr>
<td>-si</td>
<td>Specify for ShadowImage.</td>
</tr>
<tr>
<td>-ss</td>
<td>Specify for SnapShot.</td>
</tr>
<tr>
<td>-pvol <strong>lun</strong></td>
<td>Specify the logical unit number to be the P-VOL.</td>
</tr>
<tr>
<td>-svol <strong>lun</strong></td>
<td>Specify the logical unit number to be the S-VOL.</td>
</tr>
<tr>
<td>-pairname <strong>pair_name</strong></td>
<td>Specify the pair name (see note). When this option is omitted, Navigator 2 adds the following name. <strong>ShadowImage pair</strong>: SI_LUXXXX_LUYYYY <strong>SnapShot pair</strong>: SS_LUXXXX_LUYYYY <strong>XXXX</strong>: Logical unit number of the P-VOL (4 digits with 0) <strong>YYYY</strong>: Logical unit number of the S-VOL (4 digits with 0)</td>
</tr>
<tr>
<td>-localpoolno <strong>pool_no</strong></td>
<td>Specify the data pool number when creating a SnapShot pair. If this option is omitted, Navigator 2 uses the lowest available number.</td>
</tr>
<tr>
<td>-gno <strong>group_no</strong></td>
<td>Use when creating pair that belongs to the specified group. When the specified group does not exist, a new group is created.</td>
</tr>
<tr>
<td>-gname <strong>group_name</strong></td>
<td>Use when creating a pair and adding to the specified group. When the specified group already exists, created pairs are added to the specified group (see note).</td>
</tr>
<tr>
<td>-pace **prior</td>
<td>normal</td>
</tr>
<tr>
<td>-compsplit</td>
<td>Specify to split a pair automatically, immediately after pair creation.</td>
</tr>
<tr>
<td>-noread</td>
<td>Specify to make the S-VOL unavailable for reads after pair creation. This option is for ShadowImage only.</td>
</tr>
<tr>
<td>-nocopy</td>
<td>Specify when not copying from the S-VOL to the P-VOL after the pair creation.</td>
</tr>
<tr>
<td>-muno</td>
<td>Specify MU numbers at the time of pair creation. You can specify MU numbers with any numbers from 0 to 39 for ShadowImage pairs and from 0 to 1032 for SnapShot pairs. The MU numbers already used by other ShadowImage pairs or SnapShot pairs which share the P-VOL cannot be specified. If you do not specify MU numbers, free MU numbers are assigned automatically in ascending order from 1 for ShadowImage pairs and in descending order from 1,032 for SnapShot pairs.</td>
</tr>
</tbody>
</table>
NOTE: Observe the following conventions for pair name character limits:

A pair name and group name must be fewer than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols:%,*,+,-,/,=,@,_,[:,]. Do not use “Ungrouped” in the group name with this command.

If the MU numbers from 0 to 39 are already used, any more ShadowImage pairs cannot be created. When creating SnapShot pairs, specify the MU numbers from 40 or more.

Returned values
• Normal termination: 0
• Abnormal termination: Other than 0

Example

% aureplicationlocal -unit array1 -create -si -pvol 100 -svol 200 -pairname PAIR_SI_010 -gno 1
Are you sure you want to create pair “PAIR_SI_010”? (y/n [n]): y
The pair has been created successfully.
%

Split pairs

Command name
aureplicationlocal -split

Description
The aureplicationlocal -split command is used to split a pair or all pairs in the group.

Syntax
• ShadowImage
  • To split a pair by specifying the pair name:
    aureplicationlocal -unit unit_name -split -si
    -pairname pair_name
    -gno group_no | -gname group_name
    [ -force ]
    [ -splitstr split_str ]
  • To split a pair by specifying the P-VOL and S-VOL:
    aureplicationlocal -unit unit_name -split -si
    -pvol lun -svol lun
-force
-splitstr split_str

- To split the pairs in a group:
  aureplicationlocal -unit unit_name -split -si
  -gno group_no | -gname group_name
  -force
  -splitstr split_str

- SnapShot
  - To split a pair by specifying the pair name:
    aureplicationlocal -unit unit_name -split -ss
    -pairname pair_name
    -gno group_no | -gname group_name
    -splitstr split_str
  - To split a pair by specifying the P-VOL and S-VOL:
    aureplicationlocal -unit unit_name -split -ss
    -pvol lun -svol lun
    -splitstr split_str
  - To split the pairs in a group:
    aureplicationlocal -unit unit_name -split -ss
    -gno group_no | -gname group_name
    -splitstr split_str

Options

Table 3-28: Options for aureplicationlocal -split

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>The array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-split</td>
<td>Specify to split pairs.</td>
</tr>
<tr>
<td>-si</td>
<td>Specify for ShadowImage pairs.</td>
</tr>
<tr>
<td>-ss</td>
<td>Specify for SnapShot pairs.</td>
</tr>
<tr>
<td>-pvol lun</td>
<td>The logical unit number to be the P-VOL.</td>
</tr>
<tr>
<td>-svol lun</td>
<td>The logical unit number to be the S-VOL.</td>
</tr>
<tr>
<td>-pairname pair_name</td>
<td>The name of the pair to be split (see note).</td>
</tr>
<tr>
<td>-gno group_no</td>
<td>Use to split pairs that belong to the specified group. When the pair name is not specified, all pairs in the group are split.</td>
</tr>
<tr>
<td>-gname group_name</td>
<td>Use to split pairs that belong to the specified group. When the pair name is not specified, all pairs in the group are split (see note).</td>
</tr>
<tr>
<td>-force</td>
<td>Use to split pairs forcibly. This option is for ShadowImage only.</td>
</tr>
</tbody>
</table>
Table 3-28: Options for aureplicationlocal -split

| -splitstr split_str | Adds the specified character string to a pair and splits it. This option cannot be specified together with the -force option. |

NOTE: A pair name and group name must be fewer than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols:%,*,+,-,/,=,@,_,;,[]. When specifying a pair name that doesn't belong to a group, use “Ungrouped” in the group name.

Returned values

- Normal termination: 0
- Abnormal termination: Other than 0

Example

```
% aureplicationlocal -unit array1 -split -ss -pairname PAIR_SS_010 -gname CTG1 -splitstr ABCDEF
Are you sure you want to split pair?
(y/n [n]): y
The split of pair has been required.
```

Resynchronize pairs

Command name

aureplicationlocal -resync

Description

The aureplicationlocal -resync option is used to resynchronize the specified pair, or pairs in a group.

Syntax

- To resynchronize a pair by specifying the pair name:

  aureplicationlocal -unit unit_name -resync -si | -ss -pairname pair_name -gno group_no | -gname group_name

- To resynchronize a pair by specifying the P-VOL and S-VOL:

  aureplicationlocal -unit unit_name -resync -si | -ss -pvol lun -svol lun
- To resynchronize the pairs in a group:
  ```plaintext
aureplicationlocal -unit unit_name -resync
   -si | -ss
   -gno group_no | -gname group_name
  ```

**Options**

**Table 3-29: Options for aureplicationlocal -resync**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name that resynchronizes pairs. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; &quot; (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-resync</td>
<td>Use to resynchronize pairs.</td>
</tr>
<tr>
<td>-si</td>
<td>Specify for ShadowImage pairs.</td>
</tr>
<tr>
<td>-ss</td>
<td>Specify for SnapShot pairs.</td>
</tr>
<tr>
<td>-pvol lun</td>
<td>Specify the logical unit number of the P-VOL.</td>
</tr>
<tr>
<td>-svol lun</td>
<td>Specify the logical unit number of the S-VOL.</td>
</tr>
<tr>
<td>-pairname pair_name</td>
<td>Specify the pair name. When this option is omitted, all pairs that belong to the specified group are resynchronized (see note).</td>
</tr>
<tr>
<td>-gno group_no</td>
<td>Resynchronize pairs that belong to the specified group. When the pair name is not specified, all pairs that belong to the specified group are resynchronized.</td>
</tr>
<tr>
<td>-gname group_name</td>
<td>Resynchronize pairs that belong to the specified group. When the pair name is not specified, all pairs that belong to the specified group are resynchronized (see note).</td>
</tr>
</tbody>
</table>

**NOTE:** A pair name and group name must be fewer than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols: %,*,+,-,/,=,@,_,;,[]. When specifying a pair name that doesn't belong to a group, use "Ungrouped" in the group name.

**Returned values**
- Normal termination: 0
- Abnormal termination: Other than 0:

**Example**

```plaintext
% aureplicationlocal -unit array1 -resync -si -pairname PAIR_SI_010 -gname CTG1
Are you sure you want to re-synchronize pair?
(y/n [n]): y
The re-synchronizing of pair has been required.
%```

CLI command list 3-365
Restore pairs

**Command name**

    aureplicationlocal -restore

**Description**

The `aureplicationlocal -restore` option is used to restore the specified pair or pairs in the group.

**Syntax**

- To restore a pair for the specified pair name:
  ```
  aureplicationlocal -unit unit_name -restore
  -si | -ss
  -pairname pair_name
  -gno group_no | -gname group_name
  ```

- To restore a pair for the specified P-VOL and S-VOL:
  ```
  aureplicationlocal -unit unit_name -restore
  -si | -ss
  -pvol lun -svol lun
  ```

- To restore all pair in a group:
  ```
  aureplicationlocal -unit unit_name -restore
  -si | -ss
  -gno group_no | -gname group_name
  ```

**Options**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name that restores pairs. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;, (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-restore</td>
<td>Use to restore pairs.</td>
</tr>
<tr>
<td>-si</td>
<td>Specify for ShadowImage pairs.</td>
</tr>
<tr>
<td>-ss</td>
<td>Specify for SnapShot pairs.</td>
</tr>
<tr>
<td>-pvol lun</td>
<td>Specify the logical unit number of the P-VOL.</td>
</tr>
<tr>
<td>-svol lun</td>
<td>Specify the logical unit number of the S-VOL.</td>
</tr>
<tr>
<td>-pairname pair_name</td>
<td>Specify the pair name. When this option is omitted, all pairs which belong to the specified group are restored (see note).</td>
</tr>
<tr>
<td>-gno group_no</td>
<td>Restore pairs which belong to the specified group. When the pair name is not specified, all pairs in the specified group are restored.</td>
</tr>
</tbody>
</table>
Table 3-30: Options for aureplicationlocal -restore

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-gname group_name</td>
<td>Restore pairs which belong to the specified group. When the pair name is not specified, all pairs in the specified group are restored (see note).</td>
</tr>
</tbody>
</table>

**NOTE:** A pair name and group name must be fewer than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols: %,*,+,-,./,=,@,_. When specifying a pair name that doesn't belong to a group, use "Ungrouped" in the group name.

**Returned values**
- Normal termination: 0
- Abnormal termination: Other than 0:

**Example**

```bash
% aureplicationlocal -unit Array1 -restore -ss -pvol 10 -svol 100
Are you sure you want to restore pair?
(y/n [n]): y
The restoring of pair has been required.
%
```

**Delete pairs**

**Command name**

```bash
aureplicationlocal -simplex
```

**Description**

The `aureplicationlocal -simplex` option is used to delete the specified pair or pairs in a group.

**Syntax**
- To delete a pair by specifying the pair name:
  ```bash
  aureplicationlocal -unit unit_name -simplex
  -si | -ss
  -pairname pair_name
  -gno group_no | -gname group_name
  ```
- To delete a pair by specifying the P-VOL and S-VOL:
  ```bash
  aureplicationlocal -unit unit_name -simplex
  -si | -ss
  -pvol lun -svol lun
  ```
- To delete all pair in a group:
  ```bash
  aureplicationlocal -unit unit_name -simplex
  -si | -ss
  ```
Options

Table 3-31: Options for aureplicationlocal -simplex

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name that deletes pairs. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-simplex</td>
<td>Release pairs.</td>
</tr>
<tr>
<td>-si</td>
<td>Specify for ShadowImage pairs.</td>
</tr>
<tr>
<td>-ss</td>
<td>Specify for Snapshot pairs.</td>
</tr>
<tr>
<td>-pvol lun</td>
<td>Specify the logical unit number to be the P-VOL.</td>
</tr>
<tr>
<td>-svol lun</td>
<td>Specify the logical unit number to be the S-VOL.</td>
</tr>
<tr>
<td>-pairname pair_name</td>
<td>Specify the pair name. When this option is omitted, all pairs which belong to the specified group are deleted (see note).</td>
</tr>
<tr>
<td>-gno group_no</td>
<td>Specify the group number. If the pair name is not specified, all pairs which belong to the specified group are deleted.</td>
</tr>
<tr>
<td>-gname group_name</td>
<td>Specify the group name. If the pair name is not specified, all pairs which belong to the specified group are deleted (see note).</td>
</tr>
</tbody>
</table>

NOTE: A pair name and group name must be fewer than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols: %,*,+,−,/,=,@,_,;[,]. When specifying a pair name that doesn't belong to a group, use "Ungrouped" in the group name.

Returned values

- Normal termination: 0
- Abnormal termination: Other than 0:

Example

```
% aureplicationlocal -unit array1 -simplex -ss -pairname PAIR_SS_010 -gname CTG1
Are you sure you want to release pair?
{y/n [n]}: y
The pair has been released successfully.
```

Edit pairs

Command name

aureplicationlocal -chg
Description

The `aureplicationlocal -chg` option is used to change the group name, pair name, or copy pace.

Syntax

- To change a group name:

  ```
  aureplicationlocal -unit unit_name -chg
  -gno group_no | -gname group_name
  -newgname new_group_name
  ```

- To change a pair name or copy pace by specifying the pair name:

  ```
  aureplicationlocal -unit unit_name -chg
  -si | -ss
  -pairname pair_name
  -gno group_no | -gname group_name
  [ -newpairname new_pair_name ]
  [ -pace prior | normal | slow ]
  ```

- To change the pair name or the copy pace by specifying the P-VOL and S-VOL:

  ```
  aureplicationlocal -unit unit_name -chg
  -si | -ss
  -pvol lun -svol lun
  [ -newpairname new_pair_name ]
  [ -pace prior | normal | slow ]
  ```

Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ “ (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-chg</td>
<td>Changes the group information or pair information.</td>
</tr>
<tr>
<td>-si</td>
<td>Specify for ShadowImage pairs.</td>
</tr>
<tr>
<td>-ss</td>
<td>Specify for SnapShot pairs.</td>
</tr>
<tr>
<td>-pvol lun</td>
<td>Specify the logical unit number to be the P-VOL.</td>
</tr>
<tr>
<td>-svol lun</td>
<td>Specify the logical unit number to be the S-VOL.</td>
</tr>
<tr>
<td>-pairname pair_name</td>
<td>Specify the current pair name (see note).</td>
</tr>
<tr>
<td>-gno group_no</td>
<td>Specify the group number.</td>
</tr>
<tr>
<td>-gname group_name</td>
<td>Specify the current group name. *</td>
</tr>
<tr>
<td>-pace prior</td>
<td>normal</td>
</tr>
</tbody>
</table>
Table 3-32: Options for aureplicationlocal -chg (Continued)

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-newgname new_group_name</td>
<td>Changes the group name to the new name. **</td>
</tr>
<tr>
<td>-newpairname new_pair_name</td>
<td>Changes the pair name to the new name (see note).</td>
</tr>
</tbody>
</table>

NOTE: A pair name and group name must be fewer than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols: %,*,+,-,/,=,@,_,[:].

* When specifying a pair name that doesn’t belong to a group, use “Ungrouped” in the group name.

** For a new group name, do not specify “Ungrouped”. An error occurs if it is specified at the time of creation.

Returned values

- Normal termination: 0
- Abnormal termination: Other than 0:

Example

```
% aureplicationlocal -unit array1 -chg -pvol 20 -svol 200 -newpairname PAIR_SI_010
Are you sure you want to change pair information?
(y/n [n]): y
The pair information has been changed successfully.
%
```

Monitor pair status—event wait

This command is used to monitor pair status for local and remote replication.

Command name

aureplicationmon -evwait

Description

The aureplicationmon -evwait command instructs the system to display the pair status when it becomes the status that was specified in the command, for the specified pair or pairs in the group. It is also used to displays the current pair status.

Syntax

- Displays the specified status for the pairs in the group.

```
aureplicationmon -unit unit_name -evwait
   -si | -ss | -tc | -tce
   -gno group_no | -gname group_name
   -st [ simplex ] [ sync ] [ paired ]
```
• Displays the specified status for the specified P-VOL and S-VOL
  
aureplicationmon -unit unit_name -evwait
  -si | -ss | -tc | -tce
  -pairname pair_name
  -gno group_no | -gname group_name
  -st [ simplex ] [ sync ] [ paired ] [ split ] [ failure ] [ takeover ]
  -pvol | -svol
  [ -timeout time ]

• Displays current status for the specified group:
  
aureplicationmon -unit unit_name -evwait
  -si | -ss | -tc | -tce
  -gno group_no | -gname group_name
  -waitmode recovery | backup
  -nowait

• Waits until the pair status becomes the specified status for the pairs in the group.
  
aureplicationmon -unit unit_name -evwait
  -si | -ss | -tc | -tce
  -gno group_no | -gname group_name
  -st [ simplex ] [ sync ] [ paired ] [ split ] [ failure ] [ takeover ] [ splitpending ]
  -waitmode recovery | backup
  [ -timeout time ]

• Waits until the pair status becomes the specified status.
  
aureplicationmon -unit unit_name -evwait
  -si | -ss | -tc | -tce
  -pairname pair_name
  -gno group_no | -gname group_name
  -st [ simplex ] [ sync ] [ paired ] [ split ] [ failure ] [ takeover ] [ splitpending ]
  -pvol | -svol
  [ -timeout time ]

• To get the current status of the specified group:
  
aureplicationmon -unit unit_name -evwait
  -si | -ss | -tc | -tce
  -gno group_no | -gname group_name
  -waitmode recovery | backup
  -nowait

• To get the current status of the specified pair:
  
aureplicationmon -unit unit_name -evwait
  -si | -ss | -tc | -tce
  -pairname pair_name
  -gno group_no | -gname group_name
  -nowait

aureplicationmon -unit unit_name -evwait
  -si | -ss | -tc | -tce
  -pairname pair_name
# Options

**Table 3-33: Options for aureplicationmon -evwait**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit \textit{unit_name}</td>
<td>Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumerical characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-evwait</td>
<td>Waits for the specified status or gets the current status.</td>
</tr>
<tr>
<td>-si</td>
<td>Specify for ShadowImage pairs.</td>
</tr>
<tr>
<td>-ss</td>
<td>Specify for SnapShot pairs.</td>
</tr>
<tr>
<td>-tc</td>
<td>Specify for TrueCopy pair.</td>
</tr>
<tr>
<td>-tce</td>
<td>Specify for the TCE pair.</td>
</tr>
<tr>
<td>-pairname \textit{pair_name}</td>
<td>Specify the pair name (see note).</td>
</tr>
<tr>
<td>-gno \textit{group_no}</td>
<td>Specify the group number (see note)</td>
</tr>
<tr>
<td>-gname \textit{group_name}</td>
<td>Specify the group name (see note)</td>
</tr>
<tr>
<td>-st [ simplex ] [ sync ] [ paired ] [ split ] [ failure ] [ takeover ]</td>
<td>Specify the pair status that you want to wait for.</td>
</tr>
</tbody>
</table>
| -waitmode \textit{recovery} \textit{backup} | Specify the mode that defines the status of a group in which the specified pair status is desired. The two modes you can specify are:  
  - recovery: For disaster recovery.  
  - backup: For backup use.  
  See the waitmode discussion following the note. |
| -pvol                    | Specify monitoring target to P-VOL                                                                                                          |
| -svol                    | Specify monitoring target to S-VOL                                                                                                          |
| -nowait                  | Gets the current status of the pair or the group.                                                                                           |
| -timeout \textit{time}   | Specify time-out time. When this option is omitted, the time-out time set 3 seconds. \textit{time} = time-out time (0 to 180)                  |

**NOTE:** A pair name and group name must be fewer than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols: \%\*,+,–,/,=,\@,\_,:,[]. When specifying a pair name that doesn't belong to a group, use "Ungrouped" in the group name.

The following tables list group status for various features when the pair status is mixed in the group.

On waitmode: Tables 3-36 and 3-37 show how the pair status that is returned depends on the waitmode value, when the statuses differ for multiple pairs in a group.
For example, if a pair whose status is in the Split state, and another pair whose status is in the Paired state, exist in the same group, the pair status of the group (returned value) varies, depending on the value for waitmode. The pair status is in the Split state when waitmode is recovery, and it is Paired when waitmode is backup.

If you want to wait for all pairs to be in the Paired statue, specify recovery for waitmode. In this mode, all other statuses have higher priority than Paired.

If you want to wait for the pair statuses of all the pairs to be Split, specify backup for the waitmode. In this mode, all other statuses have higher priority than Split.

### Table 3-34: Group Status Priorities for Recovery Waitmode

<table>
<thead>
<tr>
<th>(ShadowImage/SnapShot)</th>
<th>Priority</th>
<th>Pair Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Synchronizing</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Split</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Threshold Over</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Paired</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Simplex</td>
</tr>
</tbody>
</table>

### Table 3-35: Group Status Priorities for Backup Waitmode

<table>
<thead>
<tr>
<th>(ShadowImage/SnapShot)</th>
<th>Priority</th>
<th>Pair Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Synchronizing</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Failure</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Paired</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Threshold Over</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Split</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Simplex</td>
</tr>
</tbody>
</table>

### Table 3-36: ShadowImage/SnapShot

<table>
<thead>
<tr>
<th>Priority</th>
<th>Pair Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Synchronizing</td>
</tr>
<tr>
<td>2</td>
<td>Failure</td>
</tr>
<tr>
<td>3</td>
<td>Split Pending</td>
</tr>
<tr>
<td>4</td>
<td>Split</td>
</tr>
</tbody>
</table>
5  |  Threshold Over
6  |  Paired Internally Synchronizing
7  |  Paired
8  |  Simplex

**ShadowImage/SnapShot**

<table>
<thead>
<tr>
<th>Priority</th>
<th>Pair Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Synchronizing</td>
</tr>
<tr>
<td>2</td>
<td>Failure</td>
</tr>
<tr>
<td>3</td>
<td>Paired</td>
</tr>
<tr>
<td>4</td>
<td>Paired Internally Synchronizing</td>
</tr>
<tr>
<td>5</td>
<td>Threshold Over</td>
</tr>
<tr>
<td>6</td>
<td>Split Pending</td>
</tr>
<tr>
<td>7</td>
<td>Split</td>
</tr>
<tr>
<td>8</td>
<td>Simplex</td>
</tr>
</tbody>
</table>

**Table 3-37: Group Status Priorities for Recovery Waitmode**

<table>
<thead>
<tr>
<th>(ShadowImage/SnapShot)</th>
<th>(TrueCopy/TCE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority</td>
<td>Prior Status</td>
</tr>
<tr>
<td>1</td>
<td>Synchronizing</td>
</tr>
<tr>
<td>2</td>
<td>Failure</td>
</tr>
<tr>
<td>3</td>
<td>Split</td>
</tr>
<tr>
<td>4</td>
<td>Threshold Over</td>
</tr>
<tr>
<td>5</td>
<td>Paired</td>
</tr>
<tr>
<td>6</td>
<td>Simplex</td>
</tr>
<tr>
<td>1</td>
<td>Synchronizing</td>
</tr>
<tr>
<td>2</td>
<td>Failure</td>
</tr>
<tr>
<td>3</td>
<td>Inconsistent</td>
</tr>
<tr>
<td>4</td>
<td>Pool Full</td>
</tr>
<tr>
<td>5</td>
<td>Split</td>
</tr>
<tr>
<td>6</td>
<td>Busy</td>
</tr>
<tr>
<td>7</td>
<td>Takeover</td>
</tr>
<tr>
<td>8</td>
<td>Paired</td>
</tr>
<tr>
<td>9</td>
<td>Simplex</td>
</tr>
</tbody>
</table>

**Table 3-38: Group Status Priorities for Backup Waitmode**

<table>
<thead>
<tr>
<th>(ShadowImage/SnapShot)</th>
<th>(TrueCopy/TCE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority</td>
<td>Prior Status</td>
</tr>
<tr>
<td>1</td>
<td>Synchronizing</td>
</tr>
<tr>
<td>2</td>
<td>Failure</td>
</tr>
<tr>
<td>3</td>
<td>Paired</td>
</tr>
<tr>
<td>4</td>
<td>Threshold Over</td>
</tr>
<tr>
<td>5</td>
<td>Split</td>
</tr>
<tr>
<td>6</td>
<td>Simplex</td>
</tr>
<tr>
<td>1</td>
<td>Synchronizing</td>
</tr>
<tr>
<td>2</td>
<td>Failure</td>
</tr>
<tr>
<td>3</td>
<td>Inconsistent</td>
</tr>
<tr>
<td>4</td>
<td>Paired</td>
</tr>
<tr>
<td>5</td>
<td>Pool Full</td>
</tr>
<tr>
<td>6</td>
<td>Busy</td>
</tr>
</tbody>
</table>
Table 3-38: Group Status Priorities for Backup Waitmode

<table>
<thead>
<tr>
<th>Priority</th>
<th>Pair Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Synchronizing</td>
</tr>
<tr>
<td>2</td>
<td>Failure</td>
</tr>
<tr>
<td>3</td>
<td>Inconsistent</td>
</tr>
<tr>
<td>4</td>
<td>Pool Full</td>
</tr>
<tr>
<td>5</td>
<td>Split</td>
</tr>
<tr>
<td>6</td>
<td>Busy</td>
</tr>
<tr>
<td>7</td>
<td>Takeover</td>
</tr>
<tr>
<td>8</td>
<td>Paired</td>
</tr>
<tr>
<td>9</td>
<td>Simplex</td>
</tr>
</tbody>
</table>

Table 3-40: TrueCopy/TCE Recovery Mode

<table>
<thead>
<tr>
<th>Priority</th>
<th>Pair Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Takeover</td>
</tr>
<tr>
<td>8</td>
<td>Split</td>
</tr>
<tr>
<td>9</td>
<td>Simplex</td>
</tr>
</tbody>
</table>

Table 3-41: TrueCopy/TCE Backup Mode

<table>
<thead>
<tr>
<th>Priority</th>
<th>Pair Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Synchronizing</td>
</tr>
<tr>
<td>2</td>
<td>Failure</td>
</tr>
<tr>
<td>3</td>
<td>Inconsistent</td>
</tr>
<tr>
<td>4</td>
<td>Paired</td>
</tr>
<tr>
<td>5</td>
<td>Pool Full</td>
</tr>
<tr>
<td>6</td>
<td>Busy</td>
</tr>
<tr>
<td>7</td>
<td>Takeover</td>
</tr>
<tr>
<td>8</td>
<td>Split</td>
</tr>
<tr>
<td>9</td>
<td>Simplex</td>
</tr>
</tbody>
</table>

Returned values

The following values are returned corresponding to the pair status when the command execution is completed. If you specify the –nowait option, the P-VOL status is returned.

Table 3-42: Returned Values for -evwait

<table>
<thead>
<tr>
<th>Monitoring Volume</th>
<th>Status</th>
<th>Returned Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-VOL or S-VOL</td>
<td>Simplex</td>
<td>10</td>
</tr>
</tbody>
</table>
Table 3-42: Returned Values for -evwait

<table>
<thead>
<tr>
<th>P-VOL</th>
<th>S-VOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronizing</td>
<td>Synchronizing</td>
</tr>
<tr>
<td>Reverse Synchronizing</td>
<td></td>
</tr>
<tr>
<td>Paired</td>
<td>Paired</td>
</tr>
<tr>
<td>Split</td>
<td>Split</td>
</tr>
<tr>
<td>Failure</td>
<td>Failure</td>
</tr>
<tr>
<td>Threshold Over</td>
<td></td>
</tr>
<tr>
<td>Pool Full</td>
<td></td>
</tr>
<tr>
<td>Inconsistent</td>
<td></td>
</tr>
<tr>
<td>Busy</td>
<td>Busy</td>
</tr>
</tbody>
</table>

Example

```bash
% aureplicationmon -unit array1 -evwait -si -pairname SI_LU0001_LU0002 -gname Ungrouped -st paired -pvol
Paired Status Monitoring...
Status has been changed to Paired.
```

CLI, CCI commands for local-replication

Table 3-43: CLI, CCI Commands for Remote Repl.

<table>
<thead>
<tr>
<th>Description</th>
<th>CLI Command</th>
<th>CCI Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display pair information</td>
<td>aureplicationlocal -refer</td>
<td>pairdisplay</td>
</tr>
<tr>
<td>Create pairs</td>
<td>aureplicationlocal -create</td>
<td>paircreate</td>
</tr>
<tr>
<td>Split pairs</td>
<td>aureplicationlocal -split</td>
<td>pairsplit</td>
</tr>
<tr>
<td>Resynchronize pairs</td>
<td>aureplicationlocal -resync</td>
<td>pairresync</td>
</tr>
<tr>
<td>Restore pairs</td>
<td>aureplicationlocal -restore</td>
<td>pairresync -restore</td>
</tr>
<tr>
<td>Delete pairs</td>
<td>aureplicationlocal -simplex</td>
<td>pairsplit -S</td>
</tr>
<tr>
<td>Event wait</td>
<td>aureplicationmon -evwait</td>
<td>pairevtwait</td>
</tr>
</tbody>
</table>
CLI Commands for Remote Replication

- This section covers the following commands related to remote replication parameters:
  - Display pair and pool information on page 3-377
  - Display volumes available for use in pairs on page 3-380
  - Remote path—display, define, delete, repair on page 3-381
  - Display remote path information on page 3-381
  - Define the remote path on page 3-384
  - Delete remote path target (CHAP secret) on page 3-387
  - Reconstruct the remote path on page 3-388
  - Delete the remote path on page 3-389
  - Creating pairs on page 3-393
  - Split pairs on page 3-396
  - Resynchronize pairs on page 3-398
  - Swap pairs on page 3-400
  - Delete pairs on page 3-401
  - Edit pairs on page 3-404
  - CLI, CCI commands for remote-replication on page 3-410

Display pair and pool information

Command name

```plaintext
aureplicationremote -refer
```

Description

The `aureplicationremote -refer` command displays the specified pairs or all the pairs in the group.

Syntax

- To display pair information in a list:
  ```plaintext
  aureplicationremote -unit unit_name -refer [-tc][-tce][-pvol lun][-svol lun]
  ```
- To display pair information in detail for each pair, include the `-detail` option:
  ```plaintext
  aureplicationremote -unit unit_name -refer -detail
  -pairname pair_name
  -gno group_no | -gname group_name
  ```
- To display pair information in detail for a specified P-VOL and S-VOL:
  ```plaintext
  aureplicationremote -unit unit_name -refer -detail
  ```
-pvol lun -svol lun

- To display the DP pool list that the pair used, specify as shown below:
  
  aureplicationremote -unit unit_name -refer -dppoolinfo

- To display the pool list that a pair uses, specify as shown:
  
  aureplicationremote -unit unit_name -refer -poolinfo

- To display the group information of the pair, specify as shown below:
  
  aureplicationremote -unit unit_name -refer -groupinfo

Options

Table 3-44: Options for aureplicationremote -refer

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Must be less than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “(space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the pair information.</td>
</tr>
<tr>
<td>-tc</td>
<td>Specify for TrueCopy pairs.</td>
</tr>
<tr>
<td>-tce</td>
<td>Specify when displaying the TCE pair.</td>
</tr>
<tr>
<td>-pvol lun</td>
<td>Specify the logical unit number of the P-VOL.</td>
</tr>
<tr>
<td>-svol lun</td>
<td>Specify the logical unit number of the S-VOL or SnapShot Logical Unit (V-VOL).</td>
</tr>
<tr>
<td>-detail</td>
<td>Specify for detailed pair information.</td>
</tr>
<tr>
<td>-poolinfo</td>
<td>Specify for pool information.</td>
</tr>
<tr>
<td>-dppoolinfo</td>
<td>Specify when displaying the DP pool information.</td>
</tr>
<tr>
<td>-groupinfo</td>
<td>Specify when displaying the group information of TCE pair.</td>
</tr>
<tr>
<td>-pairname pair_name</td>
<td>Specify the pair name (see note).</td>
</tr>
<tr>
<td>-gno group_no</td>
<td>Specify the group number.</td>
</tr>
<tr>
<td>-gname group_name</td>
<td>Specify the group name (see note).</td>
</tr>
</tbody>
</table>

NOTE: A pair name and group name must be less than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols: %, *, +, -, /, =, @, :,. When specifying a pair name that doesn't belong to a group, use “Ungrouped” in the group name.

Returned values

- Normal termination: 0.
- Abnormal termination: Other than 0
Examples

% aureplicationremote -unit localarray -refer pair name Local LUN Attribute
Remote LUN Status
Copy Type Group Name
TC_LU0000_LU0000 0 P-VOL 0 Paired(100)
%  TrueCopy ---:Ungrouped
TC_LU0001_LU0001 1 P-VOL 1 Paired(100)
%  TrueCopy ---:Ungrouped
%

Example using -pairname option

% aureplicationremote -unit localarray -refer -detail -pairname
TC_LU0000_LU0000
  -gno 0
Pair Name  : TC_LU0000_LU0000
Local Information
  LUN   : 0
  Attribute : P-VOL
  DP Pool  
  Replication Data : 0
  Management Area  : 0
Remote Information
  Array ID  : 91200007
  Path Name : N/A
  LUN       : 0
  Capacity  : 50.0 GB
  Status    : Paired(100%)
  Copy Type : TrueCopy Extended Distance
  Group     : 0:TCE_Group1
  Consistency Time : N/A
  Difference Size   : 0.0 MB
  Copy Pace          : Prior
  Fence Level        : N/A
  Previous Cycle Time  : 0 sec.
%

Example using -dppoolinfo option

% aureplicationremote -unit localarray -refer -dppoolinfo
Pair name Local LUN Attribute Remote LUN DP
Pool  DP Pool Usage Rate
TCE_LU0000_LU0000 0 P-VOL 0
0 10%
%

Example using -groupinfo

% aureplicationremote -unit localarray -refer -groupinfo
Group CTL Lapsed Time Difference Size[MB] Transfer Rate[KB/s] Transfer Completion
0:TCE_Group1 0 00:00:25 0 200 00:00:30
Display volumes available for use in pairs

Command name

`aureplicationremote -availablelist`

Description

The `aureplicationremote -availablelist` command displays a list of volumes that are available for use in a pair.

Syntax

To display a list of available P-VOLs or S-VOLs:

```
aureplicationremote  -unit unit_name -availablelist
    -tc | -tce
    -pvol
```

Options

- `-unit unit_name` Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed
- `-availablelist` Displays volumes available for use in pairs.
- `-tc` Specify for TrueCopy pairs.
- `-tce` Specify for TCE pairs.
- `-pvol` Specify when displaying volumes for a P-VOL.

Returned values

- Normal termination: 0.
- Abnormal termination: Other than 0

Example

```
% aureplicationremote -unit array1 -availablelist -tc -pvol
Available Logical Units
LUN  Capacity  RAID Group DP Pool  RAID Level  Type  Status
 1 1.0 GB      0   N/A  6(4D+2P)  SAS  Normal
 2 1.0 GB      0   N/A  6(4D+2P)  SAS  Normal
 3 1.0 GB      0   N/A  6(4D+2P)  SAS  Normal
 4 1.0 GB      0   N/A  6(4D+2P)  SAS  Normal
%
```
Remote path—display, define, delete, repair

This section provides the commands for displaying, defining, deleting, and repairing the remote path, and defining and deleting the remote path target (CHAP Secret)

Display remote path information

Command name
aurmtxpath -refer

Description
The aurmtxpath -refer command displays remote path information.

Syntax
aurmtxpath -unit unit_name -refer

Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)”, &quot;_ (underline)”, &quot;. (period)”, &quot;@”, or &quot; (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays path information.</td>
</tr>
</tbody>
</table>

Returned values
- Normal termination: 0.
- Abnormal termination: Other than 0
**Examples**

For Fibre Channel

% aurmtath -unit array1 -refer

Initiator Information

Local Information

Array ID : 90000002
Distributed Mode : N/A

Path Information

Interface Type : FC
Remote Array ID : 91222345
Remote Path Name : Array_91222345
Bandwidth [0.1 Mbps] : 15
iSCSI CHAP Secret : N/A

<table>
<thead>
<tr>
<th>Path</th>
<th>Status</th>
<th>Local</th>
<th>Remote</th>
<th>IP Address</th>
<th>Remote Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Normal</td>
<td>0A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>Normal</td>
<td>1A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

% 

For IPv4 iSCSI array model
% aurmpath -unit array1 -refer

Initiator Information
Local Information
   Array ID : 90000002
   Distributed Mode : N/A

Path Information
   Interface Type : iSCSI
   Remote Array ID : 90022345
   Remote Path Name : Array_90022345
   Bandwidth [0.1 Mbps] : 15
   iSCSI CHAP Secret : Disable

<table>
<thead>
<tr>
<th>Path</th>
<th>Status</th>
<th>Local</th>
<th>Remote</th>
<th>IP Address</th>
<th>TCP Port No. of Remote Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Normal</td>
<td>0A</td>
<td>N/A</td>
<td>192.168.0.201</td>
<td>3260</td>
</tr>
<tr>
<td>1</td>
<td>Normal</td>
<td>1A</td>
<td>N/A</td>
<td>192.168.0.209</td>
<td>3260</td>
</tr>
</tbody>
</table>

Target Information
Local Array ID : 90000002
%

For IPv6 iSCSI:

% aurmpath -unit array1 -refer

Initiator Information
Local Information
   Array ID : 91200002
   Distributed Mode : N/A

Path Information
   Interface Type : iSCSI
   Remote Array ID : 91222345
   Remote Path Name : Array_91222345
   Bandwidth [0.1 Mbps] : 40000
   iSCSI CHAP Secret : Enable

<table>
<thead>
<tr>
<th>Path</th>
<th>Status</th>
<th>Local</th>
<th>Remote</th>
<th>IP Address</th>
<th>TCP Port No. of Remote Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Normal</td>
<td>0E</td>
<td>N/A</td>
<td>ffe0:ffe0:ffe0::ffff ffe0:ffe0:ffe0::ffff</td>
<td>25000</td>
</tr>
<tr>
<td>1</td>
<td>Normal</td>
<td>1E</td>
<td>N/A</td>
<td>ffe0:ffe0:ffe0::ffff ffe0:ffe0:ffe0::ffff</td>
<td>25000</td>
</tr>
</tbody>
</table>

Target Information
Local Array ID : 91200002
%

For fibre channel
Define the remote path

**Command name**

`aurmtpath -set`

**Description**

Use the `aurmtpath -set` command to define the remote path or change the bandwidth.

**Syntax**

- For fibre channel:

  ```
  aurmtpath -unit unit_name -set
  -remote array_id | remotename remote_path_name
  -path0 0A | 0B | 0C | 0D | 0E | 0F | 0G | 0H
  -path1 1A | 1B | 1C | 1D | 1E | 1F | 1G | 1H
  -band bandwidth
  ```

```python
% aurmtpath –unit array1 –refer
Initiator Information
  Local Information
    Array ID      : 90000002
    Distributed Mode : N/A

Path Information
  Interface Type : FC
  Remote Array ID : 90022345
  Remote Path Name : Array_90022345
  Bandwidth [0.1 Mbps] : 15
  iSCSI CHAP Secret : N/A

<table>
<thead>
<tr>
<th>Path</th>
<th>Status</th>
<th>Local</th>
<th>Remote</th>
<th>IP Address</th>
<th>TCP Port No. of Remote Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Normal</td>
<td>0A</td>
<td>0A</td>
<td>192.168.0.201</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>Normal</td>
<td>1A</td>
<td>1B</td>
<td>192.168.0.209</td>
<td>N/A</td>
</tr>
</tbody>
</table>
```
• For iSCSI:
  aurmtpath -unit unit_name -set -initiator
  -remote array_id [ -remotename remote_path_name ]
  -path0 0A | 0B
  -path0_addr inet_addr
  [ -path0_tcpportnum port_num ]
  -path1 1A | 1B
  -path1_addr inet_addr
  [ -path1_tcpportnum port_num ]
  -secret enable | disable
  -band bandwidth

  aurmtpath -unit unit_name -set -initiator
  -remote array_id
  -path0 0A | 0B
  -path0_addr inet_addr
  [ -path0_tcpportnum port_num ]
  -path1 1A | 1B
  -path1_addr inet_addr
  [ -path1_tcpportnum port_num ]
  -secret enable | disable
  -band bandwidth

• To change the bandwidth or remote path name:
  aurmtpath -unit unit_name -set
  -remote array_id | -remotename remote_path_name
  [ -band bandwidth ]
  [ -newremotename new_remote_path_name ]

  aurmtpath -unit unit_name -set
  -remote array_id
  -band bandwidth

• To set the array mode:
  aurmtpath -unit unit_name -set
  [ -distributedmode hub | edge ]
Options

Table 3-47: Options for aurmtpath -set

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;+&quot;, or &quot;@&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the remote path information.</td>
</tr>
<tr>
<td>-remote array_id</td>
<td>Specify the remote array ID.</td>
</tr>
<tr>
<td>-remotename remote_path_name</td>
<td>Specify the remote path name. When the specification is omitted, the following name adds. Array_xxxxxxxx: Remote array ID remote_path_name: Remote path name (See Note 2)</td>
</tr>
<tr>
<td>-path0 local_path remote_path</td>
<td>Specify the local path 0 port number and remote path 0 port number.</td>
</tr>
<tr>
<td>-path1 local_path remote_path</td>
<td>Specify the local path 1 port number and remote path 1 port number.</td>
</tr>
<tr>
<td>-initiator</td>
<td>Specify when setting the initiator information.</td>
</tr>
<tr>
<td>-path0 0A</td>
<td>0B</td>
</tr>
<tr>
<td>-path0_addr inet_addr</td>
<td>Specify the IP address of path 0 for iSCSI. inet_addr: IP address</td>
</tr>
<tr>
<td>-path0_tcpportnum port_num</td>
<td>Specify the path 0 port number for TCP/IP communication. If this option is omitted, the port number sets to 3260. port_num: Port number</td>
</tr>
<tr>
<td>-path1 1A</td>
<td>1B</td>
</tr>
<tr>
<td>-path1_addr inet_addr</td>
<td>Specify the IP address of path 1 for iSCSI. inet_addr: IP address</td>
</tr>
<tr>
<td>-path1_tcpportnum port_num</td>
<td>Specify the path 1 port number for TCP/IP communication. If this option is omitted, the port number sets to 3260. port_num: Port number</td>
</tr>
<tr>
<td>-secret enable</td>
<td>disable</td>
</tr>
<tr>
<td>-band bandwidth</td>
<td>Specify the line band of per 0.1 Mbps. For example, to set bandwidth to 0.1 Mbps, specify 1; to set bandwidth to 1.5 Mbps, specify 15, to set bandwidth to 20 Mbps, specify 200. bandwidth: Line band.</td>
</tr>
<tr>
<td>-newremotename new_remote_path_name</td>
<td>Specify the changed remote path name. new_remote_path_name: Remote path name (See Note 2)</td>
</tr>
<tr>
<td>-distributedmode hub</td>
<td>edge</td>
</tr>
</tbody>
</table>

- For example if you want to set the bandwidth to 0.1 Mbps, specify 1 (the bandwidth to 1.5 Mbps, specify 15, the bandwidth to 20 Mbps, specify 200).
- For Remote Path Name, less than or equal to 32 ASCII characters (alphabetic characters, numerals, and the following symbols) can be used (%,*,+,-,=,@,-,,[:]). The following character string cannot be used. (N/A,---)
Returned values

- Normal termination: 0.
- Abnormal termination: Other than 0

Examples

For iSCSI

```bash
% aurmtpath -unit array1 -set -initiator -remote 9000000281000121
   -path0 0B -path0_addr 192.168.0.201 -path1 1B -path1_addr 192.168.0.209
   -secret disable -band 15
Are you sure you want to set the remote path information?
(y/n [n]): y
The remote path information has been set successfully.
%
```

For fibre channel

```bash
% aurmtpath -unit array1 -set -remote 90000002 -path0 0A 0A -path1 1A 1A -band 15
Are you sure you want to set the remote path information?
(y/n [n]): y
The remote path information has been set successfully.
%
```

Delete remote path target (CHAP secret)

This command is for iSCSI only.

Command name

aurmtpath -target

Description

The `aurmtpath -target` command defines or deletes the CHAP secret.

Syntax

- To set the CHAP secret:
  
  ```bash
  aurmtpath -unit unit_name -set -target
    -local array_id
    -secret
  ```

```bash
```

CLI command list  3-387

Hitachi Unified Storage Command Line Interface Reference Guide
• To delete the CHAP secret:

```
aurmtpath -unit unit_name -rm [ -target 
-remote array_id | -remotename remote_path_name
```

**Options**

**Table 3-48: Options for aurmtpath -target**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-set</td>
<td>Sets the remote path information.</td>
</tr>
<tr>
<td>-target</td>
<td>Specify this option to set or delete target information.</td>
</tr>
<tr>
<td>-local array_id</td>
<td>Specify the local array ID of target information.</td>
</tr>
<tr>
<td>-secret</td>
<td>Sets the CHAP Secret.</td>
</tr>
<tr>
<td>-rm</td>
<td>Deletes the remote path.</td>
</tr>
<tr>
<td>-remote array_id</td>
<td>Specify the remote array ID.</td>
</tr>
<tr>
<td>-remotename remote_path_name</td>
<td>Specify the remote path name. remote_path_name: Remote path name</td>
</tr>
</tbody>
</table>

**Returned values**

- Normal termination: 0.
- Abnormal termination: Other than 0

**Example**

```
% aurmtpath –unit array1 –set –target –local 9002234581000121 –secret
Are you sure you want to set the remote path information? (y/n [n]): y
Please input Path 0 Secret.
Path 0 Secret:
Re-enter Path 0 Secret:
Please input Path 1 Secret.
Path 1 Secret:
Re-enter Path 1 Secret:
The remote path information has been set successfully.
%
```

**Reconstruct the remote path**

**Command name**

```
aurmtpath -reconst
```
Description
The `aurmtpath -reconst` command reconstructs the remote path.

Syntax
```
aurmtpath -unit unit_name -reconst -remote array_id | -remotename remote_path_name -path0 | -path1
```

Options

### Table 3-49: Options for aurmtpath -reconst

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td><code>-reconst</code></td>
<td>Reconstructs the remote path.</td>
</tr>
<tr>
<td><code>-remote array_id</code></td>
<td>Specify the remote array ID.</td>
</tr>
<tr>
<td><code>-remotename remote_path_name</code></td>
<td>Specify the remote path name.</td>
</tr>
<tr>
<td>`-path0</td>
<td>-path1`</td>
</tr>
</tbody>
</table>

Returned values
- Normal termination: 0.
- Abnormal termination: Other than 0

Example
```
% aurmtpath –unit array1 –reconst –remote 9000000281000121 –path1
Are you sure you want to reconstruct the remote path?
(y/n [n]): y
The reconstruction of remote path has been required. Please check "Status" as –refer option.
%
```

Delete the remote path

### Command name
`aurmtpath -rm`

### Description
The `aurmtpath -rm` command deletes the remote path.
Syntax

aurmtpath -unit unit_name -rm -remote array_id | -remotename remote_path_name

Options

Table 3-50: Options for aurmtpath -rm

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-rm</td>
<td>Deletes the remote path.</td>
</tr>
<tr>
<td>-remote array_id</td>
<td>Specify the remote array ID.</td>
</tr>
<tr>
<td>-remotename</td>
<td>Specify the remote path name.</td>
</tr>
<tr>
<td>remote_path_name</td>
<td>remote_path_name: Remote path name</td>
</tr>
</tbody>
</table>

Returned values

- Normal termination: 0.
- Abnormal termination: Other than 0

Example

% aurmtpath -unit array1 -rm -remote 9000000281000121
Are you sure you want to delete the remote path information?
(y/n [n]): y
The remote path information has been deleted successfully.
%
Display or define TrueCopy options

The following sections provide commands for displaying and defining TrueCopy-related options. These options are Cycle Time and the Cycle Over report.

Display TrueCopy options

**Command name**

autruecopyopt -refer

**Description**

Use the `autruecopyopt -refer` option to display TrueCopy options: Cycle Time and the Cycle Over Report (accessed with SNMP).

**Syntax**

autruecopyopt -unit unit_name -refer

**Options**

- **-unit unit_name**: Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.

- **-refer**: Causes TrueCopy option information to display.

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Causes TrueCopy option information to display.</td>
</tr>
</tbody>
</table>

**Returned values**

- Normal termination: 0.
- Abnormal termination: Other than 0

**Example**

```bash
% autruecopyopt -unit array1 -refer
Cycle Time[sec.]: 300
Cycle Over Report: Disable
```

**Command name**

autruecopyopt -set

**Description**

Use the `autruecopyopt -set` option to define Cycle Time and Cycle Over report.
**Format**

- To define the cycle time:
  
  `autruecopyopt -unit unit_name -set -cycletime time`

- To enable or disable the Cycle Over Report:
  
  `autruecopyopt -unit unit_name -set -cycleoverreport enable | disable`

- To set the Remote Replication Write Control mode:
  
  `autruecopyopt -unit unit_name -set -writecontrolmode enable | disable`

**Options**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the array unit name that will be set the TrueCopy option information. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, “_ (underline)”, “. (period)”, “@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td><code>-set</code></td>
<td>Sets the TrueCopy option information.</td>
</tr>
<tr>
<td><code>-cycletime time</code></td>
<td>Specify the cycle time. time: cycle time in seconds.</td>
</tr>
<tr>
<td>`-cycleoverreport enable</td>
<td>disable`</td>
</tr>
</tbody>
</table>
| `-writecontrolmode enable | disable` | Set whether to validate or invalidate the specification of the remote write control mode.  
  - **enable**. Enables the specification of the remote replication with control mode.  
  - **disable**. Disables the specification of the remote replication write control mode. |

**Returned values**

- Normal termination: 0.
- Abnormal termination: Other than 0
Creating pairs

Command name

aureplicationremote -create

Description

The -create option is created a pair. Specify a P-VOL as a local array volume and an S-VOL as a remote array volume.

Syntax

TrueCopy:

When creating a pair that doesn't belong to any group:

```
aureplicationremote -unit unit_name -create -tc -pvol lun -svol lun [ -pairname pair_name ] -remote array_id | -remotename_remote_path_name [ -pace prior | normal | slow ] [ -fencelvl never | data ] [ -nocopy ]
```

When creating a new group and creating a pair that belong to the created group:

```
aureplicationremote -unit unit_name -create -tc -pvol lun -svol lun [ -pairname pair_name ] -gno group_no -remote array_id | -remotename_remote_path_name [ -pace prior | normal | slow ] [ -fencelvl never | data ] [ -nocopy ]
```

When creating a pair and adding the pair to already created group:

```
aureplicationremote -unit unit_name -create -tc -pvol lun -svol lun [ -pairname pair_name ] -gname group_name -remote array_id | -remotename_remote_path_name [ -pace prior | normal | slow ] [ -fencelvl never | data ] [ -nocopy ]
```

TCE:

When creating a new group and creating a pair that belong to the created group:

```
% auttruecopyopt -unit array1 -set -cycletime 300 -cycleoverreported enable
Are you sure you want to set the TrueCopy options? (y/n [n]): y
The TrueCopy options have been set successfully.
% 
```
aureplicationremote -unit unit_name -create -tce
-pvollun -svollun [ -pairname pair_name ]
-gno group_no
-remote array_id | -remotename_remote_path_name
[ -localrepdpoolno pool_no
-localsmgdpoolno pool_no
-remoterepdpoolno pool_no
-remotemngdpoolno pool_no ]
[ -pace prior | normal | slow ]
[ -nocopy ]

When creating a pair and adding the pair to an already created group:

aureplicationremote -unit unit_name -create -tce
-pvollun -svollun [ -pairname pair_name ]
-gname group_name
-remote array_id | -remotename_remote_path_name
[ -localrepdpoolno pool_no
-localsmgdpoolno pool_no
-remoterepdpoolno pool_no
-remotemngdpoolno pool_no ]
[ -pace prior | normal | slow ]
[ -nocopy ]
[ -pace prior | normal | slow ]
[ -fencelvl never | data ]
[ -nocopy ]

• **TCE**

• To create a new group and create a pair belonging to the group:

  aureplicationremote -unit unit_name -create -tce
  -pvollun -svollun [ -pairname pair_name ]
  -gno group_no
  -remote array_id
  [ -localpoolno pool_no ]
  -remotepoolno pool_no
  [ -pace prior | normal | slow ]
  [ -nocopy ]

• To create a pair and add the pair to an existing group:

  aureplicationremote -unit unit_name -create -tce
  -pvollun -svollun [ -pairname pair_name ]
  -gname group_name
  -remote array_id
  [ -localpoolno pool_no ]
  -remotepoolno pool_no
  [ -pace prior | normal | slow ]
  [ -nocopy ]
### Options

#### Table 3-53: Options for aureplicationremote -create

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <code>unit_name</code></td>
<td>Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, @, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-create</td>
<td>Specify this option to create pairs.</td>
</tr>
<tr>
<td>-tc</td>
<td>Specify for TrueCopy pairs.</td>
</tr>
<tr>
<td>-tce</td>
<td>Specify for TCE pairs.</td>
</tr>
<tr>
<td>-tce</td>
<td>Specify for creating the TCE pair.</td>
</tr>
<tr>
<td>-pvol <code>lun</code></td>
<td>Specify the logical unit number to be the P-VOL.</td>
</tr>
<tr>
<td>-svol <code>lun</code></td>
<td>Specify the logical unit number to be the S-VOL.</td>
</tr>
<tr>
<td>-pairname <code>pair_name</code></td>
<td>Specify the pair name (see note). When this option is omitted, Navigator 2 adds the following name.</td>
</tr>
<tr>
<td></td>
<td>- TrueCopy pair: TC_LUXXXX_LUYYYY</td>
</tr>
<tr>
<td></td>
<td>- TCE: TCE_LUXXXX_LUYYY</td>
</tr>
<tr>
<td></td>
<td>- TCE pair: TCE_LUXXXX_LUYYY</td>
</tr>
<tr>
<td></td>
<td>- XXXX: Logical unit number of the P-VOL (4 digits with 0)</td>
</tr>
<tr>
<td></td>
<td>- YYYY: Logical unit number of the S-VOL (4 digits with 0)</td>
</tr>
<tr>
<td>-gno <code>group_no</code></td>
<td>Creates pair(s) in the specified group. When the group does not exist, a new group is created.</td>
</tr>
<tr>
<td>-gname <code>group_name</code></td>
<td>Creates a pair and add it to the specified group. When the specified group already exists, created pairs add to the specified group (see note).</td>
</tr>
<tr>
<td>-remote <code>array_id</code></td>
<td>Specify the remote array ID.</td>
</tr>
<tr>
<td>-pace `prior</td>
<td>normal</td>
</tr>
<tr>
<td>-fencelvl `never</td>
<td>data`</td>
</tr>
<tr>
<td>-nocopy</td>
<td>Specify when not copying from the P-VOL to the S-VOL after the pair creation.</td>
</tr>
<tr>
<td>-localrepdppoolno <code>pool_no</code></td>
<td>Specify the replication data DP pool number of the local array. pool_no: DP pool number</td>
</tr>
<tr>
<td>-localmngdppoolno <code>pool_no</code></td>
<td>Specify the management area DP pool number of the local array. pool_no: DP pool number</td>
</tr>
<tr>
<td>-remoterepdppoolno <code>pool_no</code></td>
<td>Specify the replication data DP pool number of the remote array. pool_no: DP pool number</td>
</tr>
<tr>
<td>-remoteemngdppoolno <code>pool_no</code></td>
<td>Specify the management area DP pool number of the remote array. pool_no: DP pool number</td>
</tr>
</tbody>
</table>
### Returned values

- Normal termination: 0
- Abnormal termination: Other than 0

### Example

```
% aureplicationremote -unit localarray -create -tce -pvol 0 -svol 0 -gno 0 -remote 90000002 -remotepoolno ON/A
Are you sure you want to create pair “TCE_LU0000_LU0000”? 
(y/n [n]): y
The pair has been created successfully.
%
```

### Split pairs

#### Command name

aureplicationremote -split

#### Description

The `aureplicationremote -split` option is used to split the specified pair or all pairs in the group.

For TCE, when you split a pair, the data that is exclusive to the local side is copied when the pair split operation is performed to make the S-VOL data identical to the P-VOL data. Therefore, before the pair status changes to the Split state, the command displays the current command status. After splitting a pair, use the `aureplicationmon -evtwait` command to direct the `aureplicationremote -split` command to wait for the pair status to change to the Split status.

#### Syntax

- To split a pair by specifying the pair name:

  aureplicationremote -unit unit_name -split -tc | -tc | -tcem  
  -pairname pair_name  
  -gno group_no | -gname group_name  
  [ -svolrw r | rw ]

- To split a pair by specifying the P-VOL and S-VOL:

  aureplicationremote -unit unit_name -split -tc | -tc | -tcem  
  -locallun pvol
• To split the pairs in a group:
  aureplicationremote -unit unit_name -split -tc | –tc | -tcem
  -gno group_no | -gname group_name
  [ -svolrw r | rw ]

When the attribute of the local volume is the S-VOL:
• To split a pair by specifying the pair name:
  aureplicationremote -unit unit_name -split -tc | –tc | -tcee
  -pairname pair_name
  -gno group_no | -gname group_name
  -svolstatusaction forcedtakeover | recovertakeover

• To split a pair by specifying the P-VOL and S-VOL:
  aureplicationremote -unit unit_name -split -tc | –tc | -tcee
  -locallun pvol
  -localvol lun -remotevol lun
  -remote array_id |
  -remotename_remote_path_name
  -svolstatusaction forcedtakeover | recovertakeover

• To split the pairs in a group:
  aureplicationremote -unit unit_name -split -tc | –tc | -tcee
  -gno group_no | -gname group_name
  -svolstatusaction forcedtakeover | recovertakeover

### Options

**Table 3-54: Options for aureplicationremote -split**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols “-”, “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-split</td>
<td>Specify this option to split pairs.</td>
</tr>
<tr>
<td>-tc</td>
<td>Specify for TrueCopy pairs.</td>
</tr>
<tr>
<td>-tce</td>
<td>Specify for TCE pairs.</td>
</tr>
<tr>
<td>-tce</td>
<td>Specify for TCE pairs.</td>
</tr>
<tr>
<td>-pvol lun</td>
<td>Specify the logical unit number to be the P-VOL.</td>
</tr>
</tbody>
</table>
### Returned values
- Normal termination: 0
- Abnormal termination: Other than 0

### Example

```shell
% aureplicationremote -unit localarray -split -tc -pairname TC_LU0000_LU0000 -gname TC_Group1
Are you sure you want to split pair?
(y/n [n]): y
The pair has been split successfully.
%
```

### Resynchronize pairs

#### Command name

`aureplicationremote -resync`

#### Description

The `aureplicationremote -resync` option is used to resynchronize the specified pair, or pairs in a group.

#### Syntax

- To resynchronize a pair by specifying the pair name:

  ```shell
  aureplicationremote -unit unit_name -resync -tc | -tce | tce
  -pairname pair_name
  -gno group_no | -gname group_name
  ```
To resynchronize a pair by specifying the P-VOL and S-VOL:
   aureplicationremote -unit unit_name -resync -tc | -tce | tce
   -pvol lun -svol lun -remote array_id

To resynchronize the pairs in a group:
   aureplicationremote -unit unit_name -resync -tc | -tce | tce
   -gno group_no | -gname group_name

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-resync</td>
<td>Specify to resynchronize pairs.</td>
</tr>
<tr>
<td>-tc</td>
<td>Specify for TrueCopy pairs.</td>
</tr>
<tr>
<td>-tce</td>
<td>Specify for TCE pairs.</td>
</tr>
<tr>
<td>-pvol lun</td>
<td>Specify the logical unit number to be the P-VOL.</td>
</tr>
<tr>
<td>-svol lun</td>
<td>Specify the logical unit number to be the S-VOL.</td>
</tr>
<tr>
<td>-pairname pair_name</td>
<td>Specify the pair name. When this option is omitted, all pairs in the specified group are resynchronized (see note).</td>
</tr>
<tr>
<td>-gno group_no</td>
<td>Resynchronize pairs in the specified group. When the pair name is not specified, all pairs in the specified group are resynchronized.</td>
</tr>
<tr>
<td>-gname group_name</td>
<td>Resynchronize pairs in the specified group. When the pair name is not specified, all pairs in the specified group are resynchronized (see note).</td>
</tr>
<tr>
<td>-remote array_id</td>
<td>Specify the remote array ID.</td>
</tr>
</tbody>
</table>

NOTE: A pair name and group name must be less than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols: %,*,+,-,/,=,@,_,;,[,].

Returned values

- Normal termination: 0
- Abnormal termination: Other than 0

Example:
Example

```bash
% aureplicationremote -unit localarray -resync -adr -pairname TC_LU0000_LU0000 -gname TC_Group1
Are you sure you want to re-synchronize pair?
(y/n [n]): y
The re-synchronizing of pair has been required.
%
```

Swap pairs

Command name

- `aureplicationremote -swaps`

Description

The `aureplicationremote -swaps` option is used to swap a pair or pairs in the group.

Syntax

- To swap a pair for the specified pair name:
  ```bash
  aureplicationremote -unit unit_name -swaps -tc
  -pairname pair_name
  -gno group_no | -gname group_name
  ```

- To swap a pair for the specified S-VOL:
  ```bash
  aureplicationremote -unit unit_name -swaps -tc
  -svol lun
  ```

- To swap the pairs in a group:
  ```bash
  aureplicationremote -unit unit_name -swaps -tc | -tce | tce
  -gno group_no | -gname group_name
  ```

Options

Table 3-56: Options for aureplicationremote -swaps

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <code>unit_name</code></td>
<td>Specify the remote array unit name that swaps the pairs. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-(minus)&quot;, &quot;_&quot; (underline)&quot;&quot;, &quot;.&quot; (period), &quot;]&quot;, or &quot;]&quot; (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-swaps</td>
<td>Specify to swaps pairs.</td>
</tr>
<tr>
<td>-tc</td>
<td>Specify for TrueCopy pairs.</td>
</tr>
<tr>
<td>-tce</td>
<td>Specify for TCE pairs.</td>
</tr>
<tr>
<td>-pairname <code>pair_name</code></td>
<td>Specify the pair name. When this option is omitted, all pairs which belong to the specified group are swapped (see note).</td>
</tr>
</tbody>
</table>
Table 3-56: Options for aureplicationremote -swaps

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-gno group_no</td>
<td>Restore pairs that belong to the specified group. When the pair name is not specified, all pairs in the specified group are swapped.</td>
</tr>
<tr>
<td>-gname group_name</td>
<td>Restore pairs that belong to the specified group. When the pair name is not specified, all pairs in the specified group are swapped (see note).</td>
</tr>
<tr>
<td>-svol lun</td>
<td>Specify the logical unit number of the S-VOL.</td>
</tr>
</tbody>
</table>

**NOTE:** A pair name and group name must be less than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols: %, *, +, -, .., =, @, _, :, [, ].

### Returned values
- Normal termination: 0
- Abnormal termination: Other than 0

### Example
```
$ aureplicationremote -unit remotearray -swaps -adr -gno 0
   -gname TC_Group1
Are you sure you want to swap pair?
(y/n [n]): y
The swap of pair has been required.
```

### Delete pairs

**Command name**

`aureplicationremote -simplex`

**Description**

The `aureplicationremote -simplex` option is used to delete the specified pair or pairs in a group.

For TCE, when deleting a pair, when you delete a pair, the data on the local side is copied when the delete operation is performed to make the S-VOL data identical with the P-VOL data. Therefore, before the pair status changes to the Simplex state, the command displays the current status. After deleting a pair, use the `aureplicationmon -evtwait` command to direct the status to change to Simplex.

For TCE, before the pair status changes to Simplex, the local differential data is copied to the S-VOL, making it identical with the P-VOL. To display status when it becomes Simplex, use the `aureplicationmon -evtwait` command (see Monitor pair status—event wait on page 3-370).
There may be cases when pair status at the remote array does not change to Simplex because of failure in the remote path. You can confirm S-VOL status after the P-VOL changes to Simplex. When executing the \texttt{-simplex} option on the remote array, the S-VOL is deleted forcibly.

When executing the \texttt{-simplex} option on the remote array before executing it on the local array, the S-VOL status changes to Simplex, but data consistency in the S-VOL is not guaranteed.

**Syntax**

- To delete a pair by specifying the pair name:
  ```
  aureplicationremote -unit unit_name -simplex -tc | tce | 
  -tce 
  -pairname pair_name
  -gno group_no | -gname group_name
  ```

- To delete a pair by specifying the P-VOL and S-VOL:
  ```
  aureplicationremote -unit unit_name -simplex -tc | -tce | tce 
  -locallun pvol | svol
  -remote array_id
  ```

- To delete the pairs in a group:
  ```
  aureplicationremote -unit unit_name -simplex -tc | -tce | tce 
  -gno group_no | -gname group_name
  ```
Options

Table 3-57: Options for aureplicationremote -simplex

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the local array unit name that deletes the pairs. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols “- (minus)”, “_ (underline)”, “.” (period), “@”, or “ (space)”. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-simplex</td>
<td>Specify to release pairs.</td>
</tr>
<tr>
<td>-tc</td>
<td>Specify for TrueCopy pairs.</td>
</tr>
<tr>
<td>-tce</td>
<td>Specify for TCE pairs.</td>
</tr>
<tr>
<td>-locallun pvol</td>
<td>svol</td>
</tr>
<tr>
<td>-pvol lun</td>
<td>Specify the logical unit number to be the P-VOL.</td>
</tr>
<tr>
<td>-svol lun</td>
<td>Specify the logical unit number to be the S-VOL.</td>
</tr>
<tr>
<td>-pairname pair_name</td>
<td>Specify the pair name. When this option is omitted, all pairs in the specified group are deleted (see note).</td>
</tr>
<tr>
<td>-gno group_no</td>
<td>Delete pairs that belong to the specified group. When the pair name is not specified, all pairs in the specified group are deleted.</td>
</tr>
<tr>
<td>-gname group_name</td>
<td>Delete pairs that belong to the specified group. When the pair name is not specified, all pairs in the specified group are deleted (see note).</td>
</tr>
<tr>
<td>-remote array id</td>
<td>Specify the remote array ID.</td>
</tr>
</tbody>
</table>

**NOTE:** A pair name and group name must be less than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols: %, *, +, -, /, =, @, :, [,].

Returned values

- Normal termination: 0
- Abnormal termination: Other than 0

Example

```
% aureplicationremote -unit localarray -simplex -tc -pairname TC_LU0000_LU0000 -gname TC_Group1
Are you sure you want to release pair?
(y/n [n]): y
The pair has been released successfully.
%
```
Edit pairs

Command name

aureplicationremote -chg

Description

The `aureplicationremote -chg` option is used to change the group name, pair name, or copy pace.

Syntax

- To change a group name:

  ```
  aureplicationremote  -unit unit_name –chg
  -gno group_no | -gname group_name
  -newgname new_group_name
  ```

- To change a pair name or copy pace by specifying the pair name:

  ```
  aureplicationremote  -unit unit_name –chg –tc | -tce | tce
  -pairname pair_name
  -gno group_no | -gname group_name
  [ -newpairname new_pair_name ]
  [ -pace prior | normal | slow ]
  ```

- To change the pair name or the copy pace by specifying the P-VOL and S-VOL:

  ```
  aureplicationremote  -unit unit_name –chg –tc | -tce | tce
  -locallun pvol | svol
  -pvol lun -svol lun
  -remote array_id
  [ -newpairname new_pair_name ]
  [ -pace prior | normal | slow ]
  ```

Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit <code>unit_name</code></td>
<td>Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;- (minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot; (space)&quot;. Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td>-chg</td>
<td>Changes group or pair information.</td>
</tr>
<tr>
<td>-tc</td>
<td>Specify for TrueCopy pairs.</td>
</tr>
<tr>
<td>-tce</td>
<td>Specify for TCE pairs.</td>
</tr>
<tr>
<td>-tce</td>
<td>Specify for TCE pairs.</td>
</tr>
<tr>
<td>-locallun pvol</td>
<td>svol</td>
</tr>
<tr>
<td>-pvol <code>lun</code></td>
<td>Specify the logical unit number to be the P-VOL.</td>
</tr>
</tbody>
</table>
Table 3-58: Options for aureplicationremote -chg (Continued)

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-svol lun</td>
<td>Specify the logical unit number to be the S-VOL.</td>
</tr>
<tr>
<td>-pairname pair_name</td>
<td>Specify the pair name (see note).</td>
</tr>
<tr>
<td>-gno group_no</td>
<td>Changes the pair information in the specified group.</td>
</tr>
<tr>
<td>-gname group_name</td>
<td>Changes the pair information in the specified group. *</td>
</tr>
<tr>
<td>-pace prior</td>
<td>normal</td>
</tr>
<tr>
<td>-newgname new_group_name</td>
<td>Changes the group name to the specified new name. **</td>
</tr>
<tr>
<td>-newpairname new_pair_name</td>
<td>Changes the pair name to the specified new name (see note).</td>
</tr>
<tr>
<td>-remote array id</td>
<td>Specify the remote array ID.</td>
</tr>
</tbody>
</table>

**NOTE:** A pair name and group name must be less than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols: %,*,+,-,/,=,@,_,:,[].

* When specifying a pair name that doesn't belong to a group, use “Ungrouped” in the group name.

** For a new group name, do not specify “Ungrouped”. An error occurs if it is specified at the time of creation.

** Returned values
- Normal termination: 0
- Abnormal termination: Other than 0

** Example

```
% aureplicationremote -unit localarray -chg -tc -locallun
pvol -pvol 0 -svol 0
              -remote 9000000281000002 -newpairname
NEW_PAIR_NAME
Are you sure you want to change pair information?
(y/n [n]): y
The pair information has been changed successfully.
%
```

** Monitor pair status—synchronous wait

This command is used with TCE only. It is used to check whether data written to the P-VOL is reflected in the S-VOL immediately after the command.

For the event waiting command, for all remote and local replication systems, see Monitor pair status—event wait on page 3-370
Command name

aureplicationmon -syncwait

Description

The `aureplicationmon -syncwait` command instructs the TCE system to display whether or not data written to the P-VOL in the specified pair or group is reflected in the S-VOL. When this command is executed, the sequence number (Q-marker) on the local array is immediately compared to the sequence number on the remote array, then at regular intervals. Because the sequence number is updated for each group, you can check whether the S-VOL data has been updated or not by executing the command specifying a group when all the pairs in the target group are in the Paired status.

Syntax

- To check whether data written to the P-VOL in the specified group is reflected in the S-VOL:
  
  ```
  aureplicationmon -unit unit_name -syncwait -tce
  -gno group_no | -gname group_name
  -wait -timeout time
  [ -pvolsequence sequence_no ]
  ```

- To check whether data written to the P-VOL in the specified pair is reflected in the S-VOL:
  
  ```
  aureplicationmon -unit unit_name -syncwait -tce
  -pairname pair_name
  -gno group_no | -gname group_name
  -wait -timeout time
  [ -pvolsequence sequence_no ]
  ```

- To display the latest sequence number of the P-VOL in the specified group:
  
  ```
  aureplicationmon -unit unit_name -syncwait -tce
  -gno group_no | -gname group_name
  -nowait
  ```

- To display the latest sequence number of the P-VOL in the specified pair:
  
  ```
  aureplicationmon -unit unit_name -syncwait -tce
  -pairname pair_name
  -gno group_no | -gname group_name
  -nowait
  ```

Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 3-59: Options for aureplicationmon -syncwait</td>
<td></td>
</tr>
</tbody>
</table>
Table 3-59: Options for `aureplicationmon -syncwait`

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols “-” (minus), “_” (underline), “.” (period), “@”, or “ ” (space). Space in front and back of the character string is removed.</td>
</tr>
<tr>
<td><code>-syncwait</code></td>
<td>Checks if the write is reflected in the S-VOL immediately after the command, or gets the current sequence number of the P-VOL.</td>
</tr>
<tr>
<td><code>-tce</code></td>
<td>Specify for TCE.</td>
</tr>
<tr>
<td><code>-pairname pair_name</code></td>
<td>Specify the pair name (see note).</td>
</tr>
<tr>
<td><code>-gno group_no</code></td>
<td>Specify the group number (see note)</td>
</tr>
<tr>
<td><code>-gname group_name</code></td>
<td>Specify the group name (see note)</td>
</tr>
<tr>
<td><code>-nowait</code></td>
<td>Gets the current status of the pair or the group (see Table 3-60).</td>
</tr>
<tr>
<td><code>-timeout time</code></td>
<td>Specify time-out time. When this option is omitted, the time-out time set 3 seconds. time = time-out time (0 to 180)</td>
</tr>
<tr>
<td><code>-pvolsequence sequence_no</code></td>
<td>Waits for the write data to the P-VOL with the specified sequence number to be updated to the S-VOL. The sequence number can be obtained with -nowait option. This option is used to confirm that Write data is updated to the S-VOL. When this option is omitted, the sequence number of the P-VOL at the time the command is used.</td>
</tr>
</tbody>
</table>

**NOTE:** A pair name and group name must be less than or equal to 31 ASCII characters consisting of alphabetic characters, numerals, and the following symbols: %, *, +, -, /, =, @, , : , [, ].

### Returned values

Table 3-60: Return Values for the `-nowait` Parameter

<table>
<thead>
<tr>
<th>Status</th>
<th>Returned Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>When the <code>-nowait</code> option is specified</td>
<td>NOWAIT</td>
<td>1</td>
</tr>
<tr>
<td>When the <code>-nowait</code> option is not specified</td>
<td>DONE</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>TIMEOUT</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>BROKEN</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>CHANGED</td>
<td>13</td>
</tr>
</tbody>
</table>
Example

```bash
% aureplicationmon -unit array1 -syncwait -tce -gno 0 -wait -timeout 180
Monitoring...
Status has been changed to DONE.
Number of process queue : 976
P-VOL sequence No. : 59652
%
```

Referencing/setting TrueCopy option

Referencing the TrueCopy option

**Command name**

`autruecopyopt -refer`

**Format**

`autruecopyopt -unit unit_name -refer`

**Description**

The `-refer` option is displays for the TrueCopy option information.

**Options**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-unit unit_name</td>
<td>Specify the array unit name that will be display the TrueCopy option information. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-(minus)&quot;, &quot;_ (underline)&quot;, &quot;. (period)&quot;, &quot;@&quot;, or &quot;(space). Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td>-refer</td>
<td>Displays the TrueCopy option information.</td>
</tr>
</tbody>
</table>

**Returned values**

Normal termination: 0

Abnormal termination: **Other than 0**

**Example:**

```bash
% autruecopyopt -unit array1 -refer
Cycle Time[sec.] : 300
Cycle Over Report : Disable
%
```
Setting the TrueCopy option

**Command name**

`autruecopyopt -set`

**Format**

To set the cycle time:

`autruecopyopt -unit unit_name -set -cycletime time`

To set the cycle over report:

`autruecopyopt -unit unit_name -set -cycleoverreport enable | disable`

**Description**

The `-set` option sets the TrueCopy option.

**Options**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-unit unit_name</code></td>
<td>Specify the array unit name that will be set the TrueCopy option information. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols &quot;-&quot; (minus), &quot;_&quot; (underline), &quot;.&quot; (period), &quot;@&quot;, or &quot; (space)&quot;. Space in front and in the rear of the character string is removed.</td>
</tr>
<tr>
<td><code>-set</code></td>
<td>Sets the TrueCopy option information.</td>
</tr>
<tr>
<td><code>-cycletime time</code></td>
<td>Specify the cycle time. <strong>time</strong>: cycle time (second)</td>
</tr>
<tr>
<td><code>-cycleoverreport</code></td>
<td>Sets whether to validate or invalidate the specification of the cycle over report. <strong>enable</strong>: Enables the specification of the cycle over report <strong>disable</strong>: Disables the specification of the cycle over report</td>
</tr>
</tbody>
</table>

**Returned values**

Normal termination: **0**

Abnormal termination: **Other than 0**

**Example:**

```
% autruecopyopt -unit array1 -set -cycletime 300 -cycleoverreport enable
Are you sure you want to set the TrueCopy options? (y/n [n]): y
The TrueCopy options have been set successfully.
%
```
## CLI, CCI commands for remote-replication

**Table 3-61: Comparison with CCI Commands**

<table>
<thead>
<tr>
<th>Description</th>
<th>CLI Command</th>
<th>CCI Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display pair information</td>
<td>aureplicationremote -refer</td>
<td>pairdisplay</td>
</tr>
<tr>
<td>Create pairs</td>
<td>aureplicationremote -create</td>
<td>paircreate</td>
</tr>
<tr>
<td>Split pairs</td>
<td>aureplicationremote -split</td>
<td>pairsplit</td>
</tr>
<tr>
<td>Resynchronize pairs</td>
<td>aureplicationremote -resync</td>
<td>pairresync</td>
</tr>
<tr>
<td>Swap pairs</td>
<td>aureplicationremote -swaps</td>
<td>pairresync -swaps</td>
</tr>
<tr>
<td>Delete pairs</td>
<td>aureplicationremote -simplex</td>
<td>pairsplit -S</td>
</tr>
<tr>
<td>Synchronous wait</td>
<td>aureplicationmon -syncwait</td>
<td>pairsynctwait</td>
</tr>
</tbody>
</table>
This chapter provides procedures for performing Dynamic Provisioning operations from the command line using Navigator 2 Command Line Interface.

The following topics are covered in this chapter:

- Installing Dynamic Provisioning
- Managing DP pools from the command line
- Managing DP-VOLs from the command line
- Managing DP pool information
- Optimizing DP
Installing Dynamic Provisioning

Observe the following guidelines:

- Before installing or uninstalling Dynamic Provisioning, verify that the array is operating normally. If a failure such as a controller blockade has occurred, installation or un-installation cannot be performed.

- Confirm that the cache partition information is initialized as shown in Installing Dynamic Provisioning and rebooting the array when Dynamic Provisioning is installed in the status where Cache Partition Manager is already in use.

A key code or key file is required to install Dynamic Provisioning.

Dynamic Provisioning can be installed with or without rebooting the array.

Installing Dynamic Provisioning without rebooting

To install Dynamic Provisioning without rebooting

1. From the command prompt, register the HUS storage system in which Dynamic Provisioning is to be installed, and then connect to the array.

2. Issue the `auopt` command to install Dynamic Provisioning. An example is shown below.

Example:

```
% auopt -unit array-name -lock off -keycode manual-attached-keycode
Are you sure you want to unlock the option? (y/n [n]): y
The option is unlocked.
In order to complete the setting, it is necessary to reconfigure memory or reboot the subsystem.

Are you sure you want to start reconfigure memory? (y/n [n]): y
While in progress, performance degradation of host I/Os to the array will occur.

Are you sure you want to continue? (y/n [n]): y
Memory reconfiguring started successfully.
%
```

3. Issue the `auopt` command to confirm whether Dynamic Provisioning has been installed. An example is shown below.
Example:

```
% auopt -unit array-name -refer
Option Name                      Type       Term     Status
    Reconfigure Memory Status
D_PROVISIONING                   Permanent   ---     Enable
    Reconfiguring(10%)%  
```

Dynamic Provisioning has been installed and Status is **Enable**. Confirm the **Reconfigure Memory Status** is **Reconfiguring(nn%)** or **Normal**.

4. When the **Reconfigure Memory Status** is **Reconfiguring(nn%)**, wait awhile, then perform step 3, and confirm the **Reconfigure Memory Status** changes to **Normal**.

5. When the **Reconfigure Memory Status** is **Failed(Code-01:Timeout)**, perform step 2.

   Code-01 occurs when the access from the host is frequent or the amount of the unwritten data in the cache memory is large.

6. When the **Reconfigure Memory Status** is **Failed(Code-02: Failure of Reconfigure Memory)**, perform the following reconfigure memory operation.

   Code-02 occurs when the drive restoration processing starts in the background.

Example:

```
% auopt -unit array-name -reconfigurememory start
Are you sure you want to start reconfigure memory? (y/n [n]): y
While in progress, performance degradation of host I/Os to the array will occur.
Are you sure you want to continue? (y/n [n]): y
Memory reconfiguring started successfully.%
```

7. When the **Reconfigure Memory Status** is **Failed(Code-04:Failure of Reconfigure Memory)**, perform the following reboot operation.

   Code-03 occurs when the copy of the management information in the cache memory fails.
Example:

```
% aureboot -unit array-name
Do you want to restart the subsystem? (y/n [n]): y
Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting begins.
When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 6 - 25min.
The subsystem restarted successfully.
```

8. When the **Reconfigure Memory Status** is **Failed** *(Code-03: Failure of Reconfigure Memory)*, contact the Support Center.

**Installing Dynamic Provisioning/Dynamic Tiering when Cache Partition Manager is Used**

Dynamic Provisioning or Dynamic Tiering uses a part of the cache area to manage internal resources. Because of this, the cache capacity that Cache Partition Manager can use becomes smaller than the usual one.

Make sure that the cache partition information is initialized as shown below when Dynamic Provisioning or Dynamic Tiering is installed in the status where Cache Partition Manager is already in use.

- All the volumes are moved to the master partitions on the side of the default owner controller.
- All the sub-partitions are deleted and the size of each master partition is reduced to a half of the user data area after installing Dynamic Provisioning or Dynamic Tiering.
An example of the case where Cache Partition Manager is used is shown in Figure 4-1.

**Figure 4-1: Standard case where Cache Partition Manager is used**

### Installing Dynamic Provisioning and rebooting the array

If Dynamic Provisioning is installed, uninstalled, or changed during a after issuing a spin-down instruction using the Power Savings option, the spin down may fail. If spin-down fails, execute the spin-down again. Check that the spin-down instruction has not been issued or has been completed (no RAID group in the Power Saving Status of Normal (Command Monitoring) exists) before installing, uninstalling, or changing Dynamic Provisioning.

When you install, uninstall, enable, or disable Dynamic Provisioning when a array is used on the remote side of TrueCopy or TrueCopy Extended, the following conditions occur with the restart of the array.

- **Both paths of TrueCopy or TrueCopy Extended are blocked.** When a path is blocked, a TRAP occurs that notifies the SNMP Agent Support Function. The TrueCopy or TrueCopy Extended path recovers from the blockade automatically after the array restarts.
- **If the pair status of TrueCopy or TrueCopy Extended is Paired or Synchronizing, it changes to Failure.** When you restart the array, install, uninstall, enable, or disable Dynamic Provisioning after changing the pair status of TrueCopy or TrueCopy Extended to Split.
HDP CLI operations

If the NAS unit is connected to the array, have the drive array administrator check whether the NAS unit is connected and NAS service is operational.

Ask the NAS unit administrator to check whether a failure has occurred by checking the NAS administration software. In case of a failure, execute the maintenance operation together with the NAS maintenance personal.

If the NAS unit is connected, ask the NAS unit administrator for termination of NAS OS and planned shutdown of the NAS unit. After completing this operation, ask the NAS unit administrator to reboot the NAS unit.

After rebooting, have the NAS unit administrator refer to “Recovering from FC path errors” in the Hitachi NAS Manager User’s Guide and check the status of the Fibre Channel (FC) path and to recover the FC path if it is in a failure status.

If there are personnel for the NAS unit maintenance, ask the NAS unit maintenance personnel to reboot the NAS unit.

1. From the command prompt, register the array in which Dynamic Provisioning is to be installed, and then connect to the array.
2. Issue the `auopt` command to install Dynamic Provisioning. The example is shown below.

**NOTE:**

When the Power Saving instruction of the non I/O link is executed with the priced option, Power Saving or Power Saving Plus are used together. If Dynamic Provisionings is added, deleted, or changed while the Power Saving status is Normal (Command Monitoring), the status is changed to “Normal (Spin down Failure: PS OFF/ON)” by the array reboot which works at the time of the setting change and then the spin-down may fail.

When the spin-down fails, run a spin-down session again. Before adding, deleting, or changing the Dynamic Provisioning instance, check that the spin-down instruction has not been issued or there is no RAID group where the Power Saving status is Normal (Command Monitoring) by the Power Saving instruction of the non I/O link.

If the NAS unit is connected to the array, have the drive array administrator check whether the NAS unit is connected and NAS service is operational.

Ask the NAS unit administrator to check whether a failure has occurred by checking the NAS administration software. In case of a failure, execute the maintenance operation together with the NAS maintenance personal.

If the NAS unit is connected, ask the NAS unit administrator for termination of NAS OS and planned shutdown of the NAS unit. After completing this operation, ask the NAS unit administrator to reboot the NAS unit.

After rebooting, have the NAS unit administrator refer to “Recovering from FC path errors” in the Hitachi NAS Manager User’s Guide and check the status of the Fibre Channel (FC) path and to recover the FC path if it is in a failure status.

If there are personnel for the NAS unit maintenance, ask the NAS unit maintenance personnel to reboot the NAS unit.
Example:

```bash
% auopt -unit array-name -lock off -keycode manual-attached-keycode
Are you sure you want to unlock the option? [y/n [n]]: y
The option is unlocked.
In order to complete the setting, it is necessary to reconfigure memory or reboot the subsystem.
Are you sure you want to start reconfigure memory? [y/n [n]]: n
Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting begins.
When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
Do you agree with restarting? [y/n [n]]: y
Are you sure you want to execute? [y/n [n]]: y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 6 - 25min.
The subsystem restarted successfully.
%
```

3. Issue the `auopt` command to confirm whether Dynamic Provisioning has been installed. The example is shown below.

Example:

```bash
% auopt -unit array-name -refer
Option Name
Type Term Status
Reconfigure Memory Status
D_PROVISIONING Permanent --- Enable
Normal
%
```

Dynamic Provisioning is installed and the status is **Enable**.
Installation of Dynamic Provisioning is now complete.

**Uninstalling Dynamic Provisioning**

To uninstall Dynamic Provisioning, the key code provided with the optional feature is required. Once uninstalled, Dynamic Provisioning cannot be used (locked) until it is again installed using the key code or key file.

The following conditions must be satisfied in order to uninstall Dynamic Provisioning.
- When the DP-VOL is mapped, the mapping information must be released.
- All the DP-VOLs must be deleted.
- All the DP pools for Dynamic Provisioning must be deleted.

Dynamic Provisioning can be uninstalled with or without requiring the array to be rebooted.
Uninstalling without rebooting

1. From the command prompt, register the array in which Dynamic Provisioning is to be uninstalled, and then connect to the array.

2. Issue the `auopt` command to uninstall Dynamic Provisioning. The example is shown below.

   Example:

   ```
   % auopt -unit array-name -lock on -keycode manual-attached-keycode
   Are you sure you want to lock the option? (y/n [n]): y
   The option is locked.
   In order to complete the setting, it is necessary to reconfigure memory or reboot the subsystem.
   Are you sure you want to start reconfigure memory? (y/n [n]): y
   While in progress, performance degradation of host I/Os to the array will occur.
   Are you sure you want to continue? (y/n [n]): y
   Memory reconfiguring started successfully.
   %
   ```

3. Issue the `auopt` command to confirm whether Dynamic Provisioning has been uninstalled. The example is shown below.

   Example:

   ```
   % auopt -unit array-name -refer
   DMEC002015: No information displayed.
   %
   ```

   Uninstalling Dynamic Provisioning is now complete.

Uninstalling and rebooting the array

1. From the command prompt, register the array in which Dynamic Provisioning is to be uninstalled, and then connect to the array.

2. Issue the `auopt` command to uninstall Dynamic Provisioning. The example is shown below.

   Example:

   ```
   % auopt -unit array-name -lock on -keycode manual-attached-keycode
   Are you sure you want to lock the option? (y/n [n]): y
   The option is locked.
   In order to complete the setting, it is necessary to reconfigure memory or reboot the subsystem.
   Are you sure you want to start reconfigure memory? (y/n [n]): y
   Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
   Also, if you are logging in, the login status will be canceled when restarting begins.
   When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
   Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
   Do you agree with restarting? (y/n [n]): y
   Are you sure you want to execute? (y/n [n]): y
   Now restarting the subsystem. Start Time hh:mm:ss Time Required 6 - 25min.
   The subsystem restarted successfully.
   %
   ```
3. Issue the **auopt** command to confirm whether Dynamic Provisioning has been uninstalled. The example is shown below.

Example:

```
% auopt -unit array-name -refer
DMEC002015: No information displayed.
%
```

Uninstalling Dynamic Provisioning is now complete.

**Enabling or disabling Dynamic Provisioning**

Dynamic Provisioning can be enabled or disabled when it is installed. You can enable or disable Dynamic Provisioning with or without booting the array.

**Prerequisites for disabling Dynamic Provisioning**
- When the DP-VOL is mapped, release the mapping information.
- Delete all the DP-VOLs (see Deleting a DP-VOL from a DP pool on page 4-19).
- Delete all the DP pools for Dynamic Provisioning (see Deleting a DP pool on page 4-15).

**To enable or disable Dynamic Provisioning without rebooting**

1. From the command prompt, register the HUS storage system in which the status of the feature is to be changed, and then connect to the array.

2. Issue the **auopt** command to change the status (enable or disable). The following is an example of changing the status from enable to disable. To change the status from disable to enable, enter **enable** after the **-st** option.

Example:

```
% auopt -unit array-name -option D_PROVISIONING -st disable
Are you sure you want to disable the option? (y/n [n]): y
The option has been set successfully.
In order to complete the setting, it is necessary to reconfigure memory or reboot the subsystem.

Are you sure you want to start reconfigure memory? (y/n [n]): y
While in progress, performance degradation of host I/Os to the array will occur.

Are you sure you want to continue? (y/n [n]): y
Memory reconfiguring started successfully.
%
```

3. Issue the **auopt** command to confirm whether the status has been changed. An example is shown below.
Example:

```bash
% auopt -unit array-name -refer
Option Name Type Term Status
Reconfigure Memory Status
D_PROVISIONING Permanent --- Disable
Reconfiguring (10%)%
```

Enabling or disabling Dynamic Provisioning is now complete.

**To enable or disable Dynamic Provisioning with rebooting the array**

1. From the command prompt, register the HUS storage system in which the status of the feature is to be changed, and then connect to the array.

2. Issue the `auopt` command to change the status from enable to disable. The following is an example of changing the status from enable to disable. To change the status from disable to enable, enter `enable` after the `-st` option.

Example:

```bash
% auopt -unit array-name -option D_PROVISIONING -st disable
Are you sure you want to disable the option? (y/n [n]): y
The option has been set successfully.
In order to complete the setting, it is necessary to reconfigure memory or reboot the subsystem.
Are you sure you want to start reconfigure memory? (y/n [n]): n
Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting begins.
When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 6 - 25min.
The subsystem restarted successfully.%
```

3. Issue the `auopt` command to confirm whether the status has been changed. An example is shown below.
Example:

```
% auopt -unit array-name -refer
Option Name     Type  Term  Status
Reconfigure Memory Status
D_PROVISIONING  Permanent  ---  Disable
Normal
%
```

Enabling or disabling Dynamic Provisioning is now complete.

Managing DP pools from the command line

The `audppool` command operates DP pool. To refer the `audppool` command and its options, type `audppool -help` or `auman audppool` at the command prompt.

This section discusses the following topics:

- Creating a new DP pool
- Changing DP pool thresholds
- Deleting a DP pool
- Reinitializing a DP pool
- Adding DP pool capacity
- Shrinking the DP Pool capacity
- Canceling the DP Pool Capacity Shrinking

Creating a new DP pool

The time to create DP pools depends on the number and capacity of the DP pools to be created, the number and capacity of the HDUs to be added to the DP pool, etc. When creating many DP pools or adding HDUs of large capacity to the DP pool, it may take a long time to complete all the processing.

**To create a DP pool**

1. From the command prompt, issue the `audppool` command to create a DP pool using these settings:
   - Registered array name: HUS 130
   - DP pool number: 0
   - RAID level: 6
   - Combination: 6D+2P
   - HDU type: SAS
   - HDU capacity: 300 GB
   - HDU selection method: Auto
   - HDU number (drive count; Specify as “Combination of pools concerned x 1”): 8
• DP pool consumed capacity alert: Default settings
• Over-provisioning threshold: Default settings
• Stripe size: 64 kB (if omitting this option, the stripe size is set to 256 kB)

Example:

```
% audppool -unit HUS110 -add -dppoolno 0 -RAID6 -combination 6:2 -type SAS
   -drvcapa 300 -drive auto -drivecount 8 -notification enable -stripesize 64
The drive will be selected automatically.
Are you sure you want to set a DP pool? (y/n [n]): y
The DP pool has been set successfully.
%
```

2. Issue the `audppool` command to confirm the created DP pool.

Example of outputting items:

```
% audppool -unit HUS110 -refer -t
DP  RAID  HUS110                          Stripe
Pool  Level  Total Capacity  Consumed Capacity  Type  Status  Reconstruction Progress  Size
 0    6( 6D+2P)      1.0 TB                0.0 TB  SAS   Normal  N/A          64KB
%
```

Creating a DP pool is now complete. You can create a DP-VOL.

**Changing DP pool thresholds**

After creating a DP pool, the only DP pool attributes that can be changed are the threshold values.

**To change DP pool thresholds**

1. From the command prompt, issue the `audppool` command to change the DP pool attributes using these settings:
   • Registered array name: HUS110
   • DP pool number: 0
   • Depletion Alert: 50%

Example:

```
% audppool -unit HUS110 -chg -dppoolno 0 -depletion_alert 50
Are you sure you want to change the DP pool attribute? (y/n [n]): y
DP pool attribute changed successfully.
%
```
2. Issue the **audppool** command to confirm the DP pool attribute.

Example:
% audppool -unit HUS 110 -refer -detail -dppoolno 0 -t
DP Pool : 0
Tier Mode : N/A
RAID Level : 6(6D+2P)
Page Size : 32MB
Stripe Size : 64KB
Type : SAS
Status : Normal
Reconstruction Progress : N/A
Capacity
Total Capacity : 8.0 TB
Replication Available Capacity : 8.0 TB
Consumed Capacity : 2.0 TB
Total : 2.0 TB
User Data : N/A
Replication Data : N/A
Management Area : N/A
  Needing Preparation Capacity
DP Pool Consumed Capacity
Current Utilization Percent : 1%
Early Alert Threshold : 40%
Depletion Alert Threshold : 50%
Notifications Active : Enable
Over Provisioning
Current Over Provisioning Percent : 1%
  Warning Threshold : 100%
  Limit Threshold : 130%
  Notifications Active : Enable
Limit Enforcement : Disable
Replication
Current Replication Utilization Percent : N/A
Replication Depletion Alert Threshold : N/A
Replication Data Released Threshold : N/A
Defined LU Count : 0
DP RAID Group
DP RAID Group Tier Type Chunk Size RAID Level Capability Capacity Percent
0  49  N/A SAS  N/A  6(6D+2P)  8.0TB  2.0TB  0%
Drive Configuration
DP RAID Group RAID Level Unit HDU Type Capacity Status
0  6(6D+2P)  0  0 SAS  300GB  Standby
0  6(6D+2P)  0  1 SAS  300GB  Standby

DP RAID Group Unit HDU Type Capacity Status
0( 6D+2P)  0  0 SAS  300GB  Standby
0( 6D+2P)  0  1 SAS  300GB  Standby

Logical Unit
Consumed Stripe Cache Pair Cache No. of
LU Capacity Capacity Consumed % Size Partition Partition Status Paths

%
Deleting a DP pool

Usually only one DP pool is deleted in normal practice. However, it is possible to delete multiple DP pools at the same time, if needed.

NOTE: Before deleting a DP pool, delete all the DP-VOLs defined to the DP pool (see Deleting a DP-VOL from a DP pool on page 4-19).

To delete a DP pool

1. From the command prompt, issue the `audppool` command to delete a DP pool using these settings. To delete two or more DP pools, enter a space between a pool number.
   - Registered array name: HUS 130
   - DP pool number: 2

Example:

```
% audppool -unit HUS110 -rm -dppoolno 2
Are you sure you want to delete the specified DP pool(s)? (y/n [n]): y
The DP pool 2 has been deleted.
DP pool(s) have been deleted successfully.
%
```

Reinitializing a DP pool

You can recover a DP pool to reset the DP pool after a failure. This is an abnormal operation and should be performed with care. Before attempting to recover a DP pool, you should back up all important data and stop host access to the HUS storage system.

If the DP-VOL is blocked due to an HDU failure, recover the HDU in which the failure occurs. If the status of the DP-VOL is Unformat, perform the LU format.

To recover a DP pool

1. From the command prompt, issue the `audppool` command to reinitialize a DP pool using these settings:
   - Registered array name: HUS130
   - DP pool number: 2

Example:

```
% audppool -unit HUS110 -rm -dppoolno 2
Are you sure you want to delete the specified DP pool(s)? (y/n [n]): y
The DP pool 2 has been deleted.
DP pool(s) have been deleted successfully.
%
```
2. From the command prompt, issue the `auluref` command to confirm the DP-VOL status. Use the following settings:
   - Registered array name: HUS130

   Example:

   ```
   % auluref -unit HUS110 -g
   Stripe  RAID   DP  RAID   Number
   LU  Capacity  Size  Group  Pool  Level       Type          of Paths  Status
   0   100.0 GB  256KB  0   N/A   5( 4D+1P)  SAS                     0  Normal
   1000  500.0 GB  256KB  N/A  0    6( 6D+2P)  SAS                     0  Unformat
   %
   ```

3. From the command prompt, specify an LU whose status is displayed as Unformat, and issue the `auformat` command to format the LU. Use the following settings:
   - Registered array name: HUS110
   - Unformatted LU: 1000

   Example:

   ```
   % auformat -unit HUS110 -lu 1000
   Are you sure you want to format the logical unit(s)? (y/n [n]): y
   The format was started.
   %
   ```

### Adding DP pool capacity

You can grow DP pool capacity by adding DP RAID groups to the DP pool. The total amount of capacity of the DP RAID groups registered in the DP pool is the capacity of that DP pool. Monitor the free capacity of the usable DP pool, and grow the DP pool as needed.

**To add DP pool capacity**

From the command prompt, issue the `audppool` command to add DP pool capacity using these settings:

- Registered array name: HUS130
- DP pool number: 2
- Adding HDU number (drive count; specify as “Combination of pools concerned x 1”): 8

Example:

```bash
% audppool -unit HUS110 -chgsize -dppoolno 2 -drivecount 8
Are you sure you want to add the capacity of DP pool? (y/n [n]): y
The capacity of DP pool has been added successfully.
%
```

4. To optimize the DP pool when adding DP pool capacity, specify the `-dpoptimize` option in the `audppool` command.

Example:

```bash
% audppool -unit HUS110 -chgsize -dppoolno 2 -drivecount 8 -dpoptimize
Are you sure you want to add the capacity of DP pool? (y/n [n]): y
DP optimization (rebalancing) automatically executes for all logical units in this DP pool after capacity is added.
While in progress, performance degradation of host I/Os to the array occurs.
Do you want to continue processing? (y/n [n]): y
The capacity of DP pool has been added successfully.
%
```

**Shrinking the DP Pool capacity**

The pool capacity is shrunk by deleting the DP RAID groups which belong to the DP pool.

To shrink the DP Pool capacity:

From the command prompt, execute the `audppool` command to shrink the DP Pool capacity.

Use the following settings:

- Registered array name: HUS 110
- DP Pool number: 0
- DP RAID Group to be shrunk: 99

```bash
% audppool -unit HUS110 -chgsize -shrink -dppoolno 0 -dprg 99
Are you sure you want to shrink DP pool capacity? (y/n [n]): Y
The shrink DP pool capacity request has been cancelled successfully.
%
```

**Canceling the DP Pool Capacity Shrinking**

To cancel the shrinking of DP pool capacity:

From the command prompt, execute the `audppool` command to cancel the shrinking of the DP Pool capacity.

```bash
% audppool -unit HUS110 -chgsize -shrink -dppoolno 2 -drivecount 8 -dpoptimize
Are you sure you want to add the capacity of DP pool? (y/n [n]): y
The capacity of DP pool has been added successfully.
%```
Use the following settings:

- Registered array name: HUS110
- DP pool number: 0
- DP RAID group to cancel the shrinking: 99

Managing DP-VOLs from the command line

Use the `auluadd`, `auluref`, `auludef`, and `aulusizech` commands to operate the DP-VOL. To refer to the commands and their options, at the command prompt, type `command name -help` or `auman command name`.

This section discusses the following topics:

- Creating a DP-VOL
- Deleting a DP-VOL from a DP pool
- Changing DP-VOL capacity

Creating a DP-VOL

To create a DP-VOL

1. From the command prompt, issue the `auluadd` command to create a DP-VOL using these settings:
   
   - Registered array name: HUS130
   - DP pool number: 0
   - DP-VOL capacity: 500 GB
   - LUN: 1000

   Example:

   ```
   % auluadd -unit HUS110 -lu 1000 -size 500g -dppoolno 0
   Are you sure you want to set the logical unit? (y/n [n]): y
   The logical unit has been set successfully.
   %
   ```

2. Issue the `auluref` command to confirm the DP-VOL is created.
Example:

```
% auluref -unit HUS110 -g
```

<table>
<thead>
<tr>
<th>Stripe</th>
<th>RAID</th>
<th>DP</th>
<th>RAID</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU</td>
<td>Capacity</td>
<td>Size</td>
<td>Group</td>
</tr>
<tr>
<td>1000</td>
<td>500.0 GB</td>
<td>256KB</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Deleting a DP-VOL from a DP pool

By deleting a DP-VOL from a DP pool, the DP pool area that the DP-VOL was using is released, increasing the free capacity of the DP pool. The areas assigned to the DP-VOL are also formatted.

To delete a DP-VOL

From the command prompt, issue the `auludel` command using the following settings:

- Registered array name: HUS130
- LUN: 1000

Example:

```
% auludel -unit HUS110 -lu 1000
The specified logical unit(s) will be deleted.
The specified logical unit(s) have already been formatted.
Are you sure you want to delete the specified logical unit(s)? (y/n [n]): y
If you delete the logical unit(s), you will not be able to recover your data, Please make sure to perform backup of all important data before this operation.
When you delete your logical unit, the data becomes unusable. Systems or applications that use this subsystem will terminate abnormally. Please make sure to stop host access to the subsystem before performing this operation.
Are you sure you want to delete the specified logical unit(s)? (y/n [n]): y
The specified logical unit(s) will be deleted.
Are you sure you want to execute? (y/n [n]): y
The logical unit 1000 has been deleted.
The logical unit(s) have been deleted successfully.
```

Changing DP-VOL capacity

You can increase or decrease the capacity of the DP-VOL in which the HUS100 storage system is operational. The procedure to change the capacity of the DP-VOL is the same as for changing capacity for a normal LU.

To change the DP-VOL capacity

1. From the command prompt, issue the `auluchgsize` command using these settings:
   - Registered array name: HUS110
   - LUN: 1000
   - New size: 1 TB:
Example:

```
% auluchgsize -unit HUS100 -lu 1000 -size 1t
Are you sure you want to grow the logical unit? (y/n [n]): y
The logical unit has been grown successfully.
```

2. To optimize the DP pool when reducing DP-VOL capacity, specify the
   **-dpoptimize** option in the **auluchgsize** command.

Example:

```
% auluchgsize -unit HUS110 -lu 1000 -size 500g -dpoptimize
Are you sure you want to shrink the logical unit? (y/n [n]): y
DP optimization automatically executes for this logical unit after reducing (shrinking) logical unit capacity.
While in progress, performance degradation of host I/Os to the array occurs.
Do you want to continue processing? (y/n [n]): y
If you shrink the logical unit, you will not be able to recover your data for the reduction. Please make sure to perform backup of all important data before this operation.
When you shrink the logical unit, the data becomes unusable. Systems or applications that use this array will terminate abnormally. Please make sure to stop the host access to the array before performing this operation.
Are you sure you want to shrink the logical unit? (y/n [n]): y
The specified logical unit will be shrunk.
Are you sure you want to execute? (y/n [n]): y
The logical unit has been shrunk successfully.
```

3. Issue the **auluref** command to confirm the DP-VOL has been grown or shrunk.

Example:

```
% auluref -unit HUS110 -g
```

```
<table>
<thead>
<tr>
<th>LU</th>
<th>Capacity</th>
<th>Stripe</th>
<th>RAID</th>
<th>DP</th>
<th>RAID</th>
<th>Level</th>
<th>Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>1024.0 GB</td>
<td>256KB</td>
<td>N/A</td>
<td>0</td>
<td>6( 6D+2P)</td>
<td>SAS</td>
<td>Normal</td>
<td></td>
</tr>
</tbody>
</table>
```

### Managing DP pool information

The **audptrend** command operates the DP pool trend information. To refer to the command and its options, at the command, type **audptrend -help** or **auman audptrend**.

This section discusses the following topics:

- Viewing DP pool trend information
- Saving DP pool trend information to a file
Viewing DP pool trend information

To view the DP pool trend information

From the command prompt, issue the `audptrend` command using these settings:

- Registered array name: HUS110
- DP pool number: 0

Example:

```
% audptrend -unit HUS130 -refer -dppoolno 0
DP Pool : 0
Date     Total    Consumed
         Capacity Capacity
2009/03/15 63.9 TB  4095 GB
2009/03/14 63.9 TB  4095 GB
```

Saving DP pool trend information to a file

To output the DP pool trend information to a file

From the command prompt, issue the `audptrend` command using these settings:

- Registered array name: HUS110
- Array serial number: 90001234
- Output destination: C:\tmp

Example:

```
% audptrend -unit HUS110 -export -path C:\tmp
The trend of DP pool will be output to the file.
Are you sure you want to continue? (y/n [n]): y
The trend of DP pool has been outputted to the file.
Output File Name : 90001234 DPPool LU_20090316072440.CSV
Output File Name : 90001234_DPPool_Total_20090316072440.CSV
Output File Name : 90001234 DPPool_Consumed_20090316072440.CSV
%
```

When you specify the prefix for the CSV file (in this example, the prefix characters are trend201006):

```
% audptrend -unit USC110 -export -path C:\tmp -prefix trend201006
The trend of DP pool will be output to the file.
Are you sure you want to continue? (y/n [n]): y
The trend of DP pool has been outputted to the file.
Output File Name : trend201006_90000026_DPPool LU_20100413104807.CSV
Output File Name : trend201006_90000026_DPPool_Total_20100413104807.CSV
Output File Name : trend201006_90000026_DPPool_Consumed_20100413104807.CSV
%```
Optimizing DP

The **audpoptimize** command performs the DP pool optimization. To refer the command and its options, type **audpoptimize -help** or **auman audpoptimize** at the command prompt.

This section discusses the following topics:

- Canceling DP optimization
- Checking the progress of DP optimization
- Changing optimization priority

**Optimizing the DP pool**

To optimize the DP pool

1. From the command prompt, issue the **audpoptimize** command using these settings:
   - Registered array name: HUS150
   - DP-VOLs LUN: 2 and 3

   Example:

   ```
   % audpoptimize -unit HUS150 -start -lu 2 3
   Are you sure you want to start the DP optimization? (y/n [n]): y
   While in progress, performance degradation of host I/Os to the array will occur.
   Do you want to continue processing? (y/n [n]): y
   The DP optimization started successfully.
   ```

2. To reclaim the zero page, issue the **audpoptimize** command adding the **-zeropagereclaim** option.

   Example:

   ```
   % audpoptimize -unit HUS150 -start -lu 2 3 -zeropagereclaim
   Are you sure you want to start the DP optimization? (y/n [n]): y
   While in progress, performance degradation of host I/Os to the array will occur.
   The Zero Page Reclaim option results in DP pool optimization taking longer to process.
   Do you want to continue processing? (y/n [n]): y
   The DP optimization started successfully.
   ```

3. To optimize all DP-VOLs, issue the **audpoptimize** command adding the **-allindppool** option. If you specify the normal LU, a command error occurs.

   Example:

   ```
   % audpoptimize -unit HUS150 -start -lu 2 3 -allindppool
   Are you sure you want to start the DP optimization? (y/n [n]): y
   While in progress, performance degradation of host I/Os to the array will occur.
   The DP optimization started successfully.
   ```
Example:

```bash
% audpoptimize -unit HUS150 -start -lu 2 3 -allindppool
Are you sure you want to start the DP optimization? (y/n [n]): y
While in progress, performance degradation of host I/Os to the array will occur.
Optimization processing will occur for all logical units in DP pools including the specified logical units.
LUN  DP Pool
  2   0
  3   0
Do you want to continue processing? (y/n [n]): y
The DP optimization started successfully.
```

**Canceling DP optimization**

**To cancel the DP optimization**

1. From the command prompt, issue the `audpoptimize` command adding the `-cancel` option.

Example:

```bash
% audpoptimize -unit HUS150 -cancel -lu 2 3
Are you sure you want to cancel the DP optimization? (y/n [n]): y
The DP optimization has been canceled successfully.
```

**Checking the progress of DP optimization**

**To check the progress of DP optimization**

1. From the command prompt, issue the `audpoptimize` command adding the `-refer` option.
Changing optimization priority

**To change optimization priority**

1. From the command prompt, issue the `audpoptimize` command adding the `-chg` and `-priority` options.

Example:

```
% audpoptimize -unit HUS110 -chg -priority host
Are you sure you want to change the priority of DP optimization? (y/n [n]): y
The DP optimization option results in performance degradation of host I/Os to the array while DP optimization is in progress.
Do you want to continue processing? (y/n [n]): y
The priority of DP optimization has been changed successfully.
%
```

Changing the DP Capacity Mode

**To change the DP Capacity Mode:**

* When changing the DP Capacity Mode by the memory reconfiguration

1. From the command prompt, execute the audpoptimize command adding the `–chg` and the `–capacitymode` options.

Example:

```
% audpoptimize –unit HUS150 –chg –capacitymode maximum
Are you sure you want to change the DP capacity mode? (y/n [n]): y
When Cache Partition Manager is enabled, because cache partition feature settings goes back to a default, it is necessary to set it again.
Do you want to continue processing? (y/n [n]): y
The DP capacity mode has been changed successfully.
In order to complete the changing, it is necessary to restart the subsystem.
When not restarting, the changing will be registered, but it will not become effective on the subsystem.
Are you sure you want to start reconfigure memory? (y/n [n]): y
While in progress, performance degradation of host I/Os to the array will occur.
Are you sure you want to continue? (y/n [n]): y
Memory reconfiguring started successfully.
%
```

NOTE:  When using Cache Partition Manager, the memory reconfiguration option is not displayed because the memory reconfiguration cannot be executed.

2. From the command prompt, execute the `audpoptimize` command adding the `–refer` option, and confirm the Reconfigure Memory status is **Reconfiguring(nn%)** or **Normal**.
The following example displays output when using the `-refer` option.

3. When the Reconfigure Memory status is `Reconfiguring(nn%)`, execute step 2 operation after waiting for a while, and confirm the Reconfigure Memory status changes to Normal.

4. When the Reconfigure Memory Status is `Failed(Code-01: Timeout)`, execute step 1 operation.
   
   Code-01 occurs when the access from the host is frequent or the amount of the unwritten data in the cache memory is large.

5. When the Reconfigure Memory status is `Failed(Code-02: Failure of Reconfigure Memory)`, execute the following reconfigure memory operation.
   
   Code-02 occurs when the drive restoration processing starts in the background.

   % auopt -unit array-name -reconfigurememory start
   Are you sure you want to start reconfigure memory? (y/n [n]): y
   While in progress, performance degradation of host I/Os to the array will occur.
   Are you sure you want to continue? (y/n [n]): y
   Memory reconfiguring started successfully.

6. When the Reconfigure Memory status is `Failed(Code-04:Failure of Reconfigure Memory)`, execute the following reboot operation.
Code-04 occurs when the unwritten data in the cache memory cannot be saved to the drive.

```plaintext
% aureboot -unit array-name
Do you want to restart the subsystem? (y/n [n]): y
Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting begins.
When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min.
The subsystem restarted successfully.
%
```

7. When the Reconfigure Memory status is Failed(Code-03: Failure of Reconfigure Memory), ask the Support Center to solve the problem.

   Code-03 occurs when the copy of the management information in the cache memory fails.

8. After completing the memory reconfiguration, execute the `audpoptimize` command adding the `–refer` option from the command prompt.

   If not changed to the set mode in the confirmation result, reconfigure the memory again. The following example displays output when using the `–refer` option.
* When changing the DP Capacity Mode by restarting the array

1. From the command prompt, execute the `audpoptimize` command adding the `–chg` and the `–capacitymode` options.
After completing the reboot of the array, execute the `audpoptimize` command adding the `-refer` option from the command prompt.

If not changed to the set mode in the confirmation result, restart the array again. The following example displays output when using the `-refer` option.
Canceling Memory Reconfiguration for DP Capacity Mode Change

To cancel the memory reconfiguration:

1. From the command prompt, execute the `audpoptimize` command adding the `-reconfigurememory` option.

```bash
% audpoptimize --unit HUS150 --refer
```

<table>
<thead>
<tr>
<th>LUN</th>
<th>Pool</th>
<th>Level</th>
<th>Capacity</th>
<th>Consumed</th>
<th>Reclaimable</th>
<th>Status</th>
<th>DP Capacity Mode</th>
<th>Capacity Mode</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>5( 2D+1P)</td>
<td>5.0 GB</td>
<td>4.0 GB</td>
<td>0.0 MB Normal</td>
<td>Normal</td>
<td>Disable</td>
<td>Disable</td>
<td>0.0 MB</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>5( 2D+1P)</td>
<td>50.0 GB</td>
<td>35.0 GB</td>
<td>0.0 MB Normal</td>
<td>Disable</td>
<td>Disable</td>
<td>Disable</td>
<td>0.0 MB</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>5( 2D+1P)</td>
<td>100.0 GB</td>
<td>11.0 GB</td>
<td>0.0 MB Normal</td>
<td>Disable</td>
<td>Disable</td>
<td>Disable</td>
<td>0.0 MB</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>5( 2D+1P)</td>
<td>500.0 GB</td>
<td>101.0 GB</td>
<td>0.0 MB Normal</td>
<td>Disable</td>
<td>Disable</td>
<td>Disable</td>
<td>0.0 MB</td>
</tr>
</tbody>
</table>

```bash
% auopt --unit array-name -reconfigurememory cancel
```

Are you sure you want to cancel reconfigure memory? (y/n [n]): y

Memory reconfiguring canceled successfully.

NOTE: If the memory reconfiguration proceeds to some extent and the cache memory configuration rewrite starts, the memory reconfiguration cannot be canceled. Cancellation is possible only when the rate of progress of the Reconfigure Memory Status is less than 50 percent.
Changing provisioning attributes

1. When you want to change the accelerated wide striping mode attribute, execute the audpoptimize command adding the `-chg` and `-widestriping` options.

Example:

```
% audpoptimize -unit HUS110 -chg -lu 0 -widestriping enable
Are you sure you want to change the Provisioning attributes? (y/n [n]): y
The Provisioning attributes has been changed successfully.
```

To optimize after changing the accelerated wide striping mode attributes, adding the `-doptimize` options.

```
% audpoptimize -unit HUS110 -chg -lu 0 -widestriping enable -doptimize
Are you sure you want to change the Provisioning attributes? (y/n [n]): y
The Provisioning attributes has been changed successfully.
```

To change the full capacity attributes, execute the `audpoptimize` command adding the `-chg` and `-fullcapacity` options.

```
% audpoptimize -unit HUS110 -chg -lu 0 -fullcapacity enable
Are you sure you want to change the Provisioning attributes? (y/n [n]): y
The Provisioning attributes has been changed successfully.
```

When you want to change the auto DP optimization mode, execute the `audpoptimize` command, adding the `-chg` and the `-auto` options. Furthermore, when you want to set the threshold value of auto DP optimization, enter the specified threshold value, adding the `-threshold` option.

```
% audpoptimize -unit HUS110 -chg -lu 0 -auto enable -threshold 10g
Are you sure you want to change the Provisioning attributes? (y/n [n]): y
The Provisioning attributes has been changed successfully.
```

When you want to change the auto DP optimization mode of all the DP volumes in the DP pool including the specified DP volume, execute the `audpoptimize` command, adding the `-allindppool` option.

```
% audpoptimize -unit HUS110 -chg -lu 0 -auto enable -threshold 10g -allindppool
Are you sure you want to change the Provisioning attributes? (y/n [n]): y
The Provisioning attributes has been changed successfully.
```
This chapter lists the supported CLI commands and covers the following topics:

- Overview
- Installing and Uninstalling
- Enabling or Disabling
- Managing DP Pools
- Managing DP-VOLs
- Managing DP Pool Information
- DP Optimization
- Changing the Provisioning Attributes
- DP Tier Management
Overview

This chapter describes HDT administration commands. All commands can be used as the standard commands.

When using an administration command, a password must be specified. This password is for the workstation where the commands are executed, and is stored in a password file on this workstation. The administration commands that require passwords have an ✗ under the Password column, and are optional. The commands that can be used online have an ⬗ under the Online use column.

Additionally, when the optional Password Protection function is installed on the array, some commands require a user ID and password. The commands that require a login have an ✗ under the Login column.

This chapter describes operation using Navigator 2 CLI.

Installing and Uninstalling

Installing

Since Dynamic Tiering is an extra-cost option, Dynamic Tiering cannot usually be selected (locked) when first using the disk array. To make Dynamic Tiering available, you must install Dynamic Tiering and make its function selectable (unlocked).

Dynamic Tiering can be installed from Navigator 2. This section describes the installation/un-installation procedures performed by using Navigator 2 via the Command Line Interface (CLI).

NOTE:

Before installing/uninstalling Dynamic Tiering, verify that array is operating in a normal state. If a failure such as a controller blockade has occurred, installation/un-installation cannot be performed.

Be careful that the cache partition information is initialized as shown in Appendix A when Dynamic Tiering is installed in the status where Cache Partition Manager is already in use.

To install Dynamic Tiering, the key code or key file provided with the optional feature is required. The following describes the installation procedure.
Without Rebooting Installing

1. From the command prompt, register the array in which Dynamic Tiering is to be installed, and then connect to the array.

2. Execute the `auopt` command to install Dynamic Tiering. The example is shown below.

   ```
   % auopt -unit array-name -lock off -keycode manual-attached-keycode
   Are you sure you want to unlock the option? (y/n [n]): y
   The option is unlocked.
   In order to complete the setting, it is necessary to reconfigure memory or reboot the subsystem.
   Are you sure you want to unlock the option? (y/n [n]): y
   The option is unlocked.
   
   Are you sure you want to start reconfigure memory? (y/n [n]): y
   While in progress, performance degradation of host I/Os to the array will occur.
   Are you sure you want to continue? (y/n [n]): y
   Memory reconfiguring started successfully.
   ```

3. Execute the `auopt` command to confirm whether Dynamic Tiering has been installed. The example is shown below.

   ```
   % auopt -unit array-name -refer
   Option Name          Type  Term  Status
   Reconfigure Memory Status
   D_TIERING            Permanent --- Enable
   Reconfiguring(10%)
   
   Dynamic Tiering has been installed and Status is Enable. Confirm the Reconfigure Memory Status is Reconfiguring(nn%) or Normal.

   1. When the Reconfigure Memory Status is Reconfiguring(nn%), execute step 3 operation after waiting for a while, and confirm the Reconfigure Memory Status changes to Normal.

   2. When the Reconfigure Memory Status is Failed(Code-01:Timeout), execute step 2 operation.

   Code-01 occurs when the access from the host is frequent or the amount of the unwritten data in the cache memory is large.

   3. When the Reconfigure Memory Status is Failed(Code-02: Failure of Reconfigure Memory), execute the following reconfigure memory operation.

   Code-02 occurs when the drive restoration processing starts in the background.

   ```
   % auopt -unit array-name -reconfigurememory start
   Are you sure you want to start reconfigure memory? (y/n [n]): y
   While in progress, performance degradation of host I/Os to the array will occur.
   ```
Are you sure you want to continue? (y/n [n]): y
Memory reconfiguring started successfully.

4. When the **Reconfigure Memory Status** is **Failed(Code-04:Failure of Reconfigure Memory)**, execute the following reboot operation.
   
   Code-04 occurs when the unwritten data in the cache memory cannot be saved to the drive.

   ```
   % aureboot -unit array-name
   Do you want to restart the subsystem? (y/n [n]): y
   Host will be unable to access the subsystem while restarting.
   Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
   Also, if you are logging in, the login status will be canceled when restarting begins.
   When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
   Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
   Do you agree with restarting? (y/n [n]): y
   Are you sure you want to execute? (y/n [n]): y
   Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min.
   The subsystem restarted successfully.
   %
   ```

5. When the **Reconfigure Memory Status** is **Failed(Code-03: Failure of Reconfigure Memory)**, ask the Support Center to solve the problem.
   
   Code-03 occurs when the copy of the management information in the cache memory fails.
   
   Installation of Dynamic Tiering is now complete.
Rebooting Installing

**NOTE:**

- When the Power Saving instruction of the non I/O link is executed with the priced option, Power Saving or Power Saving Plus are used together. If Dynamic Tiering is added, deleted, or changed while the Power Saving status is Normal (Command Monitoring), the status is changed to “Normal (Spin down Failure: PS OFF/ON)” by the array reboot which works at the time of the setting change and then the spin-down may fail.

When the spin-down fails, run a spin-down session again. Before adding, deleting, or changing the Dynamic Tiering instance, check that the spin-down instruction has not been issued or there is no RAID group where the Power Saving status is Normal (Command Monitoring) by the Power Saving instruction of the non I/O link.

- If Dynamic Tiering is installed, uninstalled, or changed during a period from an issue of a spin-down instruction to the completion of the spin-down when Power Saving, which is a priced option of the disk array, is used together, the spin down may fail. When the spin-down fails, execute the spin-down again. Check that the spin-down instruction has not been issued or has been completed (no RAID group in the Power Saving Status of **Normal(Command Monitoring)** exists) before installing, uninstalling, or changing Dynamic Tiering.

- When you perform the installing, uninstalling, enabling, or disabling of Dynamic Tiering in the case where the disk array is used on the remote side of TrueCopy or TCE, the following phenomena occur with the restart of the disk array.

The both paths of TrueCopy or TCE are blocked. When a path is blocked, a TRAP occurs, that is, a notification to the SNMP Agent Support Function. Inform the departments concerned of the above beforehand. The path of TrueCopy or TCE is recovered from the blockade automatically after the disk array is restarted.

- When the pair status of TrueCopy or TCE is **Paired** or **Synchronizing**, it is changed to **Failure**.

- When you restart the disk array necessarily, perform the installing, un installing, enabling, or disabling of Dynamic Tiering after changing the pair status of TrueCopy or TCE to **Split**.

**NOTE:** Notes for the case where DKN-200-NGW1 (NAS unit in short) is connected to the disk array.

Items to be checked in advance

Prior to this operation, if all of the following three items applies to the disk array, execute Correspondence when connecting the NAS unit.

1. NAS unit is connected to the disk array. (* 1)
2. NAS unit is in operation. (* 2)

3. A failure has not occurred on the NAS unit. (* 3)
   * 1: Confirm with the disk array administrator to check whether the NAS unit is connected or not.
   * 2: Confirm with the NAS unit administrator to check whether the NAS service is operating or not.
   * 3: Ask the NAS unit administrator to check whether failure has occurred or not by checking with the NAS administration software, NAS Manager GUI, List of RAS Information, etc. In case of failure, execute the maintenance operation together with the NAS maintenance personal.

• Correspondence when connecting the NAS unit:
  If the NAS unit is connected, ask the NAS unit administrator for termination of NAS OS and planned shutdown of the NAS unit.

• Points to be checked after completing this operation:
  Ask the NAS unit administrator to reboot the NAS unit. After rebooting, ask the NAS unit administrator to refer to “Recovering from FC path errors” in “Hitachi NAS Manager User’s Guide” and check the status of the Fibre Channel path (FC path in short) and to recover the FC path if it is in a failure status.
  In addition, if there are any personnel for the NAS unit maintenance, ask the NAS unit maintenance personnel to reboot the NAS unit.

1. From the command prompt, register the array in which Dynamic Tiering is to be installed, and then connect to the array.

2. Execute the `auopt` command to install Dynamic Tiering. The example is shown below.

   % auopt -unit array-name -lock off -keycode manual-attached-keycode
   Are you sure you want to unlock the option? (y/n [n]): y
   The option is unlocked.
   In order to complete the setting, it is necessary to reconfigure memory or reboot the subsystem.
   Are you sure you want to start reconfigure memory? (y/n [n]): n
   Host will be unable to access the subsystem while restarting.
   Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
   Also, if you are logging in, the login status will be canceled when restarting begins.
   When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
   Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
   Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time
Required 7 - 25min.
The subsystem restarted successfully.
%

3. Execute the `auopt` command to confirm whether Dynamic Tiering has been installed. The example is shown below.

```bash
% auopt -unit array-name -refer
Option Name   Type    Term Status Reconfigure Memory Status
D_PROVISIONING Permanent --- Enable Normal
D_TIERING    Permanent --- Enable Normal
%
```

Dynamic Tiering is installed and the status is Enable. Installation of Dynamic Tiering is now complete.

**Uninstalling**

To uninstall Dynamic Tiering, the key code or key file provided with the optional feature is required. Once uninstalled, Dynamic Tiering cannot be used (locked) until it is again installed using the key code or key file.

---

**NOTE:** The following conditions must be satisfied in order to uninstall Dynamic Tiering.

- When the DP-VOL is mapped, the mapping information must be released.
- All the DP-VOLs must be deleted.
- All the DP pools for Dynamic Tiering must be deleted.

---

**Uninstall Dynamic Tiering Without Rebooting Uninstallation**

1. From the command prompt, register the array in which Dynamic Tiering is to be uninstalled, and then connect to the array.

2. Execute the `auopt` command to uninstall Dynamic Tiering. The example is shown below.

```bash
% auopt -unit array-name -lock on -keycode manual-attached-keycode
Are you sure you want to lock the option? (y/n [n]): y
The option is locked.
In order to complete the setting, it is necessary to reconfigure memory or reboot the subsystem.
Are you sure you want to start reconfigure memory? (y/n [n]): y
While in progress, performance degradation of host I/Os to the array will occur.
Are you sure you want to continue? (y/n [n]): y
Memory reconfiguring started successfully.
%
```

3. Execute the `auopt` command to confirm whether Dynamic Tiering has been uninstalled. The example is shown below.
Uninstalling Dynamic Tiering is now complete.

Rebooting Uninstalling

1. From the command prompt, register the array in which Dynamic Tiering is to be uninstalled, and then connect to the array.

2. Execute the `auopt` command to uninstall Dynamic Tiering. The example is shown below.

   ```
   % auopt -unit array-name -lock on -keycode manual-attached-keycode
   Are you sure you want to lock the option? (y/n [n]): y
   The option is locked.
   In order to complete the setting, it is necessary to reconfigure memory or reboot the subsystem.
   Are you sure you want to start reconfigure memory? (y/n [n]): n
   Host will be unable to access the subsystem while restarting.
   Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
   Also, if you are logging in, the login status will be canceled when restarting begins.
   When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
   Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
   Do you agree with restarting? (y/n [n]): y
   Are you sure you want to execute? (y/n [n]): y
   Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min.
   The subsystem restarted successfully.
   %
   ``

3. Execute the `auopt` command to confirm whether Dynamic Tiering has been uninstalled. The example is shown below.

   ```
   % auopt -unit array-name -refer
   Option Name   Type    Term Status Reconfigure Memory Status
   D_PROVISIONING Permanent --- Enable Normal
   %
   ``

Uninstalling Dynamic Tiering is now complete.

Enabling or Disabling

Dynamic Tiering can be set to "enable" or "disable" when it is installed.
NOTE: The following conditions must be satisfied in order to disable Dynamic Tiering:

- When the DP-VOL is mapped, the mapping information must be released.
- All the DP-VOLs must be deleted.
- All the DP pools for Dynamic Tiering must be deleted.
Enabling or Disabling Dynamic Tiering Without Rebooting

1. From the command prompt, register the array in which the status of the feature is to be changed, and then connect to the array.

2. Execute the `auopt` command to change the status (enable or disable).

The following is an example of changing the status from enable to disable. If you want to change the status from disable to enable, enter enable after the `-st` option.

   ```
   % auopt -unit array-name -option D_TIERING -st disable
   Are you sure you want to disable the option? (y/n [n]): y
   The option has been set successfully.
   In order to complete the setting, it is necessary to reconfigure memory or reboot the subsystem.
   
   Are you sure you want to start reconfigure memory? (y/n [n]): y
   While in progress, performance degradation of host I/Os to the array will occur.
   
   Are you sure you want to continue? (y/n [n]): y
   Memory reconfiguring started successfully.
   
   
   %
   
   3. Execute the `auopt` command to confirm whether the status has been changed. The example is shown below.

   ```
   % auopt -unit array-name -refer
   Option Name   Type    Term Status Reconfigure Memory Status
   D_PROVISIONING Permanent --- Enable Normal
   D_TIERING    Permanent --- Disable Normal
   `%

   Enabling or disabling Dynamic Tiering is now complete.

Rebooting Enabling or Disabling

1. From the command prompt, register the array in which the status of the feature is to be changed, and then connect to the array.

2. Execute the `auopt` command to change the status (enable or disable).

The following is an example of changing the status from enable to disable. If you want to change the status from disable to enable, enter enable after the `-st` option.

   ```
   % auopt -unit array-name -option D_TIERING -st disable
   Are you sure you want to disable the option? (y/n [n]): y
   The option has been set successfully.
   In order to complete the setting, it is necessary to reconfigure memory or reboot the subsystem.
   
   Are you sure you want to start reconfigure memory? (y/n [n]): n
   Host will be unable to access the subsystem while restarting.
   Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem. Also, if you are logging in, the login status will be canceled when restarting begins. When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
   ```
Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.

Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y

Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min.
The subsystem restarted successfully.

3. Execute the auopt command to confirm whether the status has been changed. The example is shown below.

```
% auopt -unit array-name -refer
Option Name  Type  Term Status Reconfigure Memory Status
D_PROVISIONING Permanent --- Enable Normal
D_TIERING     Permanent --- Disable Normal
```

Enabling or disabling Dynamic Tiering is now complete.

Managing DP Pools

The audppool command operates DP pool. To refer the audppool command and its options, type in `audppool -help` or `auman audppool` at the command prompt.

This section discusses the following topics:

- Creating DP Pools (with Tier Mode Enabled) Newly
- Changing the Tier Mode of the DP Pool
- Changing the DP Pool Basic Attribute
- Changing the DP Pool Tier Attribute
- Deleting the DP Pool
- Reinitializing the DP Pool
- Adding a DP Pool Capacity

Creating DP Pools (with Tier Mode Enabled) Newly

The time to create DP pools (with the Tier Mode enabled) varies depending on the number and capacity of the DP pools (with the Tier Mode enabled) to be created, the number and capacity of the HDUs to be added to the DP pool, etc. When creating many DP pools or adding HDUs of large capacity to the DP pool, it may take unexpected time until completing all the processing.

To create a DP pool newly:

1. From the command prompt, execute the audppool command to create a DP pool newly.
2. For the drive count to be specified, you need to specify the number of drives the same as “specified combination 1”.
   Use the following settings:
Registered array name: HUS150
DP pool number: 0
Tier Mode: Enable
The number of DP RAID groups: 1
RAID level: 6
Combination: 6D+2P
HDU type: SAS
HDU capacity: 900 GB
HDU selection method: Auto
1st Tier Buffer Space for New Page Assignment: 10
1st Tier Buffer Space for Tier Relocation: 15
High Efficiency Relocation Mode: Enable
Auto Progress Mode: Enable
Monitoring Periods: Always running
Relocation Periods: 00:30 to 02:30 on Sunday and Wednesday, and 19:00 to 23:30 on Wednesday, Friday, and Saturday

```bash
% audppool -unit HUS150 -add -dppoolno 0 -tiermode enable -dprgcount 1 -composition auto RAID6 8:2 -type SAS 900 -tier1st_newpageassignment 10 -tier1st_tierrelocation 15 -highefficiencyrelocation enable -autoprogress enable -monitorperiods always -relocationperiods 0030 0200 mon wed 1900 2330 web fri sat
```
Are you sure you want to set a DP pool? (y/n [n]): y
When you specify SSD drive and do not specify an even multiple (2, 4, 8 and 16) of data drives, DP efficiency will be reduced. The drive will be selected automatically.
The capacity of DP pool after setting out is set to 8.0TB.
The DP pool has been set successfully.

3. Execute the audppool command to confirm the created DP pool.

```bash
% audppool -unit HUS150 -refer -t
```

<table>
<thead>
<tr>
<th>DP</th>
<th>RAID</th>
<th>Pool Tier Mode</th>
<th>Level</th>
<th>Total Cpcty</th>
<th>Consumed Cpcty</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Enable</td>
<td>6(8D+2P)</td>
<td>6.3 TB</td>
<td>0.0 TB</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

Over Provision Replication Available Replication Util
Percent | Capacity | Percent | Type |
---|---|---|---|
0% | 6.3 TB | 0% | SAS |

Stripe Needing Preparation
Status Reconstruction Progress Size Capacity
Normal (Formatting(1%)) | N/A | 256KB | 0.0TB |

Creating a DP pool (with Tier Mode enabled) is now complete. You can create a DP-VOL.
Changing the Tier Mode of the DP Pool

To change the Tier Mode of the DP pool:
1. From the command prompt, execute the `audppool` command to change the Tier Mode.

   Use the following settings:
   - Registered array name: HUS150
   - DP pool number: 0
   - Tier Mode: Enable

   ```
   % audppool -unit HUS150 -chg -dppoolno 0 -tiermode enable
   Are you sure you want to change the tier mode? (y/n [n]): y
   The tier mode changed successfully.
   %
   ```

2. Execute the `audppool` command to confirm the Tier Mode.

   ```
   % audppool -unit HUS150 -refer -t
   DP          RAID                     Util
   Pool        Tier Mode Level Total Capacity Consumed Capacity Pct
   0           Enable     6(8D+2P) 6.3 TB       0.0 TB 0%
   Over Provisioning Replication Available Replication Util Percent Capacity Percent Type
   1%          6.3 TB 0%                  SAS
   StripeNeed Prep
   Status       Reconstr Progress Size Cap
   Normal (Formatting (1%)) N/A         256KB     0.0TB
   %
   ```

Changing the DP Pool Basic Attribute

After creating the DP pool, only the threshold value can be changed among the DP pool settings.

To change the DP pool basic attributes:
1. From the command prompt, execute the `audppool` command to change the DP pool basic attribute.

   Use the following settings:
   - Registered array name: HUS150
   - DP pool number: 0
   - Depletion alert: 50%

   ```
   % audppool -unit HUS150 -chg -dppoolno 0 -depletion_alert 50
   Are you sure you want to change the DP pool attribute? (y/n [n]): y
   DP pool attribute changed successfully.
   %
   ```

2. Execute the `audppool` command to confirm the DP pool basic attribute.

   ```
   % audppool -unit HUS150 -refer -detail -dppoolno 0 -auto
   DP Pool : 0
   Tier Mode : Enable
   RAID Level : 6(8D+2P)
   ```
Changing the DP Pool Tier Attribute

To change the Buffer Area for New Page Assignment and the Buffer Area for Tier Relocation of the DP Pool Tier Attribute:

1. From the command prompt, execute the `audppool` command to change the Buffer Area for New Page Assignment and the Buffer Area for Tier Relocation.
Use the following settings:

Registered array name: HUS150

DP pool number: 0

1st tier Buffer Space for New Page Assignment: 12%

1st tier Buffer Space for Tier Relocation: 17%

% audppool -unit HUS150 -chg -dppoolno 0
-tier1st_newpageassignment 12
-tier1st_tierrelocation 17
Are you sure you want to change the DP pool attribute? (y/n [n]): y
DP pool attribute changed successfully.

2. Execute the audppool command to confirm the DP pool tier attribute.

% audppool -unit HUS150 -refer -detail -dppoolno 0 -auto

DP Pool : 0
Tier Mode : Enable
RAID Level : 6(8D+2P)
Page Size : 32MB
Stripe Size : 256KB
Type : SAS
Status : Normal
Reconstruction Progress : N/A
Capacity
Total Capacity : 6.3 TB
Replication Available Capacity : 6.3 TB
Consumed Capacity
Total : 100.0 GB
User Data : 100.0 GB
Replication Data : 0.0 MB
Management Area : 0.0 MB
Needling Preparation Capacity : 0.0 MB
DP Pool Consumed Capacity
Current Utilization Percent : 1%
Early Alert Threshold : 40%
Depletion Alert Threshold : 50%
Notifications Active : Enable
Over Provisioning
Current Over Provisioning Percent : 1%
Warning Threshold : 100%
Limit Threshold : 130%
Notifications Active : Disable
Limit Enforcement : Disable
Replication
Current Replication Utilization Percent : 1%
Replication Depletion Alert Threshold : 40%
Replication Data Released Threshold : 95%
Defined LU Count : 1
Tier
Total Consumed Buffer Space Buffer Space
DP RAID Group Tier Type Chunk Size RAID Level Opcty Opcty Percent
199 1st SAS 1 GB 6(6D+2P) 6.3TB 100.0GB 1%

Drive Configuration
DP RAID Group RAID Level Unit HDU Type Capacity Status
199 6(8D+2P) 0 8 SAS 900GB Normal
199 6(8D+2P) 0 9 SAS 900GB Normal
Deleting the DP Pool

Usually, one DP pool to be deleted is specified and only the DP pool is deleted. However, it is possible to delete two or more DP pools together if needed.

NOTE: Before deleting the DP pool, delete the DP-VOL defined as the DP pool.

To delete one DP pool:
1. From the command prompt, execute the `audppool` command to delete the DP pool.
2. To delete two or more DP pools, enter a space between a pool number.
   Use the following settings:
   - Registered array name: HUS150
   - DP pool number: 2
   % audppool -unit HUS150 -rm -dppoolno 2
   Are you sure you want to delete the specified DP pool(s)? (y/n [n]): y
   The DP pool 2 has been deleted.
   DP pool(s) have been deleted successfully.

Reinitializing the DP Pool

Recover the DP pool to recover the failure. Do not perform this operation normally. When the DP-VOL is blocked due to an HDU failure, recover the HDU in which the failure occurs. When the status of the DP-VOL is Unformat, perform the volume format.
1. From the command prompt, execute the `audppool` command to reinitialize the DP pool.
   Use the following settings:
Registered array name: HUS150

DP pool number: 2

% audppool -unit HUS150 -recover -dppoolno 2
Confirm DP pool reinitialization.
If you reinitialize the DP pool, you will not be able to recover your data.
Please backup all important data before performing this operation.
When you reinitialize a DP pool, the data becomes unusable. Systems or applications that use this array may terminate unexpectedly. Please make sure to stop the host access to the array before performing this operation.
Are you sure you want to reinitialize the specified DP pool?
(y/n [n]): y
Start the DP pool reinitialization.

2. From the command prompt, execute the auluref command to confirm the DP-VOL status.

Use the following settings:

Registered array name: HUS150

% auluref -unit HUS150 -g
Stripe RAID DP Tier RAID Number
LU Capacity Size Group Pool Mode Level Type of Paths Status
0 100.0GB 256KB 0 N/A N/A 5( 4D+1P)SAS 0 Normal
1000 500.0GB 256KB N/A 0 Disable 6( 6D+2P)SAS 0 Unformat

3. From the command prompt, specify a volume whose status is displayed as Unformat, and execute the auformat command to format the volume.

Use the following settings:

Registered array name: HUS150

Unformatted volume: 1000

% auformat -unit HUS150 -lu 1000
Are you sure you want to format the logical unit(s)? (y/n [n]): y
The format was started.

Adding a DP Pool Capacity

1. From the command prompt, execute the audppool command to add the DP pool capacity.

2. For the number of drives to be specified for the –drivecount option, you need to specify the number of drives the same as “combination of DP pools specified by –dppoolno option 1”.

Use the following settings:

Registered array name: HUS150

DP pool number: 2

Adding HDU number (drive count): 8
% audppool -unit HUS150 -chgsize -dppoolno 2 -drivecount 8
Are you sure you want to grow the DP pool? (y/n [n]): y
The DP pool has been grown successfully.
%

3. You want to optimize of the DP pool when adding a DP pool capacity, specify the -dpoptimize option to the audppool command.

% audppool -unit HUS150 -chgsize -dppoolno 2 -drivecount 8 -dpoptimize
Are you sure you want to grow the DP pool? (y/n [n]): y
DP optimization (rebalancing) automatically executes for all logical units in this DP pool after capacity is added.
While in progress, performance degradation of host I/Os to the array occurs.
Do you want to continue processing? (y/n [n]): y
The DP pool has been grown successfully.
%

Shrinking the DP Pool capacity

The pool capacity shrinks by deleting the DP RAID gropus which belong to the DP pool.

To shrink the DP Pool capacity:
1. From the command prompt, execute the audppool command to shrink the DP Pool capacity, using the following settings:
   • Registered array name: HUS110
   • DP pool number: 0
   • DP RAID Group to shrink: 99

% audppool -unit HUS110 -chgsize -shrink -dppoolno 0 -dprg 99
Are you sure you want to shrink DP pool capacity? (y/n [n]): y
The shrink DP pool capacity request has been issued successfully.
%

Canceling the DP Pool capacity shrink

To cancel the DP pool capacity shrink operation:

From the command prompt, execute the audppool command to cancel the DP pool capacity shrink operation, using the following settings:

Registered array name: HUS110
DP pool number: 0
DP RAID group to cancel the shrink operation: 99

% audppool -unit HUS110 -cancel -shrink -dppoolno 0 -dprg 99
Are you sure you want to cancel the shrink DP pool capacity? (y/n [n]): y
The shrink DP pool capacity request has been cancelled
Managing DP-VOLs

The auuluadd, auluref, auludel, and/or aulusizechg commands operate DP-VOL. To refer the commands and its options, type in command name –help or auman command name at the command prompt.

This section discusses the following topics:
- Creating DP-VOLs Newly
- Deleting the DP-VOLs
- Changing the DP-VOL Capacity

Creating DP-VOLs Newly

To create a new DP-VOL:

1. From the command prompt, execute the auuluadd command to create a DP-VOL.

   Use the following settings:
   - Registered array name: HUS150
   - DP pool number: 0
   - DP-VOL capacity: 500 GB
   - LUN: 1000

   ```
   % auuluadd –unit HUS150 –lu 1000 –size 500g –dppoolno 0
   Are you sure you want to set the logical unit? (y/n [n]): y
   The logical unit has been set successfully.
   %
   ```

2. Execute the auluref command to confirm the DP-VOL is created.

   ```
   % auluref –unit HUS150 –g
   ```

   ```
   Stripe RAID DP Tier
   Number
   LU Capacity Size Group Pool Mode Level
   Type of Paths Status
   1000 500.0 GB 256KB N/A 0 Enable 6(6D+2P) SAS 0 Normal
   %
   ```

   ```
   % auluref –unit HUS150 –g
   ```

   ```
   Stripe RAID DP Tier RAID Number
   LU Capacity Size Group Pool Mode Level Type of Paths Status
   1000 500.0 GB 256KB N/A 0 Enable 6(6D+2P)SAS 0 Normal
   ```
Deleting the DP-VOLs

If the DP-VOL is deleted, the page assigned with the DP-VOL is also deleted and formatted.

To delete the DP-VOL from a DP pool:

1. From the command prompt, execute the `auludel` command to delete the DP-VOL.

   Use the following settings:

   ```
   Registered array name: HUS150
   LUN: 1000
   
   % auludel -unit HUS150 -lu 1000
   The specified logical unit(s) will be deleted.
   The specified logical unit(s) have already been formatted.
   Are you sure you want to delete the specified logical unit(s)? (y/n [n]): y
   If you delete the logical unit(s), you will not be able to recover your data.
   Please make sure to perform backup of all important data before this operation.
   When you delete your logical unit, the data becomes unusable.
   Systems or applications that use this subsystem will terminate abnormally.
   Please make sure to stop host access to the subsystem before performing this operation.
   Are you sure you want to delete the specified logical unit(s)? (y/n [n]): y
   The logical unit(s) have been deleted successfully.
   ```

Changing the DP-VOL Capacity

The operation to change the capacity of the DP-VOL is same as the normal volume. (Standard function)

To change the DP-VOL capacity:

1. From the command prompt, execute the `auluchgsize` command to change the DP-VOL capacity.

   Use the following settings:

   ```
   Registered array name: HUS150
   LUN: 1000
   
   Changing size: 1 TB
   
   % auluchgsize -unit HUS150 -lu 1000 -size 1t
   Are you sure you want to grow the logical unit? (y/n [n]): y
   The logical unit 1000 has been deleted.
   The logical unit(s) have been deleted successfully.
   ```
You want to optimize of the DP pool when reducing the DP-VOL capacity, specify the -dpoptimize option to the auluchgsize command.

% auluchgsize -unit HUS110 -lu 1000 -size 500g -dpoptimize
Are you sure you want to shrink the logical unit? (y/n [n]): y
DP optimization automatically executes for this logical unit after reducing (shrinking) logical unit capacity.
While in progress, performance degradation of host I/Os to the array occurs.
Do you want to continue processing? (y/n [n]): y
If you shrink the logical unit, you will not be able to recover your data for the reduction. Please make sure to perform backup of all important data before this operation.
When you shrink the logical unit, the data becomes unusable. Systems or applications that use this array will terminate abnormally. Please make sure to stop the host access to the array before performing this operation.
Are you sure you want to shrink the logical unit? (y/n [n]): y
The specified logical unit will be shrunk.
Are you sure you want to execute? (y/n [n]): y
The logical unit has been shrunk successfully.
%

2. Execute the auluref command to confirm the DP-VOL has been grown or shrunk.
% auluref -unit HUS110 -g
Stripe RAID DP RAID Number
LU Capacity Size Group Pool Level Type of Paths Status
1000 1024.0 GB 256KB N/A 0 6(6D+2P)SAS 0 Normal
%

Managing DP Pool Information

The audptrend command operates the DP pool trend information. To refer the command and its options, type in audptrend -help or auman audptrend at the command prompt.

This section discusses the following topics:
- Viewing the Trend Information
- Outputting the Trend Information to a File

Viewing the Trend Information

To view the DP pool trend information:

1. From the command prompt, execute the audptrend command to view the DP pool information.

Use the following settings:
- Registered array name: HUS150
- DP pool number: 0
% audptrend -unit HUS150 -refer -dppoolno 0
DP Pool : 0

<table>
<thead>
<tr>
<th>Date</th>
<th>Total Capacity</th>
<th>Consumed Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011/10/15</td>
<td>63.9 TB</td>
<td>4095 GB</td>
</tr>
<tr>
<td>2011/10/14</td>
<td>63.9 TB</td>
<td>4095 GB</td>
</tr>
</tbody>
</table>

**Outputting the Trend Information to a File**

To output the DP pool trend information to a file:

1. From the command prompt, execute the `audptrend` command to output the DP pool trend information to a file.

   Use the following settings:

   - Registered array name: HUS150
   - Array serial number: 91101234
   - Output destination: C:\tmp

   % audptrend -unit HUS150 -export -path C:\tmp
   The trend of DP pool has been outputted to the file.
   Output File Name : 91101234_DPPool_LU_20111016072440.CSV
   Output File Name : 91101234_DPPool_Total_20111016072440.CSV
   Output File Name : 91101234_DPPool_Consumed_20111016072440.CSV

   When specify the prefix for the CSV file:

   - Prefix characters: trend201110

   % audptrend -unit HUS150 -export -path C:\tmp -prefix trend201110
   The trend of DP pool has been outputted to the file.
   Output File Name : trend201106_91100026_DPPool_LU_20111013104807.CSV
   Output File Name : trend201106_91100026_DPPool_Total_20111013104807.CSV
   Output File Name : trend201106_91100026_DPPool_Consumed_20111013104807.CSV

**DP Optimization**

The `audpoptimize` command executes the DP pool optimization. To refer the command and its options, type in `audpoptimize -help` or `auman audpoptimize` at the command prompt.

This section discusses the following topics:

- **Optimizing the DP Pool**
- **Cancellation of the DP Optimization**
Optimizing the DP Pool

To optimize the DP pool:

1. From the command prompt, execute the `audpoptimize` command to optimize the DP pool.

   Use the following settings:
   
   Registered array name: HUS150
   
   DP-VOLs LUN: 2 and 3
   
   ```
   % audpoptimize –unit HUS150 –start –lu 2 3
   Are you sure you want to start the DP optimization? (y/n [n]): y
   While in progress, performance degradation of host I/Os to the array will occur.
   
   Do you want to continue processing? (y/n [n]): y
   The DP optimization started successfully.
   ```

   You want to reclaim the zero page, execute the `audpoptimize` command adding the `-zeropagereclaim` option.

   ```
   % audpoptimize –unit HUS150 –start –lu 2 3 –zeropagereclaim
   Are you sure you want to start the DP optimization? (y/n [n]): y
   While in progress, performance degradation of host I/Os to the array will occur.
   
   The Zero Page Reclaim option results in DP pool optimization taking longer to process.
   
   Do you want to continue processing? (y/n [n]): y
   The DP optimization started successfully.
   ```

   You want to optimize all DP-VOLs, execute the `audpoptimize` command adding the `-allindppool` option. If specify the normal volume, command error occurs.

   ```
   % audpoptimize –unit HUS150 –start –lu 2 3 –allindppool
   Are you sure you want to start the DP optimization? (y/n [n]): y
   While in progress, performance degradation of host I/Os to the array will occur.
   
   Optimization processing will occur for all logical units in DP pools including the specified logical units.
   
   LUN   DP Pool
   2      0
   3      0
   
   Do you want to continue processing? (y/n [n]): y
   The DP optimization started successfully.
   ```

Cancellation of the DP Optimization

To cancel the DP optimization:
1. From the command prompt, execute the `audpoptimize` command adding the `--cancel` option.

    % audpoptimize --unit HUS150 --cancel --lu 2 3
    Are you sure you want to cancel the DP optimization? (y/n [n]): y
    The DP optimization has been canceled successfully.

    %

**Checking the progress of DP optimization**

**To check the progress of DP optimization**

1. From the command prompt, issue the `audpoptimize` command adding the `-refer` option.

    % audpoptimize --unit HUS150 --refer
    Priority : DP Optimization
    DP Capacity Mode
    Current : Regular Capacity
    User Setting : Regular Capacity
    Reconfigure Memory Status : Normal
    DP RAID Total Consumed Reclaimable Accelerated Wide Full Anch
    LUN Pool Level Capacity Capacity Capacity Status Striping Mode Capacity Mode Cap
    0 0 5(2D+1P) 5.0 GB 4.0 GB 0.0 MB Normal Disable Disable 0.0 MB
    1 0 5(2D+1P) 50.0 GB 35.0 GB 0.0 MB Normal Disable Disable 0.0 MB
    2 0 5(2D+1P) 100.0 GB 11.0 GB 0.0 MB Normal Disable Disable 896.0 MB
    3 0 5(2D+1P) 500.0 GB 101.0 GB 0.0 MB Normal Disable Disable 0.0 MB

    Needing Preparation 1st Tier Reclaimable 2nd Tier Reclaimable 3rd Tier Reclaimable Auto DP Opt Auto DP Opt
    Capacity Capacity Capacity Capacity Capacity Status Threshold
    0.0 MB N/A N/A N/A N/A N/A N/A
    0.0 MB N/A N/A N/A N/A N/A N/A
    0.0 MB N/A N/A N/A N/A N/A N/A
    0.0 MB N/A N/A N/A N/A N/A N/A

    %

**Changing optimization priority**

**To change optimization priority**

1. From the command prompt, issue the `audpoptimize` command adding the `-chg` and `-priority` options.

    Example:

    % audpoptimize -unit HC110 -chg -priority host
    Are you sure you want to change the priority of DP optimization? (y/n [n]): y
    The DP optimization option results in performance degradation of host I/Os to the array while DP optimization is in progress.
    Do you want to continue processing? (y/n [n]): y
    The priority of DP optimization has been changed successfully.

    %
Changing the DP Capacity Mode

To change the DP Capacity Mode:

* When changing the DP Capacity Mode by the memory reconfiguration

1. From the command prompt, execute the `audpoptimize` command adding the `–chg` and the `–capacitymode` options.

   ```
   % audpoptimize –unit HUS150 –chg –capacitymode maximum
   Are you sure you want to change the DP capacity mode? (y/n [n]): y
   When Cache Partition Manager is enabled, because cache partition feature settings goes back to a default, it is necessary to set it again.
   Do you want to continue processing? (y/n [n]): y
   The DP capacity mode has been changed successfully.
   In order to complete the changing, it is necessary to restart the subsystem.
   When not restarting, the changing will be registered, but it will not become effective on the subsystem.
   Are you sure you want to start reconfigure memory? (y/n [n]): y
   While in progress, performance degradation of host I/Os to the array will occur.
   Are you sure you want to continue? (y/n [n]): y
   Memory reconfiguring started successfully.
   %
   ```

   **NOTE:** When using Cache Partition Manager, the memory reconfiguration option is not displayed because the memory reconfiguration cannot be executed.

2. From the command prompt, execute the `audpoptimize` command adding the `–refer` option, and confirm the Reconfigure Memory status is **Reconfiguring(nn%)** or **Normal**.

   The following example displays output when using the `–refer` option.

   ```
   % audpoptimize –unit HUS150 –refer
   Priority : Normal
   DP Capacity Mode
   Current                   : Regular Capacity
   User Setting              : Maximum Capacity
   Reconfigure Memory Status : Reconfiguring(83%)
   DP RAID  Total Consumed Reclaimable
   LUN  Pool Level         Capacity  Capacity  Capacity  Reclaimable  Accelerated Wide  Full  Anchored
   0    0( 2D+1P)  5.0 GB   4.0 GB        0.0 MB Normal Disable Disable 0.0 MB
   1    0( 2D+1P)  50.0 GB  35.0 GB        0.0 MB Normal Disable Disable 0.0 MB
   2    0( 2D+1P) 100.0 GB  11.0 GB        0.0 MB Normal Disable Disable 896.0 MB
   3    0( 2D+1P) 500.0 GB 101.0 GB        0.0 MB Normal Disable Disable 0.0 MB
   Needing Preparation 1st Tier Reclaimable 2nd Tier Reclaimable 3rd Tier Reclaimable Auto DP Optimize Auto
   DP Optimize Capacity
   0.0 MB N/A N/A N/A Disable N/A
   0.0 MB N/A N/A N/A Disable N/A
   0.0 MB N/A N/A N/A Disable N/A
   0.0 MB N/A N/A N/A Disable N/A
   %
   ```
3. When the Reconfigure Memory status is Reconfiguring(nn%), execute step 2 operation after waiting for a while, and confirm the Reconfigure Memory status changes to Normal.

4. When the Reconfigure Memory Status is Failed(Code-01:Timeout), execute step 1 operation.
   Code-01 occurs when the access from the host is frequent or the amount of the unwritten data in the cache memory is large.

5. When the Reconfigure Memory status is Failed(Code-02: Failure of Reconfigure Memory), execute the following reconfigure memory operation.
   Code-02 occurs when the drive restoration processing starts in the background.

\[
\text{% auopt –unit array-name -reconfigurememory start} \\
\text{Are you sure you want to start reconfigure memory? (y/n [n]): y} \\
\text{While in progress, performance degradation of host I/Os to the array will occur.} \\
\text{Are you sure you want to continue? (y/n [n]): y} \\
\text{Memory reconfiguring started successfully.}
\]

6. When the Reconfigure Memory status is Failed(Code-04:Failure of Reconfigure Memory), execute the following reboot operation.
   Code-04 occurs when the unwritten data in the cache memory cannot be saved to the drive.

\[
\text{% aureboot -unit array-name} \\
\text{Do you want to restart the subsystem? (y/n [n]): y} \\
\text{Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.} \\
\text{Also, if you are logging in, the login status will be canceled when restarting begins.} \\
\text{When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.} \\
\text{Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.} \\
\text{Do you agree with restarting? (y/n [n]): y} \\
\text{Are you sure you want to execute? (y/n [n]): y} \\
\text{Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min.} \\
\text{The subsystem restarted successfully.} \\
\text{%}
\]

7. When the Reconfigure Memory status is Failed(Code-03: Failure of Reconfigure Memory), ask the Support Center to solve the problem.
Code-03 occurs when the copy of the management information in the cache memory fails.

8. After completing the memory reconfiguration, execute the `audpoptimize` command adding the `-refer` option from the command prompt.

If not changed to the set mode in the confirmation result, reconfigure the memory again. The following example displays output when using the `-refer` option.

```bash
% audpoptimize -unit HUS150 -refer
Priority : Normal
DP Capacity Mode
Current : Maximum Capacity
User Setting : Maximum Capacity
Reconfigure Memory Status : Normal

Reconfigure Memory Status : Normal

DP    RAID          Total      Consumed   Reclaimable                                  Accelerated Wide      Full             Anchored
LUN    Pool  Level         Capacity   Capacity   Capacity     Status                         Striping Mode         Capacity
Mode    Capacity
0       0    5( 2D+1P)     5.0 GB     4.0 GB        0.0 MB  Normal                                  Disable               Disable
1       0    5( 2D+1P)    50.0 GB    35.0 GB        0.0 MB  Normal                                  Disable               Disable
2       0    5( 2D+1P)   100.0 GB    11.0 GB        0.0 MB  Normal                                  Disable               Disable
3       0    5( 2D+1P)   500.0 GB   101.0 GB        0.0 MB  Normal                                  Disable               Disable

Needing Preparation 1st Tier Reclaimable 2nd Tier Reclaimable 3rd Tier Reclaimable Auto DP Optimize Auto

DP Optimize Capacity
Capacity
0.0 MB N/A
0.0 MB N/A
0.0 MB N/A
0.0 MB N/A

%```

* When changing the DP Capacity Mode by restarting the array
  1. From the command prompt, execute the `audpoptimize` command adding the `-chg` and the `-capacitymode` options.
2. After completing the reboot of the array, execute the \texttt{audpoptimize} command adding the \texttt{–refer} option from the command prompt.

If not changed to the set mode in the confirmation result, restart the array again. The following example displays output when using the \texttt{–refer} option.

% audpoptimize –unit HUS150 –chg –capacitymode maximum
Are you sure you want to change the DP capacity mode? (y/n [n]): y
When Cache Partition Manager is enabled, because cache partition feature settings goes back to a default, it is necessary to set it again.
Do you want to continue processing? (y/n [n]): y
The DP capacity mode has been changed successfully.
In order to complete the changing, it is necessary to restart the subsystem.
When not restarting, the changing will be registered, but it will not become effective on the subsystem.
Are you sure you want to start reconfigure memory? (y/n [n]): n
Do you restart the subsystem? (y/n [n]): y
Host will be unable to access the subsystem while restarting.
Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting begins.
When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min.
The subsystem restarted successfully.
%

\textbf{NOTE:} When using Cache Partition Manager, the memory reconfiguration option is not displayed because the memory reconfiguration cannot be executed.
Canceling Memory Reconfiguration for DP Capacity Mode Change

To cancel the memory reconfiguration:

1. From the command prompt, execute the `audpoptimize` command adding the `--reconfigurememory` option.

```
% audpoptimize --unit HUS150 --refer
Priority : Normal
DP Capacity Mode
Current : Maximum Capacity
User Setting : Maximum Capacity
Reconfigure Memory Status : Normal
DP RAID Total Consumed Reclaimable Accelerated Wide Full Anchored
LUN Pool Level Capacity Capacity Capacity Status Striping Mode Capacity Mode Capacity
0 0 5( 2D+1P) 5.0 GB 4.0 GB 0.0 MB Normal Disable Disable
1 0 5( 2D+1P) 50.0 GB 35.0 GB 0.0 MB Normal Disable Disable
2 0 5( 2D+1P) 100.0 GB 11.0 GB 0.0 MB Normal Disable Disable
3 0 5( 2D+1P) 500.0 GB 101.0 GB 0.0 MB Normal Disable Disable
0.0 MB
896.0 MB
0.0 MB
Needing Preparation 1st Tier Reclaimable 2nd Tier Reclaimable 3rd Tier Reclaimable Auto DP Optimize Auto DP Optimize
Capacity Capacity Capacity Status Threshold
0.0 MB N/A N/A N/A N/A
0.0 MB N/A N/A N/A N/A
0.0 MB N/A N/A N/A N/A
0.0 MB N/A N/A N/A N/A
%
%
```

```
% auopt --unit array-name -reconfigurememory cancel
Are you sure you want to cancel reconfigure memory? (y/n [n]): y
Memory reconfiguring canceled successfully.
%
```

**NOTE:** If the memory reconfiguration proceeds to some extent and the cache memory configuration rewrite starts, the memory reconfiguration cannot be canceled. Cancellation is possible only when the rate of progress of the Reconfigure Memory Status is less than 50 percent.

Changing the Optimization Priority

To change the optimization priority:

1. From the command prompt, execute the `audpoptimize` command adding the `--chg` and `--priority` options.

```
% audpoptimize --unit HUS150 --chg --priority host
Are you sure you want to change the priority of DP optimization? (y/n [n]): y
The DP optimization option results in performance degradation of host I/Os to the array while DP optimization is in progress.
```
Do you want to continue processing? (y/n [n]): y
The priority of DP optimization has been changed successfully.
%

Changing the Provisioning Attributes

1. When you want to change the accelerate wide striping attribute, execute the audpoptimize command adding the -chg and -widestriping options.

% audpoptimize -unit HUS150 -chg -lu 0 -widestriping enable
Are you sure you want to change the Provisioning attributes? (y/n [n]): y
The Provisioning attributes has been changed successfully.
%

2. When you want to optimize after changing the accelerated wide striping mode attributes, adding the -dpoptimize options.

% audpoptimize -unit HUS150 -chg -lu 0 -widestriping enable -dpoptimize
Are you sure you want to change the Provisioning attributes? (y/n [n]): y
The Provisioning attributes has been changed successfully.
%

3. When you want to change the full capacity attributes, execute the audpoptimize command adding the -chg and -fullcapacity options.

% audpoptimize -unit HUS150 -chg -lu 0 -fullcapacity enable
Are you sure you want to change the Provisioning attributes? (y/n [n]): y
The Provisioning attributes has been changed successfully.
%

4. When you want to chang the auto DP optimization mode, execute the audpoptimize command, adding the -chg and -auto options. Furthermore, when you want to set the threshold value of the auto DP optimization, enter the specified threshold value, adding the -threshold option.

% audpoptimize -unit HUS150 -chg -lu 0 -auto enable -threshold 10g
Are you sure you want to change the Provisioning attributes? (y/n [n]): y
The Provisioning attributes has been changed successfully.
%

5. When you want to change the auto DP optimization mode of all the DP volumes in the DP pool including the specified DP volume, execute the audpoptimize command, adding the -allindppool option.

% audpoptimize -unit HUS150 -chg -lu 0 -auto enable -threshold 10g -allindppool
Are you sure you want to change the Provisioning attributes? (y/n [n]): y
The Provisioning attributes has been changed successfully.
%
DP Tier Management

The audptier command executes the DP pool optimization. To refer the command and its options, type in audptier –help or auman audptier at the command prompt.

This section discusses the following topics:

• Changing the Mode
• Changing the Relocation Periods
• Changing the Monitoring Periods
• Changing the Relocation Speed
• Changing the Tiering Attributes of the DP-VOLs

Changing the Mode

To change the High Efficiency Relocation Mode and the Auto Progress Mode:

1. From the command prompt, execute the audptier command to change the High Efficiency Relocation Mode and the Auto Progress Mode.

   Registered array name: HUS150
   Auto Progress Mode: Disable
   High Efficiency Relocation Mode: Enable

   % audptier –unit HUS150 –chg –dppoolno 0 –highefficiencyrelocation disable –autoprogress enable
   Are you sure you want to change the mode? (y/n [n]): y
   The mode has been changed successfully.
   %

2. Execute the audptier command to confirm the High Efficiency Relocation Mode and the Auto Progress Mode.

   Use the following settings:
   Registered array name: HUS150
   DP pool number: 0

   % audptier –unit HUS150 –refer –dppoolno 0 –detail
   DP Pool : 0
   Detail
   Scanning Status : 30%
   High Efficiency Relocation Mode : Disable
   Auto Progress Mode : Enable
   Relocation Status : Stopped
   Monitoring
   Status : Stopped
   Data : Valid
   %

Changing the Relocation Periods

To change the Relocation Periods setting to Enable:
1. From the command prompt, execute the `audptier` command to change the Relocation Periods setting to Enable (ON).

   Use the following settings:

   Registered array name: HUS150
   DP pool number: 0
   Relocation Periods: Enable (ON)
   Monday and Tuesday: 12:00 to 13:00,
   Friday: 7:30 to 8:00,
   Thursday, Saturday, and Sunday: 22:30 to 24:00

   ```
   % audptier -unit HUS150 -chg -dppoolno 0 -periods on -relocationperiods 1200 1300 mon tue 0730 0800 fri 2230 2400
   Are you sure you want to change the relocation periods? (y/n [n]): y
   The relocation periods have been changed successfully.
   %
   ```

2. Execute the `audptier` command to confirm the Relocation Periods.

   Use the following settings:

   Registered array name: HUS150
   DP pool number: 0

   ```
   % audptier -unit HUS150 -refer -dppoolno 0 -relocationperiods
   DP Pool :  0
   Relocation Periods
   07:30 08:00           ON
   12:30 13:00 ON   ON
   22:33 24:00          ON      ON  ON
   %
   ```

   To change the Relocation Periods setting to Disable:

3. From the command prompt, execute the `audptier` command to change the Relocation Periods setting to Disable (OFF).

   Use the following settings:

   Registered array name: HUS150
   DP pool number: 0
   Relocation Periods: Disable (OFF)
   Always Running

   ```
   % audptier -unit HUS150 -chg -dppoolno 0 -periods off -relocationperiods always
   Are you sure you want to change the relocation periods? (y/n [n]): y
   The relocation periods have been changed successfully.
   %
   ```

### Changing the Monitoring Periods

To change the Monitoring Periods setting to Enable:
1. From the command prompt, execute the `audptier` command to change the Monitoring Periods setting to Enable (ON).

Use the following settings:

- Registered array name: HUS150
- DP pool number: 0
- Monitoring Periods: Enable (ON) Always

```
% audptier -unit HUS150 -chg -dppoolno 0 -periods on -monitoringperiods always
Are you sure you want to change the monitoring periods? (y/n [n]): y
The monitoring periods have been changed successfully.
```

2. Execute the `audptier` command to confirm the Monitoring Periods.

```
% audptier -unit HUS150 -refer -dppoolno 0 -monitoringperiods
DP Pool :  0
Monitoring Periods
00:00   24:00   ON    ON    ON    ON    ON    ON
```

To change the Monitoring Periods setting to Disable:

1. From the command prompt, execute the `audptier` command to change the Monitoring Periods setting to Disable (OFF).

Use the following settings:

- Registered array name: HUS150
- DP pool number: 0
- Monitoring Periods: Disable (OFF)
  - Monday and Tuesday: 12:00 to 13:00,
  - Friday: 7:30 to 8:00,
  - Thursday, Saturday, and Sunday: 22:30 to 24:00

```
% audptier -unit HUS150 -chg -dppoolno 0 -periods off -monitoringperiods 1200 1300 mon tue 0730 0800 fri 2230 2400 thu sat sun
Are you sure you want to change the monitoring periods? (y/n [n]): y
The monitoring periods have been changed successfully.
```

### Changing the Relocation Speed

To change the Relocation Speed:

1. From the command prompt, execute the `audptier` command to change the Relocation Speed to high.
Use the following settings:

Registered array name: HUS150
Relocation Speed: High
%
% audptier -unit HUS150 -set -relocationspeed high
Are you sure you want to change the relocation speed? (y/n [n]): y
The relocation speed has been changed successfully.
%

2. Execute the audptier command to confirm the Relocation Speed.
%
% audptier -unit HUS150 -refer -systeminfo
Relocation Speed: High
%

Changing the Tiering Attributes of the DP-VOLs

To change the New Page Assignment Tier, the Monitored I/O, the Promptly Promotion Mode, and Disabling Tier Relocation of the DP-VOL:

1. From the command prompt, execute the audptier command to change the New Page Assignment Tier, the Monitored I/O, the Promptly Promotion Mode, and Disabling Tier Relocation.

   Use the following settings:
   
   Registered array name: HUS150
   DP-VOL number: 10
   New Page Assignment Tier: Low
   Monitored I/O: Write
   Promptly Promotion Mode: Disable
   Disabling Tier Relocation: Enable
%
% audptier -unit HUS150 -chg -lu 10 -newpageassignmenttier low -monitoredio w -promptlypromote disable - disablingtierrelocation enable
Are you sure you want to change the attributes? (y/n [n]): y
The attributes have been changed successfully.
%

2. If you want to apply changes in the tiering attributes to all the DP-VOLS in the DP pool including the selected DP-VOLs, execute the audptier command adding the –allindppool option.
%
% audptier -unit HUS150 -chg -lu 10 -newpageassignmenttier middle -allindppool
Are you sure you want to change the attributes? (y/n [n]): y
The attributes have been changed successfully.
%

Outputting Data

The following sections details tasks associated with outputting data:

- Outputting the Tier Relocation Cycle Log
- Outputting the Page Relocation Log
• Outputting the Frequency Distribution of the DP Pool to a File
• Outputting the Frequency Distribution of the DP-VOL to a File

Outputting the Tier Relocation Cycle Log

To get a tier relocation cycle log:
1. From the command prompt, execute the audptier command to output the tier relocation cycle log.
   Use the following settings:
   Registered array name: HUS150
   Controller to get a log : Controller 0
2. If the –path option is omitted using the –export option, the log file is outputted in the current directory.
   % audptier –unit HUS150 –export –relocationcyclelog –ctl0
   The tier relocation cycle log will be output to the file. Are you sure you want to continue? (y/n [n]): y
   The tier relocation cycle log have been outputted to the file.
   The output file name : xxx.csv
%

Outputting the Page Relocation Log

To get a page relocation Log:
1. From the command prompt, execute the audptier command to output the Page Relocation Log.
   Use the following settings:
   Registered array name: HUS150
   Controller to get a log : Controller 1
   If the –path option is omitted using the –export option, the log file is outputted in the current directory.
   % audptier –unit HUS150 –export –pagerelocationlog –ctl1
   The page relocation log will be output to the file. Are you sure you want to continue? (y/n [n]): y
   The page relocation log have been outputted to the file.
   The output file name : xxx.csv
%

Outputting the Frequency Distribution of the DP Pool to a File

To output the frequency distribution of the DP pool to a file:
1. From the command prompt, execute the audptier command to output the frequency distribution of the DP pool.
   Use the following settings:
   Registered array name: HUS150
   DP pool number : 10
   If the –path option is omitted using the –export option, the log file is outputted in the current directory.
% audptier –unit HUS150 –export –dppoolno 10
–frequencydistributionchart
The frequency distribution chart will be output to the file.
Are you sure you want to continue? (y/n [n]): y
The frequency distribution chart have been outputted to the file.
The output file name : 93000001_af_pool_010_201205111234.csv
%

For details of the CSV file, refer to the section 2.4.9.

**Outputting the Frequency Distribution of the DP-VOL to a File**

To output the frequency distribution of the DP-VOL to a file:

1. From the command prompt, execute the audptier command to output the frequency distribution of the DP-VOL.
   - Registered array name: HUS150
   - DP-VOL number : 1000
   - If the –path option is omitted using the –export option, the log file is outputted in the current directory.

   % audptier –unit HUS150 –export –lu 1000
   –frequencydistributionchart
   The frequency distribution chart will be output to the file.
   Are you sure you want to continue? (y/n [n]): y
   The frequency distribution chart have been outputted to the file.
   The output file name : 93000001_af_vol_1000_201205111234.csv
%

**NOTE:** Unless you are monitoring errors, do not work online, because your connection may time out.

Changed settings do not become effective until the array is restarted. However, when connecting the AMS200/500/1000, SMS100, or, AMS2100/2300/2500, restarting is not required.

The auparts command includes the function of the aucache and ausupply commands. The aucache and ausupply commands cannot be used by the 9580V, SMS100, AMS2100/2300/2500.

Importing the boot options is not effective until the array is restarted. Some free-basis options do not function until the array is restarted.

Set items do not become effective until the array unit is restarted. However, when connecting the 9500V, SMS100, AMS2100/2300/2500, restarting is not necessary. If the reference (-refer) is specified by the option, the commands can be executed without logging in.
Examples of output for selected commands

This section contains output for selected commands. Output sections will be selectively added upon each new revision of HSNM2.

Example of auiscsi output

The following example displays the iSCSI port information by issuing the auiscsi command of an array unit hus110a1.

```
% auiscsi -unit hus110a1 -refer
Port 0A
  Port Number            : 3260
  Keep Alive Timer[sec.] : 60
  MTU                    : 1500
  Transfer Rate          : 1Gbps
  Link Status            : Link Up
  Ether Address          : 00:01:02:03:04:05
  IPv4 Address               : 100.101.102.103
  IPv4 Subnet Mask           : 255.255.255.0
  IPv4 Default Gateway       : 150.151.152.153
  IPv4 Status            : Enable
  IPv6 Link Local IP Address
    Address Type : Manual
    IP Address   : fe80::2022
    Address Status : ---
  IPv6 Global IP Address
    Address Type : Manual
    IP Address 1 : 2080::2022
    Address Status : ---
    IP Address 2 : 2081::2022
    Address Status : ---
    Subnet Prefix Length : 22
  Default Gateway
    IP Address
      Current : 3034::2022
      Setting : 3033::2022
      Address Status : Unconfigured
    Link MTU : 1500
    Connecting Hosts : 10000
    Result : Setting
    VLAN Status : Enable
    VLAN ID : 22
    Header Digest : Enable
    Data Digest : Enable

Port 0B
  %
```

Example of audrive output

The following example displays the drive information of an array unit HUS 100.

```
% audrive -unit hus100 -vendor
Unit No HDU Capacity Drive Type Rotational Speed Vendor
ID  Product ID Revision Serial No.
  0       0 600GB SAS (SFF) 1000rpm Seagate DKS5C-
```
J600SS 5C00 6WN01SLP
  0 1 600GB SAS(SFF) 1000rpm SEAGATE DKS5C-J600SS
5C00 6WN02TK4
   : 
   %
This appendix describes some basic CLI-based tasks that may be performed when using your storage features and includes the following topics:

- Storage management features overview
- Storage features support
- Installing the storage features
- Account Authentication
- Audit Logging
- Cache Partition Manager
- Cache Residency Manager
- Data Retention Utility
- LUN Manager (Fibre Channel)
- Modular Volume Migration
- SNMP Agent Support Function
- Power Saving
- Power Saving Plus
- Data At Rest Encryption
Storage management features overview

The storage features described in this appendix may be pre-installed and enabled, pre-installed and disabled, or require installation and enabling by providing a license key for that specific feature. These storage features may also be referred to as Program Products in related Hitachi Data Systems documentation. In most cases, you are required to enter the license key to activate the feature you want to use. This task is usually performed only once.

Depending on the options provided with your purchase, some of these features are provided at no charge while others may require an additional license fee to activate. Contact your sales representative if you have any questions on the storage features provided with your system.

---

**NOTE:** Some storage features described in this appendix may not be available for your product or product version. Please contact your sales representative for specific storage feature availability.

Storage features support

This chapter provides information on supported and enabled storage features for SMS 100. Note that not all features listed may be available for your system. Contact your sales representative for specific storage feature information.

Installing the storage features

Refer to the following sections on the specific CLI commands required to activate (or uninstall) the storage feature you want. Note that some selected features require a license key to enable.

---

**NOTE:** Some storage features described in this appendix may not be available for your product or product version. Please contact your sales representative for specific storage feature availability. See also the previous section regarding feature support.
Account Authentication

**NOTE:** Account Authentication cannot be enabled simultaneously with the Password Protection feature. You must disable Password Protection before enabling Account Authentication.

This section describes operation procedures for Account Authentication using the CLI of Storage Navigator Modular 2. The following sections are included:

- Installing Account Authentication
- Uninstalling Account Authentication
- Displaying the account information
- Adding account information
- Changing password of the owner account information
- Changing the log in valid term
- Setting the warning banner
- Changing the Advanced Security Mode
- Forcibly logging out
- Logging in
- Setting/deleting the account information corresponding to the Script

### Installing Account Authentication

The following instructions describe how to install Account Authentication, using the CLI version of Storage Navigator Modular 2:

**NOTE:** Account Authentication cannot be used with Password Protection at the same time. When installing Account Authentication, Password Protection must be uninstalled or disabled.

1. From the command prompt, register the disk array in which Account Authentication is to be installed, and then connect to the disk array.

2. Execute the `auopt` command to install Account Authentication. The example is shown below.

   ```
   % auopt -unit disk array-name -lock off -keycode manual-attached-keycode
   Are you sure you want to install the option?
   (y/n [n]): y
   The option is installed successfully.
   %
   ``

3. Execute the `auopt` command to confirm that Account Authentication has been installed. The example is shown below. Enter root for User ID and storage for Password. See the note below.

   ```
   % auopt -unit disk array-name -refer
   The Account Authentication is enabled. Please login.
   User ID: root
   Password: 
   ```
Uninstalling Account Authentication

Follow the instructions below to uninstall Account Authentication. When it is
uninstalled, Account Authentication is not available (locked) until it is
installed by the key code or key file.

- To uninstall Account Authentication, the key code provided with the
  Account Authentication feature is required.
- Follow the instructions below to uninstall Account Authentication.

NOTE: The un-installation can be operated only with the account assigned
to the role of an Account Administrator (View and Modify). When the un-
installation is executed, all the accounts that have been logged in excluding
the own account are forced into log out. The un-installation cannot be
executed when the forced log out of all users is not completed. After the
un-installation is executed, all the account information excluding the initial
password of the built-in account is deleted.

1. From the command prompt, connect to the disk array in which you will
   uninstall Account Authentication.

2. Execute the auopt command to uninstall Account Authentication. The
   example is shown below.

   % auopt -unit disk array-name -lock on -keycode manual-attached-keycode
   User ID: root
   Password:
   Are you sure you want to de-install the option?
   (y/n [n]): y
   The option is de-installed successfully.

3. Execute the auopt command to confirm whether Account Authentication
   has been uninstalled. The example is shown below.

   % auopt -unit disk array-name -refer
   DMEC002015: No information displayed.

   Uninstalling Account Authentication is now complete.

Enabling/disabling

Account Authentication feature can be set to Disable or Enable depending
on the conditions in which the feature has been installed.

NOTE: Because the initial password of a built-in account can be assumed
easily, be sure to change it after the installation. Also, when a password
of a built-in account is lost, it cannot be returned to the initial password.
Therefore, take enough care to manage the password of the built-in
account.
The following paragraphs describe a CLI procedure for setting the feature to Disable or Enable while Account Authentication feature stays in an installed state.

**NOTE:** Setting the function to disable or enable can be operated only with the account assigned to the role of an Account Administrator (View and Modify). When the function to disable or enable is executed, all the accounts that have been logged in excluding the own account are forced into log out. The un-installation cannot be executed when the forced log out of all users is not completed.

1. From the command prompt, connect to the disk array in which you will set Account Authentication.
2. Execute the `auopt` command to change the status (enable or disable).
3. The following is an example of changing the status from enable to disable. If you want to change the status from disable to enable, enter `enable` after the `-st` option.

   ```
   % auopt –unit disk array-name –option ACCOUNT –st disable
   The Account Authentication is enabled. Please login.
   User ID: root
   Password: 
   Are you sure you want to disable the option? (y/n [n]): y
   The option has been set successfully.
   %
   ```

4. Execute the `auopt` command to confirm whether the status has been changed. The example is shown below.

   ```
   % auopt -unit disk array-name -refer
   Option NameType    Term     Status
   ACCOUNTPermanent ---    Disable
   %
   ```

   Enabling or disabling Account Authentication is now complete.

### Displaying the account information

To display the account information:

**NOTE:** This operation can be operated only with the account assigned to the role of an Account Administrator (View and Modify) or an Account Administrator (View Only).

1. From the command prompt, connect to the disk array in which you will display account information.
2. Execute the `auaccount` command to display account authentication information. The example is shown below.

   ```
   % auaccount –unit disk array-name –refer
   The Account Authentication is enabled. Please login.
   User ID: root
   Password: root-password
   User ID: root
   Account Type: Built-in
   Account Enable/Disable: Enable
   Session Count: 1
   Update Permission: Allowed
   Role: Account Administrator (View and Modify)

   User ID: User001
   ```
Adding account information

To add the account information:

1. From the command prompt, connect to the disk array in which you will add account information.
2. Execute the `auaccount` command to add the account authentication information. The example is shown below.

```
% auaccount –unit disk array-name –add –uid User001 –account disable –rolepattern 000001
The Account Authentication is enabled. Please login.
User ID: root
Password: root-password
Assigned role
Storage Administrator (View and Modify)
Are you sure you want to add the account? (y/n [n]): y
```

### NOTE:
This operation can be operated only with the account assigned to the role of an Account Administrator (View and Modify). Immediately after the installation of the Account Authentication function, log in with the built-in account and add the account information.

When adding the account information, it is required to register an optional user ID and a password. It is recommended to register character strings that are hard to be assumed as the user ID and the password.

It is prescribed in the standard ISO/IEC 17799 (BS 7799) to avoid to use the following character strings as far as possible because they are especially easy to be assumed.

- Built_in_user
- Admin
- Administrator
- Administrators
- root
- Authentication
- Authentications
- Guest
- Guests
- Anyone
- Everyone
- System
- Maintenance
- Developer
- Supervisor

### NOTE:
It is recommended that a user who uses an account should log in and change the password immediately after creation of the account (that is because it is possible that an account creator remembers the initial password and logs in illegally).

When monitoring the failure via Storage Navigator Modular 2, because the failure monitoring cannot be applied to the disk array that is a target of the Account Authentication unless it is logged in, register the common user ID and the password for the monitoring to be used at the time of the failure monitoring. It is required to create the user ID and the password for the failure monitoring beforehand for each of the disk array for which the Account Authentication has been validated.
The role pattern value (-rolepattern) is as follows.

<table>
<thead>
<tr>
<th>Role Pattern</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100000</td>
<td>Audit Log Administrator (View Only)</td>
</tr>
<tr>
<td>010000</td>
<td>Audit Log Administrator (View and Modify)</td>
</tr>
<tr>
<td>001000</td>
<td>Account Administrator (View Only)</td>
</tr>
<tr>
<td>000100</td>
<td>Account Administrator (View and Modify)</td>
</tr>
<tr>
<td>000010</td>
<td>Storage Administrator (View Only)</td>
</tr>
<tr>
<td>000001</td>
<td>Storage Administrator (View and Modify)</td>
</tr>
</tbody>
</table>

Example: When the role pattern is assigned **Account Administrator (View and Modify)** and **Storage Administrator (View and Modify)**, specify 000101.

NOTE: When using "!", "#", "$", "&", "\", "*", "?", "\", "{", "|", or "~" for the -uid option, set the file by using the -uidfile option. When "!", "#", "$", "&", "\", "*", "?", "\", "{", "|", or "~" is used for the -uid option, the command may terminate abnormally or the illegal user ID may be set.

Modifying the account information

You can modify the following information:
- Password
- Role assignment
- Account enable/disable

This operation can be operated only with the account assigned to the role of an Account Administrator (View and Modify).

The procedure for modifying the account information to be explained here can be executed for an account of the other user. The own account information cannot be modified. However, the built-in account can modify the own account information.

The account information that has been modified is applied to the following log in of the account concerned.

The public account cannot modify the built-in account information.

Either user ID of the public account and the built-in account cannot be changed.

When using "!", "#", "$", "&", "\", "*", "?", "\", "{", "|", or "~" for the -uid option, set the file by using the -uidfile option.

To modify the account information:
1. From the command prompt, connect to the disk array in which you will modify account information.
2. Execute the auaccount command to modify the account authentication information. The example is shown below.
% auaccount --unit disk array-name --chg --uid User001 --account enable --rolepattern 000101
The Account Authentication is enabled. Please login.
User ID: root
Password: root-password
Assigned role before a change
  Storage Administrator (View and Modify)
Assigned role after a change
  Storage Administrator (View and Modify)
  Account Administrator (View and Modify)
Are you sure you want to change the account?
(y/n [n]): y
The account information has been changed.
%
Deleting the account information

To delete the account information:

1. From the command prompt, connect to the disk array in which you will delete account information.
2. Execute the `auaccount` command to delete the account authentication information. The example is shown below.

```
% auaccount –unit disk array-name –rm –uid User001
The Account Authentication is enabled. Please login.
User ID: root
Password: root-password
Are you sure you want to delete [User001]?
(y/n [n]): y
If you will delete the logged in user account, user is logged out. Do you want to continue processing?
(y/n [n]): y
The account has been deleted.
%
```

Changing password of the owner account information

To change the password is as follows.

1. From the command prompt, connect to the disk array in which you will change account information.
2. Execute the `auaccount` command to change the owner password. The example is shown below.

```
% auaccount –unit disk array-name –chgownpwd
The Account Authentication is enabled. Please login.
User ID: root
Password: root-password
Are you sure you want to change the password?
(y/n [n]): y
Please input password.
Old Password: old-root-password
New Password: new-root-password
Re-enter Password: new-root-password
The password has been changed.
%
```

Changing the log in valid term

This operation can be operated only with the account assigned to the role of an Account Administrator (View and Modify) or an Account Administrator (View Only). To change the log in valid term:
1. From the command prompt, connect to the disk array in which you will change the log in valid term.

2. Execute the `auaccount` command to change the log in valid term. The example is shown below.

```
% auaccountopt –unit disk array-name –set –timeout 20
The Account Authentication is enabled. Please login.
User ID: root
Password: root-password
Are you sure you want to set the account option?
(y/n [n]): y
The account option has been set successfully.
```

### Setting the warning banner

The warning banner set here is registered in the disk array independently of the Storage Navigator Modular 2 GUI.

To set a warning banner:

1. From the command prompt, connect to the disk array in which you will set a warning banner.

2. Execute the `auaccountopt` command to set a warning banner. The example is shown below.

```
% auaccountopt –unit disk array-name –set –bannerfile c:\banner.txt
The Account Authentication is enabled. Please login.
User ID: root
Password: root-password
Are you sure you want to set the account option?
(y/n [n]): y
The account option has been set successfully.
%
% auaccountopt –unit disk array-name –refer
The Account Authentication is enabled. Please login.
User ID: root
Password: root-password
Banner : Valid
Warning Notice!
This is a [Company Name Here] computer system, which may be accessed and used only for authorized [Company Name Here] business by authorized personnel. Unauthorized access or use of this computer system may subject violators to criminal, civil, and/or administrative action.

All information on this computer system may be intercepted, recorded, read, copied, and disclosed by and to authorized personnel for official purposes, including criminal investigations. Such information includes sensitive data encrypted to comply with confidentiality and privacy requirements. Access or use of this computer system by any person, whether authorized or unauthorized, constitutes consent to these terms. There is no right of privacy in this system.
%
```

### Changing the Advanced Security Mode

To change the Advanced Security Mode:

1. From the command prompt, connect to the disk array in which you will change the Advanced Security Mode.

2. Execute the `auaccountopt` command to change the Advanced Security Mode. The example is shown below.

```
% auaccountopt –unit disk array-name –set –advancedsecuritymode enable
The Account Authentication is enabled. Please login.
User ID: root
```
Setting an external authentication server

The external authentication server is set. You can set the external authentication server that supports the RADIUS protocol to the external authentication server to be set here.

1. From the command prompt, connect to the disk array in which you will set an external authentication server.
2. Execute the `auexternalauth` command to set an external authentication server. The example is shown below.

```
Password: root-password
Are you sure you want to set the account option? (y/n [n]): y
The account option has been set successfully.
```

```
Setting an external authentication server

The external authentication server is set. You can set the external authentication server that supports the RADIUS protocol to the external authentication server to be set here.

1. From the command prompt, connect to the disk array in which you will set an external authentication server.
2. Execute the `auexternalauth` command to set an external authentication server. The example is shown below.

For the port number of the external authentication server, 1821 is generally used.

```
% auexternalauth –unit disk array-name –set –user_auth RADIUS
   -srv1_addr external authentication server IP address
   -srv1_portnum external authentication server port number
   -srv1_auth_protocol PAP

The Account Authentication is enabled. Please login.
User ID: root
Password: root-password
Are you sure you want to set the external authentication server?
(y/n [n]): y
Please input shared secret of server 1.
Shared Secret: shared-secret
Re-enter Shared Secret: shared-secret
The external authentication server has been set successfully.
```

Note the following two limitations for setting an external authentication server:

- When using the RADIUS server as the external authentication server, the user ID can be no more than 253 characters. The password can be no more than 128 characters. Since there is a case where the user ID length and the password length may differ depending on the external authentication server, check the specifications of the external authentication server to be used in advance.

- When using the external authentication server to authenticate users, if the communication with the external authentication server fails, you cannot log in to the server. Make sure the communication connection to the external authentication server is active before attempting to configure it.

Changing the external authentication server

To change the setting of the external authentication server:

1. From the command prompt, connect to the disk array in which you will change the setting of the external authentication server.
2. Execute the `auexternalauth` command to change the setting of the external authentication server. The example is shown below.

```
% auexternalauth –unit disk array-name –chg –user_auth RADIUS
   -srv1_addr external authentication server IP address
   -srv1_portnum external authentication server port number
   -srv1_auth_protocol PAP
   -srv1_sharedsecret

The Account Authentication is enabled. Please login.
```

CLI-based storage feature tasks
User ID: root
Password: root-password
Are you sure you want to change the external authentication server?
(y/n [n]): y
Please input shared secret of server 1.
Shared Secret: shared-secret
Re-enter Shared Secret: shared-secret
The external authentication server has been changed successfully.
%

Deleting the external authentication server

To delete the setting of the external authentication server:
1. From the command prompt, connect to the disk array in which you will delete the setting of the external authentication server.
2. Execute the
3. auexternalauth command to delete the setting of the external authentication server. The example is shown below.

% auexternalauth –unit disk array-name –rm –srv1
The Account Authentication is enabled. Please login.
User ID: root
Password: root-password
Are you sure you want to delete the external authentication server?
(y/n [n]): y
The external authentication server has been deleted successfully.
%

Forcibly logging out

The forced logout forcibly logs out other users except the built-in account that logs in the disk array.

When a failure occurs in the controller of the disk array during a log in of an account, a session ID being logged in may remain in the disk array. Therefore, when a controller failure occurs, log out by force all the accounts with the remaining session IDs among the accounts to which the roles of the Account Administrator (View and Modify) are assigned. The account that has been forced into log out becomes invalid. The account concerned cannot be logged in again unless the account is validated using the account to which the Account Administrator (View and Modify) role is assigned. When using “!”, “#”, “$”, “&”, “”, “*”, “?” , “\”, “{”, “|” , or “~” for the –uid option, set the file by using the –uidfile option.
1. From the command prompt, connect to the disk array in which you will forcibly log out.
2. Execute the auaccount command to log out forcibly. The example is shown below.

% auaccount –unit disk array-name –forcelogout –uid User001
The Account Authentication is enabled. Please login.
User ID: root
Password: root-password
Are you sure you want to force logout of [User001]?
(y/n [n]): y
When the user is using the array, the user cannot continue the operation. The account is disabled and cannot login from the next time.
Do you want to continue processing? (y/n [n]): y
The force logout of [User001] has been completed.
%
Logging in

When a log in cannot be performed following the procedure explained in this appendix although the account has been registered, contact a user who manages the account of the Account Administrator (View and Modify) role. (It is possible that the user ID or password is incorrect or the account has been invalidated through a forced log out.)

1. For example, you specify the `aurgref` command, disk array requires User ID and its password, enter User ID and its password. See following example.

```
% aurgref –unit disk array-name
The Account Authentication is enabled. Please login.
User ID: User001
Password: User001-password
RAID   RAID Parity
Group  Level Groups  Type  Total Capacity Free Capacity Reconstruction
       Priority Status  Progress
0 6( 9D+2P)1   SATA 8635318272 blocks 8614305792 block( 9 9.8%)  RAID Group Expansion Normal N/A
%
```

Changing Advanced Security Mode

When you change the Advanced Security Mode, the following information will be deleted or initialized:

- All logged-in sessions. The logged-in account will log out.
- All public accounts registered to the storage system.
- The roles and password of the built-in account.

You can only change Advanced Security Mode using a built-in account.

To change Advanced Security Mode

1. From the command prompt, connect to the storage system to which you will change the Advanced Security Mode.
2. Execute the `auaccountopt` command to change the Advanced Security Mode.

```
% auaccountopt –unit disk array-name –set –timeout 20
The Account Authentication is enabled. Please login.
User ID: root
Password: root-password
Are you sure you want to set the account option? (y/n [n]): y
The account option has been set successfully.
%
```
Setting/deleting the account information corresponding to the Script

When using "!", "#", "$", "&", "\", "*", "?", "\{", "\}", or "~" for the –uid option, set the file by using the –uidfile option. When "!", "#", "$", "&", "\", "*", "?", "\{", "\}", or "~" is used for the –uid option, the command may terminate abnormally or the illegal user ID may be set.

1. From the command prompt, connect to the disk array in which the account information is to be set or delete.
2. Execute the auaccountenv command to set or delete the account information. The example is shown below.

```
% auaccountenv –set –uid User001
Are you sure you want to set the account information? (y/n [n]): y
Please input password.
Password: User001-password
The account information has been set successfully.
%
% auaccountenv –rm
Are you sure you want to delete the account information? (y/n [n]): y
The account information has been deleted successfully.
%
```

3. Set Storage Navigator Modular 2 environment variable. By setting the environment variable here, the script operation that uses the set account information becomes possible.
   - When making it valid by the limitation in the script to be executed, it is defined at the head of the script.
   - When Account Authentication is Enabled:
     
     ```
     STONAVM_ACT=on
     The input request for the user ID and password of Account Authentication is executed with the user ID and password set with the auaccountenv command by setting the STONAVM_ACT environment variable to "on".
     STONAVM_RSP_PASS=on
     All the input requests for checking a command are responded with "y" by setting the STONAVM_RSP_PASS environment variable to "on".
     ```

For Windows

```
% set STONAVM_ACT=on
% set STONAVM_RSP_PASS=on
```

For Windows

```
% set STONAVM_ACT=on
% set STONAVM_RSP_PASS=on
```

For Red Hat Linux and UNIX (C shell)

```
% setenv STONAVM_ACT=on
% setenv STONAVM_RSP_PASS=on
```
When Account Authentication is Disabled:

STONAVM_RSP_PASS=on

All the input requests for checking a command are responded with “y” by setting the STONAVM_RSP_PASS environment variable to “on”.

For Windows:

% set STONAVM_RSP_PASS=on

For Red Hat Linux and UNIX (C shell):

% setenv STONAVM_RSP_PASS=on

Confirming account information for other arrays

In addition, you can confirm whether account information which was set by using the auaccountenv command can be used for some arrays. A series of sample steps shows how you can perform this task.

The first step sets account information using the auaccountenv command.

% auaccountenv –set –uid User001 -authentication -unit Array1
Are you sure you want to set the account information? (y/n [n]): y
Please input password.
Password: User001-password
Unit Name            Result
Array1              Succeed
Are you sure you want to set the account information? (y/n [n]): y
The account information has been set successfully.
%

The second step specifies selected storage systems, “Array1” and “Array2”.

% auaccountenv –set –uid User001 -authentication -unit Array1 Array2
Are you sure you want to set the account information? (y/n [n]): y
Please input password.
Password: User001-password
Unit Name            Result
Array1              Succeed
Array2              Succeed
Are you sure you want to set the account information? (y/n [n]): y
The account information has been set successfully.
%

The following step assumes you did not specify a storage system. Then confirm account information for all storage systems registered with Navigator 2.

% auaccountenv –set –uid User001 -authentication
Are you sure you want to set the account information? (y/n [n]): y
Please input password.
Password: User001-password
Unit Name            Result
Array1              Succeed
Array2              Succeed
Array3              Succeed
Are you sure you want to set the account information? (y/n [n]): y
The account information has been set successfully.
%

The following step assumes you configured account information for specified storage systems.
The following step assumes you specified storage systems, “Array1” and “Array2”.

```
% auaccountenv -test -authentication -unit Array1 Array2
Are you sure you want to test for account information? (y/n [n]): y
Unit Name    Result
Array1       Succeed
Array2       Succeed
```

When you do not specify a storage system, you can confirm the lack of an entity for all storage systems registered with Navigator 2 as show in the following step.

```
% auaccountenv -test -authentication
Are you sure you want to test for account information? (y/n [n]): y
Unit Name    Result
Array1       Succeed
Array2       Succeed
Array3       Succeed
```
Audit Logging

This section describes operation procedures for Audit Logging using the CLI of Storage Navigator Modular 2. The following sections are included:

- Installing
- Enabling/disabling
- Setting the Syslog server information
- Exporting the internal logged data
- Initializing the internal logged data
- Audit Log format and output code information
- Note 25: When this array is HUS 150 and Data At Rest Encryption is enabled, it is output.

Installing

Audit Logging feature is usually not selected (locked); to make it available, you must install Audit Logging feature and make its functions selectable (unlocked). To install this function, the key code or key file provided with the optional feature is required.

Follow the instructions below to install Audit Logging feature. Audit Logging is installed and uninstalled using Storage Navigator Modular 2.

NOTE: Installing, uninstalling, enabling, and disabling of Audit Logging feature are set for each disk array. Before installing and un installing, make sure that the disk array is in normal operating condition. If a failure such as a controller blockade has occurred, installation and un-installation operations cannot be performed.

The following instructions describe how to install Audit Logging, using the CLI version of Storage Navigator Modular 2:

1. From the command prompt, register the disk array in which you will install Audit Logging feature. Connect to the disk array.
2. Install the optional feature by using the following:

   % auopt -unit array-name -lock off -licensefile license_file_path\license_file_name

   No.  Option Name
   1 Audit Logging

   Please specify the number of the option to unlock.
   When you unlock the two or more options, partition the numbers, which are given in the list, with the space(s). When you unlock all options, input 'all'. Input 'q', then break.
   The number of the option to unlock. (number/all/q [all]): 1

   Are you sure you want to unlock the option?

   (y/n [n]): y
Audit Logging is installed and the status is “Enable”. Installation of Audit Logging is now complete.

Uninstalling

Follow the instructions below to uninstall Audit Logging. When it is uninstalled, Audit Logging is not available (locked) until it is installed by the key code or key file.

To uninstall Audit Logging, the key code provided with the Audit Logging feature is required.

Follow the instructions below to uninstall Audit Logging.
1. From the command prompt, connect the disk array in which you will uninstall Audit Logging feature.
2. Uninstall the optional features by using the following:

```
% auopt -unit array-name -lock on -keycode 48 chracters key code
Are you sure you want to lock the option?
(y/n [n]): y
The option is locked.
%
% auopt -unit array-name -refer
DMEC902015: No information displayed.
%
```

Enabling/disabling

Audit Logging feature can be set to Disable or Enable depending on the conditions in which the feature has been installed.

The following paragraphs describe a CLI procedure for setting the feature to Disable or Enable while Audit Logging feature stays in an installed state.
1. From the command prompt, connect the disk array in which you will change the status of Audit Logging feature.
2. Execute the auopt command to change the status (enable or disable) of Audit Logging feature.

The following is an example of how to change the status from enable to disable. To change the status from disable to enable, enter enable after the -st option.
% auopt -unit array-name -option AUDIT-LOGGING -st disable
Are you sure you want to disable the option?
(y/n [n]): y
The option has been set successfully.
%

3. Execute the auopt command to verify that Audit Logging feature status has changed.

% auopt -unit disk array-name -refer
Option Name       Type      Term       Status
Reconfigure Memory Status
FASSWD-PROTECT    Permanent--- Enable       N/A
SNMP-AGENT       Permanent--- Enable       N/A
LUN-MANAGER      Permanent--- Enable       N/A
FFM-MONITOR      Permanent--- Enable       N/A
AUDIT-LOGGING    Permanent--- Disable      N/A
ACCOUNT          Permanent--- Disable      N/A

Setting the Syslog server information

When Account Authentication is valid, you can only operate an account with
an Audit Log Administrator (View and Modify) role is assigned. The CLI
operation to set the Syslog server information with Storage Navigator
Modular 2 is as follows.
1. From the command prompt, connect the disk array in which you want to
set Syslog server information.
2. Execute the audit log command to specify the Syslog server information
with an IP address of syslog server 1: 192.168.100.100

% auauditlog -unit array-name -set -syslogsrv enable –srv1addr
192.168.100.100 -srv2 disable
Are you sure you want to set the audit logging information?
(y/n [n]): y
The audit logging information has been set successfully.
%
3. Specify as follows when checking the information to be displayed.

% auauditlog -unit disk array-name -refer
Syslog Server Transfer : Enable
Server   IP Address
  1   Enable  192.168.100.100
  2   Disable 0.0.0.0
Internal Log : Enable
%

Exporting the internal logged data

When Account Authentication is valid, you can only operate an account with
an Audit Log Administrator (View and Modify) role is assigned. The CLI
operation to output the internal logged data with Storage Navigator Modular
2 is as follows.

% auauditlog -unit disk array-name -export
The internal log is exported to audit\syslog_91100100.txt.
Do you want to continue processing? [y/n [n]]: y
The export of internal log may affect the host access. In some cases,
performance deterioration or time-out occurs.
Do you want to continue processing? [y/n [n]]: y
The internal log has been exported successfully.
**Initializing the internal logged data**

When Account Authentication is valid, you can only operate with an account that has an Audit Log Administrator (View and Modify) role assigned to it. The CLI operation to initialize the internal logged data with Storage Navigator Modular 2 is as follows.

```
% auauditlog -unit disk array-name -init
Are you sure you want to initialize the internal log? (y/n [n]): y
If you initialize the internal log, all logs will be deleted. You cannot recover
the deleted internal log. Please export internal log before this operation.
Are you sure you want to initialize the internal log? (y/n [n]): y
The internal log will be initialized.
Are you sure you want to execute? (y/n [n]): y
The internal log has been initialized successfully.
```

**Miscellaneous Audit Logging Feature Information**

When the log stored inside the disk array is initialized, all the logs stored are deleted. When the log is initialized, it cannot be restored. When the log stored inside the disk array is valid, it cannot be initialized. Make the log stored inside the disk array invalid, and then initialize it.

The following sections provide additional details on the Audit Logging storage feature.

**Audit Log format and output code information**

The log format of Audit Logging conforms to the format used in the Hitachi storage security products.

**Log data output:**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 Nov 22 11:10:42</td>
<td>192.168.100.10</td>
<td>Storage: CELFSS,1,123456,,2005-11-22T11:10:40.0+09:00,Storage,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>192.168.100.10,Authentication,Success,uid=Hitachi_storage_admin,DF800:850012345,.....,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>from=192.168.100.200,,to=192.168.100.10,,39970100 Account User Login</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following table provides information how the audit log output is organized:
<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Priority</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PRI Priority</td>
<td>Priority</td>
<td>The priority is output by the following formula. Priority = 8 Facility + Severity Facility is 1 (fixed). 3: Error (indicating that the operation has ended abnormally) 4: Warning (indicating that the operation has partly ended abnormally) 6: Informational (indicating that the operation has ended normally) For example, 14 is output for priority when severity is informational.</td>
</tr>
<tr>
<td>2</td>
<td>Header Date, time</td>
<td>Date, time</td>
<td>The date and time is output in the format of “MMM DD hh:mm:ss” (MMM: month, DD: day, hh: hour, mm: minute and ss: second). <strong>Note:</strong> When output the date in the format of DD, the date is output after a blank if the date is 1 digit. Example: “ 1” is output for the 1st.</td>
</tr>
<tr>
<td>3</td>
<td>Detected location</td>
<td>The IP address is output.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MSG/TAG Program (process) name</td>
<td>The program (process) name that created log message is output as Storage.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>MSG/Contents Common specification identification character</td>
<td>The common specification identification character is output as CELFSS.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>MSG/Contents Revision number of the common specification document</td>
<td>The revision number of the common specification document is output as 1.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>MSG/Contents Message identification information</td>
<td>The serial number of the syslog header information is output. <strong>Note:</strong> When the disk array is rebooted, the sequential numbers to be output and those that have been output before the reboot will be out of order. Be careful that orders of the sequential numbers and logs that are output do not match.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>MSG/Contents Message ID</td>
<td>Message ID (not output because it is not used)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>MSG/Contents Date, time, time difference</td>
<td>The date, time and the time difference between UTC (Coordinated Universal Time) is output in the format of “YYYY-MM-DDThh:mm:ss ± hh:mm” (YYYY: year, MM: month, DD: day, hh: hour, mm: minute, ss: second, hh: hours of the time difference and mm: minute of the time difference) “+00:00” is output when there is no time difference between UTC, such as “20011-12-26T:23:06:58.0+00:00”. <strong>Note:</strong> The output format for second “ss.0” indicates that it is output to one decimal place.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>MSG/Contents Detection entity</td>
<td>The detection entity identification character is output as Storage.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>MSG/Contents Detected location</td>
<td>The IP address is output.</td>
<td></td>
</tr>
</tbody>
</table>
### Table A-1: Audit Log Output Items (Continued)

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Priority</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| 12  | MSG/Contents          | Type of audit event | The category name of the event is output. The category name and the example of the event are described below.  
StartStop: Disk array power on or disk array power off  
Authentication: Success/failure of authentication of the accounting function  
AccessControl: An operation outside the authority of the role (The rejection is collected as a piece of log data) and exporting audit logged data  
ConfigurationAccess: Setting operations |
| 13  | MSG/Contents          | Result of the audit event | The result of the audit event is output as follows.  
Success: The event has ended successfully.  
Failed: The event has ended abnormally.  
Occurred: Occurrence of an audit event |
| 14  | MSG/Contents          | Subject identification information | The log is output with a prefix added corresponding to the audit event. The prefix is “uid=”, “wwn=”, “iSN=”, or “system”.  
uid=: Denotes user ID (by management I/F event).  
wwn=: Denotes World Wide Name (by Fibre event)  
iSN=: Denotes iSCSI Name (by iSCSI event)  
system: Denotes disk array (by disk array event)  
When Account Authentication is invalid or uninstalled, only a prefix is output. |
| 15  | MSG/Contents          | Hardware identification information | The ID (HUS) to identify the model name of the product and the serial number divided by a colon (:) is output. |
| 16  | MSG/Contents          | Generated location information | Not output because it is not used. |
| 17  | MSG/Contents          | Related information | The location identification name (not output because it is not used) |
| 18  | MSG/Contents          |          | FQDN (not output because it is not used) |
| 19  | MSG/Contents          |          | Redundant identification information (not output because it is not used) |
| 20  | MSG/Contents          | Agent information | Not output because it is not used. |
### Table A-1: Audit Log Output Items (Continued)

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Priority</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>MSG/Contents</td>
<td>Detailed info</td>
<td>Host which sent the request</td>
</tr>
<tr>
<td>22</td>
<td>MSG/Contents</td>
<td></td>
<td>Port which sent the request (not output because it is not used).</td>
</tr>
<tr>
<td>23</td>
<td>MSG/Contents</td>
<td></td>
<td>Host which the request is sent to</td>
</tr>
<tr>
<td>24</td>
<td>MSG/Contents</td>
<td></td>
<td>Port which the request is sent to</td>
</tr>
<tr>
<td>25</td>
<td>MSG/Contents</td>
<td></td>
<td>Collective operation identification number (not output because it is not used)</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td></td>
<td>Reserve #1 (not output because it is not used)</td>
</tr>
<tr>
<td>27</td>
<td></td>
<td></td>
<td>Reserve #2 (not output because it is not used)</td>
</tr>
<tr>
<td>28</td>
<td></td>
<td></td>
<td>A highly readable sentence is output, which shows details, an object and parameters of the management operation, and a reason why the event is audited. For more information, refer to the following section.</td>
</tr>
</tbody>
</table>
Audit Log entry information

This section provides details on the codes and other information used in the audit log entries.

A message that is output in the detailed information in #28 of the previous section table is shown below. Note the following:

- The shaded parts are items to be operated by the service personnel.
- There are some items (which are annotated in the explanations in) of which no parameter is output on the specific conditions. In this case, the symbol # is output. Conditions of this symbol are described as an explanation of the note at the end of the following table.
- For the parameters that a user does not specify, 0 (zero) may be the output value. Also, values that were specified before may be the output.

Table A-2: Audit Log Entry Details

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>310001</td>
<td>Create LU[*1] AssignedSize=*2Blocks Type=*3 AcceleratedWideStripingMode=*4 FullCapacityMode=*5 Promotion=*6 Tier=*7 &lt;MonitoredIO: Read=*8 Write=*9&gt; Disabling Tier=*10</td>
<td>Creating a logical unit *1 LU number *2 Assigned size [Optional character string</td>
</tr>
<tr>
<td>310002</td>
<td>Delete LU[*1] Type=*2</td>
<td>Deleting a logical unit *1 LU number *2 Type [RG</td>
</tr>
</tbody>
</table>
Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>31000300</td>
<td>Grow LU[*1] AssignMode=*2 NewAssignedSize=*3Blocks Type=*4</td>
<td>Growing a logical unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 LU number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Method to set</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Manual</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 Capacity [Optional character string</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*4 Type [RG</td>
</tr>
<tr>
<td>31000400</td>
<td>Shrink LU[*1] NewAssignedSize=*2Blocks Type=*3 OptimizingDP=*4</td>
<td>Shrinking a logical unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 LU number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Capacity [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 Type [RG</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*4 Optimizing of the DP pool [Yes</td>
</tr>
<tr>
<td>31000500</td>
<td>Add DMLU Capacity[*1] NewAllocatedSize=*2BlocksRG=*3</td>
<td>Adding a DMLU capacity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 LU number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Capacity [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 RAID group number</td>
</tr>
<tr>
<td>32000100</td>
<td>Set Drive Maintenance: Function=*1 &lt;Location Unit[*2] HDU[*3]&gt;</td>
<td>Setting of maintenance function of drive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Maintenance function of drive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Detach</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Unit number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 HDU number</td>
</tr>
</tbody>
</table>
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>35000100</td>
<td>Set Auto Detach Condition: &lt;WarningInfo OCCUR=*1 RECV=*2 STAT=*3 Mode=*4&gt;</td>
<td>Setting of warning report mode to the host</td>
</tr>
<tr>
<td></td>
<td>&lt;OnlineVerifyTest=*5 SkipVerify=*6 CacheVerify=*7&gt;</td>
<td>*1 Report occurrence of warning to the host [Enable</td>
</tr>
<tr>
<td></td>
<td>&lt;DriveResponseDiagnosis=*8 SATA=*9 Response=*10times&gt;</td>
<td>*2 Report recovery of warning to the host [Enable</td>
</tr>
<tr>
<td></td>
<td>&lt;SATA WriteandCompare=*11 Mode=*12&gt;</td>
<td>*3 Report over of statistics threshold to the host [Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*4 Warning Information Report Mode [Port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Setting of verify</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*5 Online Verify Test [Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*6 Skip Verify [ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*7 Online Cache Verify [Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Setting of Drive Response Diagnosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*8 Drive Response Diagnosis ([Note 1] Disable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*9 SATA Drive Diagnosis ([Note 1] [ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*10 Diagnosis Criterion (Difference in response time of each drive)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>([Note 1] [1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*11 SATA Write &amp; Compare [Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*12 SATA Write &amp; Compare Mode [Full</td>
</tr>
</tbody>
</table>
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>36000100</td>
<td>Set Restore Options: Mode1=*1 Mode2=*2 Time=<em>3</em>10ms Size=<em>4</em>128blocks Sparing=*5 Operation=*6</td>
<td>Setting of drive restoration options *1 Drive Restoration Mode [Background</td>
</tr>
<tr>
<td>3A000100</td>
<td>Create RAID Group[*1] Encryption=*2</td>
<td>Definition a RAID group *1 RAID group number *2 Encryption [Enable</td>
</tr>
<tr>
<td>3A000200</td>
<td>Delete RAID Group[*1]</td>
<td>Deleting the RAID group *1 RAID group number</td>
</tr>
<tr>
<td>3A000300</td>
<td>Delete All RAID Groups</td>
<td>Deleting the all RAID group</td>
</tr>
</tbody>
</table>
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| 3C0001 00 | Modify Cache Residency settings: <CTL0=*1 LU[*2]> <CTL1=*1 LU[*2]>       | Setting a Cache Residency LU  
*1 Residency Mode  
[Enable|Disable]  
*2 LU number (Note 2) |
| 3E0301 00 | Set Boot Options: Startup=*1 Delay=*2 Detach=*3 VendorID=*4 ProductID=*5 ROM=*6 RAM=*7 | Setting the Boot Options  
*1 System Startup Attribute  
[SingleMode|DualActive Mode]  
*2 Delay Planned Shutdown time  
*3 Drive Detach Mode  
[Enable|Disable]  
*4 Vendor ID  
*5 Product ID  
*6 ROM Micro program Version  
*7 RAM Micro program Version |
| 3E0601 00 | Set SNMP Information                                                     | Setting the SNMP information                                                                                                                  |
| 3E0C01 00 | Login (Password Protection)                                              | Logged in with Password Protection user ID                                                                                                   |
| 3E0C02 00 | Logout (Password Protection)                                             | Log out already logged in with Password Protection user ID                                                                                   |
| 3E0C03 00 | Reset UserID (Password Protection)                                       | Clearing logged in status with Password Protection user ID                                                                                   |
| 3E0C04 00 | Register UserID (Password Protection)                                    | Registering a Password Protection user ID                                                                                                    |
| 3E0C05 00 | Delete UserID (Password Protection)                                      | Deleting the Password Protection user ID                                                                                                     |
| 3E1101 00 | Set Spare Drives: Unit[*1] HDU[*2]                                      | Setting the spare drives  
*1 Unit number  
*2 HDU number                                                                                                                                       |
| 3E1102 00 | Release Spare Drives: Unit[*1] HDU[*2]                                   | Releasing the spare drives  
*1 Unit number  
*2 HDU number                                                                                                                                       |
| 3E1103 00 | Release Spare Drives: The drives exist in the unmounted trays            | Releasing the spare drives after removing trays                                                                                               |
| 3E1301 00 | Set RTC [20YY/MM/DD hh:mm:ss]                                           | Setting a RTC information (YY: year, MM: month, DD: day, hh: hour, mm: minute, ss: second)                                                  |
Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
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</thead>
<tbody>
<tr>
<td>3E1B0100</td>
<td>Create Local Pair: CopyType=ShadowImage&lt;br&gt;PName=*1 P-VOL=*2 S-VOL=*3 CTG=*4 CopyPace=*5 MU=*8</td>
<td>ShadowImage pair creating <em>(Note 3)</em>&lt;br&gt;*1 Pair name&lt;br&gt;*2 P-VOL number&lt;br&gt;*3 S-VOL number&lt;br&gt;*4 CTG number&lt;br&gt;*5 Copy pace [Fast</td>
</tr>
<tr>
<td>3E1B0200</td>
<td>Create Local Pair: CopyType=SnapShot&lt;br&gt;PName=*1 P-VOL=*2 S-VOL=*3 CTG=*4 Replication[*5]</td>
<td>SnapShot pair creating <em>(Note 3)</em>&lt;br&gt;*1 Pair name&lt;br&gt;*2 P-VOL number&lt;br&gt;*3 S-VOL number&lt;br&gt;*4 CTG number&lt;br&gt;*5 DP pool number for replication data [Optional character string</td>
</tr>
<tr>
<td>3E1B0300</td>
<td>Create Remote Pair: CopyType=TrueCopy&lt;br&gt;PName=*1 P-VOL=*2 S-VOL=*3 RemoteSerialNumber=*4 CTG=*5 CopyPace=*6 Mode=*7 FenceLevel=*8</td>
<td>TrueCopy pair creating <em>(Note 3)</em>&lt;br&gt;*1 Pair name&lt;br&gt;*2 P-VOL number&lt;br&gt;*3 S-VOL number&lt;br&gt;*4 Remote array serial number&lt;br&gt;*5 CTG number&lt;br&gt;*6 Copy pace [Fast</td>
</tr>
</tbody>
</table>
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| 3E1B0400 | Create Remote Pair:  
CopyType=TrueCopyExtendedDistance  
PairName=*1 P-VOL=*2 S-VOL=*3  
RemoteArraySerialNumber=*4 GroupNumber=*5  
LocalDPPool=Replication[*6]/Management[*7]  
RemoteDPPool=Replication[*8]/Management[*9]  
RemoteDataPool=*10 Copy Pace=*11 Mode=*12 | TrueCopy Extended Distance pair creating *(Note 3)*  
*1 Pair name  
*2 P-VOL number  
*3 S-VOL number  
*4 Remote array serial number  
*5 CTG number  
*6 Local DP pool number for replication data [Optional character string | AUTO]  
*7 Local DP pool number for management area [Optional character string|AUTO]  
*8 Remote DP pool number for replication data [Optional character string [AUTO] *(Note 16)*  
*9 Remote DP pool number for management area [Optional character string |AUTO] *(Note 16)*  
*10 Copy pace [Fast|Medium|Slow]  
*11 Copy mode [Copy Skip|Initial Copy]  
*12 Copy mode [Copy Skip|Initial Copy] |
| 3E1B0500 | *1: CopyType=ShadowImage P-VOL=*2 S-VOL=*3 GroupNumber=*4 Copy Pace=*5 Mode=*6 | ShadowImage resynchronize/ restore a pair  
*1 Operation mode [Resync Local Pair|Restore Local Pair]  
*2 P-VOL number  
*3 S-VOL number  
*4 CTG number  
*5 Copy pace [Fast|Medium|Slow]  
*6 Mode [Normal|Quick] |
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
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</table>
| 3E1B0600   | *1: CopyType=SnapShot PairName=*2 P-VOL=*3 S-VOL=*4 GroupNumber=*5 CopyPace=*6 | SnapShot resynchronize/restore a pair  
  *1 Operation mode  
  [Resync Local Pair|Restore Local Pair]  
  *2 Pair name  
  *3 P-VOL number  
  *4 S-VOL number  
  *5 CTG number  
  [Optional character string|Ungrouped]  
  *6 Copy pace  
  [Fast|Medium|Slow] |
| 3E1B0700   | *1: CopyType= TrueCopy P-VOL=*2 S-VOL=*3 RemoteArraySerialNumber=*4 GroupNumber= CTG CopyPace=*5 SyncCTGMode=*6 | TrueCopy resynchronize/restore a pair  
  *1 Operation mode  
  [Resync Remote Pair|Resync-SWAP Remote Pair]  
  *2 P-VOL number  
  *3 S-VOL number  
  *4 Remote array serial number  
  *5 Copy pace  
  [Fast|Medium|Slow]  
  *6 Sync CTG mode  
  [NoSyncCTG|SyncCTG] |
| 3E1B0800   | *1: CopyType= TrueCopyExtendedDistance P-VOL=*2 S-VOL=*3 RemoteArraySerialNumber=*4 GroupNumber= CTG CopyPace=*5 ResumeUnit=*6 | TrueCopy Extended Distance resynchronize/restore a pair  
  *1 Operation mode  
  [Resync Remote Pair|Resync-SWAP Remote Pair]  
  *2 P-VOL number  
  *3 S-VOL number  
  *4 Remote array serial number  
  *5 Copy pace  
  [Fast|Medium|Slow]  
  *6 Resume scope  
  [Group|Volume] |
| 3E1C0100   | Split Local Pair: CopyType=ShadowImage P-VOL=*1 S-VOL=*2 SuspendUnit=*3 Discription=*4 Mode=*5 | Split a ShadowImage pair  
  *1 P-VOL number  
  *2 S-VOL number  
  *3 Suspend scope  
  [Group|Volume]  
  *4 Character string for split  
  *5 Split status  
  [Normal|Forcing|Quick] |
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
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<tbody>
<tr>
<td>3E1C02</td>
<td>Split Local Pair: CopyType=SnapShot *1 P-VOL=*2 S-VOL=*3 GroupNumber=*4 SuspendUnit=*5 Discription=*6</td>
<td>Split a SnapShot pair *1 Pair *2 P-VOL number *3 S-VOL number *4 CTG number [Optional character string</td>
</tr>
<tr>
<td>3E1C03</td>
<td>Split Remote Pair: CopyType=TrueCopy P-VOL=*1 S-VOL=*2 RemoteArraySerialNumber=*3 SuspendUnit=*4 S-VOLAccessibility=*5 Mode=*6</td>
<td>Split a TrueCopy pair *1 P-VOL number *2 S-VOL number *3 Remote array serial number *4 Split scope [Group</td>
</tr>
<tr>
<td>3E1C04</td>
<td>Split Remote Pair: CopyType=TrueCopyExtendedDistance P-VOL=*1 S-VOL=*2 RemoteArraySerialNumber=*3 SuspendUnit=*4 S-VOLAccessibility=*5 Mode=*6</td>
<td>Split a TrueCopy Extended Distance pair *1 P-VOL number *2 S-VOL number *3 Remote array serial number *4 Split scope [Group</td>
</tr>
<tr>
<td>3E1C05</td>
<td>Split after Create Local Pair: CopyType=ShadowImage PairName=*1 P-VOL=*2 S-VOL=*3 CopyPace=*4 SecondaryNoRead=*5 Mode=*6 MU=*7</td>
<td>Split after ShadowImage pair crating *1 Pair name *2 P-VOL number *3 S-VOL number *4 Copy pace [Fast</td>
</tr>
</tbody>
</table>
**Table A-2: Audit Log Entry Details (Continued)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3E1C0600</td>
<td>Split after Create Local Pair: CopyType=SnapShot</td>
<td>Split after SnapShot pair crating</td>
</tr>
<tr>
<td></td>
<td>*1 Pair name</td>
<td>*1 Pair name</td>
</tr>
<tr>
<td></td>
<td>*2 P-VOL number</td>
<td>*2 P-VOL number</td>
</tr>
<tr>
<td></td>
<td>*3 S-VOL number</td>
<td>*3 S-VOL number</td>
</tr>
<tr>
<td></td>
<td>*4 Copy pace</td>
<td>*4 Copy pace [Fast</td>
</tr>
<tr>
<td></td>
<td>*5 DP pool number for replication data</td>
<td>*5 DP pool number for replication data [Optional character string</td>
</tr>
<tr>
<td></td>
<td>*6 DP pool number for management area</td>
<td>*6 DP pool number for management area [Optional character string</td>
</tr>
<tr>
<td></td>
<td>*7 MU number</td>
<td>*7 MU number</td>
</tr>
<tr>
<td>3E1D0100</td>
<td>Delete Pair: CopyType=*1 P-VOL=*2 S-VOL=*3 PairName=*4 GroupNumber=*5</td>
<td>Deleting a pair (ShadowImage/SnapShot)</td>
</tr>
<tr>
<td></td>
<td>*1 Copy class</td>
<td>*1 Copy class [ShadowImage</td>
</tr>
<tr>
<td></td>
<td>*2 P-VOL number</td>
<td>*2 P-VOL number</td>
</tr>
<tr>
<td></td>
<td>*3 S-VOL number</td>
<td>*3 S-VOL number</td>
</tr>
<tr>
<td></td>
<td>*4 Pair name</td>
<td>*4 Pair name</td>
</tr>
<tr>
<td></td>
<td>*5 CTG number</td>
<td>*5 CTG number [Optional character string</td>
</tr>
<tr>
<td>3E1D0200</td>
<td>Delete Pair: CopyType=TrueCopy</td>
<td>Deleting a TrueCopy pair</td>
</tr>
<tr>
<td></td>
<td>RequestDevices=*1 RequestTarget=*2 P-VOL=*3 S-VOL=*4 RemoteArraySerialNumber=*5</td>
<td>*1 Request devices [M-VOL</td>
</tr>
<tr>
<td></td>
<td>*2 Request target</td>
<td>*2 Request target [LU</td>
</tr>
<tr>
<td></td>
<td>*3 P-VOL number</td>
<td>*3 P-VOL number</td>
</tr>
<tr>
<td></td>
<td>*4 S-VOL number</td>
<td>*4 S-VOL number</td>
</tr>
<tr>
<td></td>
<td>*5 Remote array serial number</td>
<td>*5 Remote array serial number</td>
</tr>
<tr>
<td></td>
<td>M-VOL means P-VOL and S-VOL</td>
<td>M-VOL means P-VOL and S-VOL</td>
</tr>
<tr>
<td></td>
<td>R-VOL means S-VOL</td>
<td>R-VOL means S-VOL</td>
</tr>
<tr>
<td>3E1D0300</td>
<td>Delete Pair: CopyType=TrueCopyExtendedDistance</td>
<td>Deleting a TrueCopy Extended Distance pair</td>
</tr>
<tr>
<td></td>
<td>RequestDevices=*1 RequestTarget=*2 P-VOL=*3 S-VOL=*4 RemoteArraySerialNumber=*5</td>
<td>*1 Request devices [M-VOL</td>
</tr>
<tr>
<td></td>
<td>*2 Request target</td>
<td>*2 Request target [LU</td>
</tr>
<tr>
<td></td>
<td>*3 P-VOL number</td>
<td>*3 P-VOL number</td>
</tr>
<tr>
<td></td>
<td>*4 S-VOL number</td>
<td>*4 S-VOL number</td>
</tr>
<tr>
<td></td>
<td>*5 Remote array serial number</td>
<td>*5 Remote array serial number</td>
</tr>
<tr>
<td></td>
<td>M-VOL means P-VOL and S-VOL</td>
<td>M-VOL means P-VOL and S-VOL</td>
</tr>
<tr>
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<td>R-VOL means S-VOL</td>
<td>R-VOL means S-VOL</td>
</tr>
<tr>
<td>Code</td>
<td>Message</td>
<td>Explanation</td>
</tr>
<tr>
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<td>-------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
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<tr>
<td>3E200100</td>
<td>Set Command Devices LU[*1]</td>
<td>Setting a Command Devices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 LU number</td>
</tr>
<tr>
<td>3E200200</td>
<td>Release Command Devices LU[*1]</td>
<td>Releasing the Command Devices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 LU number</td>
</tr>
<tr>
<td>3E200300</td>
<td>Set RAID Manager Protect for Command Devices LU[*1]</td>
<td>Setting the RAID Manager Protect function</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 LU number</td>
</tr>
<tr>
<td>3E220100</td>
<td>Unify MainLU[*1] and SubLU[*2]</td>
<td>Unifying LUs (Note 3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 MainLU number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 SubLU number</td>
</tr>
<tr>
<td>3E220200</td>
<td>Separate SubLU from MainLU[*1]</td>
<td>Separating all unified LUs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 MainLU number</td>
</tr>
<tr>
<td>3E220300</td>
<td>Separate SubLU[*1] from MainLU[*2] (Last LU Separation)</td>
<td>Separating the last LU from the unified LU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Note 4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 SubLU number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 MainLU number</td>
</tr>
<tr>
<td>3E240100</td>
<td>Set Remote Path: SerialNumber=*1 Bandwidth=*2Mbps RemotePathName=*3</td>
<td>Setting a remote path information of TrueCopy/TrueCopy Extended Distance (FC)</td>
</tr>
<tr>
<td></td>
<td>&lt;Path0 LocalPort<em>4 RemotePort</em>5&gt; &lt;Path1 LocalPort<em>6 RemotePort</em>7&gt;</td>
<td>*1 Remote array serial number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Bandwidth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 Remote path name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*4 Local port number of path 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*5 Remote port number of path 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*6 Local port number of path 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*7 Remote port number of path 1</td>
</tr>
<tr>
<td>3E240200</td>
<td>Delete Remote Path: SerialNumber=*1</td>
<td>Deleting the remote path information</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Remote array serial number</td>
</tr>
<tr>
<td>3E240300</td>
<td>Recover Remote Path: Path=*1 SerialNumber=*2</td>
<td>Recovery the remote path</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Path number [0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Remote array serial number</td>
</tr>
<tr>
<td>3E240500</td>
<td>Set Remote Path: SerialNumber=*1 Bandwidth=*2Mbps RemotePathName=*3</td>
<td>Changing the bandwidth and remote path name of the remote path</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Remote array serial number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Bandwidth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 Remote path name</td>
</tr>
</tbody>
</table>
Table A-2: Audit Log Entry Details (Continued)

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<th>Message</th>
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<tbody>
<tr>
<td>3E240600</td>
<td>Set Remote Path: SerialNumber=*1 Bandwidth=*2Mbps Secret=<em>3 RemotePathName=<em>4 &lt;Path0 LocalPort</em>5 RemoteIP=<em>6 RemoteLanPort</em>7&gt; &lt;Path1 LocalPort</em>8 RemoteIP=<em>9 RemoteLanPort</em>10&gt;</td>
<td>Setting a remote path information of TrueCopy/TrueCopy Extended (iSCSI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Remote array serial number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Bandwidth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 Setting of secret [Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*4 Remote path name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*5 Local port number of path 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*6 Remote IP address of path 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*7 Remote port number of path 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*8 Local port number of path 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*9 Remote IP address of path 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*10 Remote port number of path 1</td>
</tr>
<tr>
<td>3E240700</td>
<td>Set Distributed Mode: *1</td>
<td>Setting a Distributed mode of TrueCopy/TrueCopy Modular Distributed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Distributed mode [Hub</td>
</tr>
<tr>
<td>3E350100</td>
<td>Set Host Group</td>
<td>Setting a host group information</td>
</tr>
<tr>
<td>Code</td>
<td>Message</td>
<td>Explanation</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>3E3901</td>
<td>Set System Parameter P/LAN P Port Number:</td>
<td>Setting the system parameters online</td>
</tr>
<tr>
<td></td>
<td>WN=*1 URES=*2 AUREC=*3 WTHR=*4 SHAD_IO=*5 CACHEXE=*6 DETACH=*7 DETACH_TH=*8 BAT CH=*9 OP_FAIL=*10 Title=*11 C0_WV=*12 C1_WV=*13 C0_NonSP=*14 C1_NonSP=*15 C0_NonSPNum=*16 C1_NonSPNum=*17 C0_SPNum=*18 C1_SPNum=*19</td>
<td>*1 Turbo LU Warning [ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Write Unique Response Mode [ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 Auto Reconstruction Mode [ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*4 Forced Write Through Mode [ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*5 ShadowImage I/O Switch Mode [ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*6 Synchronize Cache Execution Mode [ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*7 Drive Detach Mode [ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*8 Lower Drive Detach Threshold Mode [ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*9 Battery Charging Write Command [Write Through</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*10 Operation if the Processor failures Occurs [ResetTheFault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*11 Web Title</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*12 CTL0 Write &amp; Verify Execution Mode (Note 5) [ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*13 CTL1 Write &amp; Verify Execution Mode [ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Setting a LAN port number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*14 CTL0 (LAN normal port open/close status) [Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*15 CTL1 (LAN normal port open/close status) [Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*16 CTL0 (LAN normal port number)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*17 CTL1 (LAN normal port number) (Note 5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*18 CTL0 (LAN secure port number)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*19 CTL0 (LAN secure port number) (Note 5)</td>
</tr>
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</table>
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3E3A02 00</td>
<td>Default Tuning Parameter(System)</td>
<td>Default setting of the system tuning parameters</td>
</tr>
<tr>
<td>3E3D01 00</td>
<td>Set Data Pool: Pool=*1 Threshold=*2% LU[*3]</td>
<td>Setting a Data Pool threshold (Note 3) *1 Pool number *2 Threshold value *3 LU number</td>
</tr>
<tr>
<td>3E3D02 00</td>
<td>Delete All LUs from Data Pool: Pool=*1</td>
<td>Deleting the all LUs from Data Pool *1 Pool number</td>
</tr>
<tr>
<td>3E3E01 00</td>
<td>Set SnapShot Logical Units LU[*1]: size[*2]</td>
<td>Creating SnapShot logical unit of P-VOL *1 LU number *2 Capacity (unit: blocks)</td>
</tr>
<tr>
<td>3E3E02 00</td>
<td>Delete SnapShot Logical Units LU[*1]</td>
<td>Deleting SnapShot logical unit of P-VOL *1 LU number</td>
</tr>
<tr>
<td>3E3F01 00</td>
<td>Set Data Retention: LU[*1] Attribute=*2 S-VOL=*3 Term=*4day(s)</td>
<td>Setting the access level of LU *1 LU number *2 Access level (attribute) [Read/Write</td>
</tr>
</tbody>
</table>
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3E3F0200</td>
<td>Set Data Retention: ExpirationLock=*1</td>
<td>Setting the Expiration Lock *1 Expiration lock [ON</td>
</tr>
<tr>
<td>3E460100</td>
<td>Format LU[*1]</td>
<td>Formatting of a LU *1 LU number</td>
</tr>
<tr>
<td>3E460200</td>
<td>Set Format Mode: Priority=*1 FormatData=*2</td>
<td>Setting the format mode *1 Format priority mode *(Note 8) [Normal</td>
</tr>
<tr>
<td>3E480100</td>
<td>Change SATA Options: SMART=*1 Threshold=*2%</td>
<td>Setting the SATA drive options *1 SMART function [Enable</td>
</tr>
<tr>
<td>3E490100</td>
<td>Set SATA Restore Options:CorrectionCopyMagnification=*time(s)</td>
<td>Setting the SATA drive restore options *1 Correction copy mount</td>
</tr>
<tr>
<td>3E4A0100</td>
<td>Set Remote Path(System Upgrade): SerialNumber=*1</td>
<td>Setting a remote array serial number of TrueCopy or TCE *1 Remote array serial number</td>
</tr>
<tr>
<td>3E4B0100</td>
<td>Start Parity Correction: LU[*1]</td>
<td>Specifying starting of parity correction *1 LU number</td>
</tr>
<tr>
<td>3E4B0200</td>
<td>Skip Parity Correction: LU[*1]</td>
<td>Specifying skip of parity correction *1 LU number</td>
</tr>
<tr>
<td>Code</td>
<td>Message</td>
<td>Explanation</td>
</tr>
<tr>
<td>----------</td>
<td>---------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>3E4B0300</td>
<td>Cancel Parity Correction: LU[*1]</td>
<td>Specifying stop of parity correction *1 LU number</td>
</tr>
<tr>
<td>3E520100</td>
<td>Change LU Mapping Guard</td>
<td>Changing of the mapping guard setting</td>
</tr>
<tr>
<td>3E550100</td>
<td>Install: *1 UserRegistrationWizard=*2</td>
<td>Installing the priced option *1 The priced option name (Note 19) *2 User Registration Wizard [Start</td>
</tr>
<tr>
<td>3E550200</td>
<td>De-install: *1</td>
<td>Uninstalling the priced option *1 The priced option name (Note 19)</td>
</tr>
<tr>
<td>3E550300</td>
<td>Enable: *1 UserRegistrationWizard=*2</td>
<td>Validation of a priced option *1 The priced option name *2 User Registration Wizard [Start</td>
</tr>
<tr>
<td>3E550400</td>
<td>Disable: *1</td>
<td>Invalidation of a priced option *1 The priced option name</td>
</tr>
<tr>
<td>3E550500</td>
<td>Reconfigure Memory</td>
<td>Specifying the memory reconfiguring</td>
</tr>
<tr>
<td>3E550600</td>
<td>Cancel Reconfigure</td>
<td>Canceling the memory reconfiguring</td>
</tr>
<tr>
<td>3E620100</td>
<td>Set DM-LU: LU[*1]</td>
<td>Setting the DM-LU *1 LU number</td>
</tr>
<tr>
<td>3E620200</td>
<td>Release DM-LU: LU[*1]</td>
<td>Releasing the DM-LU *1 LU number</td>
</tr>
<tr>
<td>3E630100</td>
<td>Set Cache Partition</td>
<td>Registering the Cache Partition information</td>
</tr>
</tbody>
</table>
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
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<tbody>
<tr>
<td>3E640100</td>
<td>Assign Cache Partition LU</td>
<td>Registering the LU to the Cache Partition assignment</td>
</tr>
<tr>
<td>3E6C0100</td>
<td>Default Tuning Parameter(Multi Stream/Prefetch)</td>
<td>Default setting of the multi stream tuning parameters</td>
</tr>
<tr>
<td>3E6C0200</td>
<td>Set Tuning Parameter(Multi Stream/Prefetch)</td>
<td>Setting the multi stream tuning parameters</td>
</tr>
<tr>
<td>3E710100</td>
<td>Set Maintenance LAN: CTL0 IPv4=*1 IPv6=*2</td>
<td>Setting the IP address of maintenance port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 IPv4 address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 IPv6 add</td>
</tr>
<tr>
<td>3E750100</td>
<td>Set LAN: &lt;CTL0 ObtainAdd=*1 IPv4=*2 Subnet=*3 Gateway=*4</td>
<td>ObtainAdd=*5 IPv6=*6 Subnet=*7 Gateway=*8</td>
</tr>
<tr>
<td></td>
<td>&lt;CTL1 ObtainAdd=*1 IPv4=*2 Subnet=*3 Gateway=*4</td>
<td>ObtainAdd=*5 IPv6=*6 Subnet=*7 Gateway=*8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Setting method of IPv4 address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[DHCP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 IPv4 address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 Subnet mask</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*4 IPv4 default gateway address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*5 Setting method of IPv6 address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[DHCP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*6 IPv6 address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*7 Subnet prefix</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*8 IPv6 default gateway address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*9 Negotiation mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Auto</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*10 Maintenance port IP address automatic port IP address change mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Enable</td>
</tr>
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</table>
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3E760100</td>
<td>Set LAN Information:</td>
<td>Setting the LAN information of user's management port by the constitution file (Note 7)</td>
</tr>
<tr>
<td></td>
<td>&lt;CTL0 ObtainAdd=*1 IPv4=*2 Subnet=*3 Gateway=*4</td>
<td>ObtainAdd=*5 IPv6=*6 Subnet=*7 Gateway=*8</td>
</tr>
<tr>
<td></td>
<td>&lt;CTL1 ObtainAdd=*1 IPv4=*2 Subnet=*3 Gateway=*4</td>
<td>ObtainAdd=*5 IPv6=*6 Subnet=*7 Gateway=*8</td>
</tr>
<tr>
<td></td>
<td>AUTO_CHNG=*10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Setting method of IPv4 address [DHCP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 IPv4 address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 Subnet mask</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*4 IPv4 default gateway address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*5 Setting method of IPv6 address [DHCP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*6 IPv6 address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*7 Subnet prefix</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*8 IPv6 default gateway address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*9 Negotiation mode [Auto</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*10 Maintenance port IP address automatic change mode [Enable</td>
</tr>
<tr>
<td>3E830100</td>
<td>Change Host Group Security/WWN information</td>
<td>Setting the host group security mode enable or disable/setting the WWN information.</td>
</tr>
</tbody>
</table>
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
</table>
*1 Port number [0A|0B|0E|0F|1A|1B|1E |1F]  
*2 IPv4 address  
*3 IPv4 subnet mask  
*4 IPv4 default gateway address  
*5 IPv6 flag [Enabled|Disabled]  
*6 IPv6 link local address  
*7 IPv6 address 1  
*8 IPv6 address 2  
*9 IPv6 default gateway address (Note 18)  
*10 Port number of TCP/IP  
*11 Keep Alive time  
*12 MTU (Maximum Transmission Unit) [1500|4500|9000]  
*13 VLAN ID (Note 1)  
*14 Header Digest [Enabled|Disabled]  
*15 Data Digest [Enabled|Disabled]  
*16 Window Scale [Enable|Disable] |
| 3E8E0100 | Change CHAP User Settings: Port*1            | Setting the iSCSI CHAP User information  
*1 Port number [0A|0B|1A|1B] |
| 3E900100 | Set Target Information(iSCSI): Port*1       | Setting the iSCSI target information  
*1 Port number [0A|0B|1A|1B] |
| 3E910100 | Set iSNS Server: <Port0A Server=*1 IP=*2 Port=*3> <Port0B Server=*1 IP=*2 Port=*3> <Port1A Server=*1 IP=*2 Port=*3> <Port1B Server=*1 IP=*2 Port=*3> | Setting the iSNS server information (Note 12)  
*1 Whether to use the iSNS server or not [ON|OFF]  
*2 IP address (Note 9)  
*3 Port number of TCP/IP (Note 9) |
<p>| 3E920100 | Send Ping                                   | Sending ping                                                                                           |</p>
<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3E9301 00</td>
<td>Set Initiator Information(iSCSI): Port*1</td>
<td>Setting the iSCSI initiator information *1 Port number [0A</td>
</tr>
<tr>
<td>3E9401 00</td>
<td>Modify Port Options</td>
<td>Setting the port options by the constitution file</td>
</tr>
<tr>
<td>3E9501 00</td>
<td>Set LU Mapping</td>
<td>Setting the mapping information of LUs or batch setting the mapping information of LUs per port (by the constitution file)</td>
</tr>
<tr>
<td>3E9701 00</td>
<td>Start Volume Migration: P-VOL[*1] S-VOL[*2] CopyPace=*3</td>
<td>Starting Volume Migration ([Note 3] *1 P-VOL number *2 S-VOL number *3 Copy pace [Prior</td>
</tr>
<tr>
<td>3E9702 00</td>
<td>Cancel Volume Migration: P-VOL[*1] S-VOL[*2]</td>
<td>Terminating Volume Migration *1 P-VOL number *2 S-VOL number</td>
</tr>
<tr>
<td>3E9703 00</td>
<td>Split the Pair(Volume Migration): P-VOL[*1] S-VOL[*2]</td>
<td>Releasing a pair of Volume Migration *1 P-VOL number *2 S-VOL number</td>
</tr>
<tr>
<td>3E9704 00</td>
<td>Change Copy Pace for Volume Migration: CopyPace=*1 P-VOL[*2] S-VOL[*3]</td>
<td>Changing a copy pace *1 Copy pace [Prior</td>
</tr>
<tr>
<td>3E9801 00</td>
<td>*1 Reserve LU for Volume Migration: LU[*2]</td>
<td>Defining or releasing reserved LU for Volume Migration *1 [Add</td>
</tr>
<tr>
<td>3E9901 00</td>
<td>Execute LRC Check</td>
<td>Specifying starting of LRC check</td>
</tr>
<tr>
<td>3E9902 00</td>
<td>Cancel LRC Check</td>
<td>Specifying stopping of LRC check</td>
</tr>
</tbody>
</table>

Table A-2: Audit Log Entry Details (Continued)
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<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3E9C01</td>
<td>*1: DP Pool[*2] TierMode=*3 AutoProgressMode=*4 RelocationMode=*5 RelocationSpeed=*6</td>
<td>Setting the DP pool tier management</td>
</tr>
<tr>
<td>3EB001</td>
<td>Set TimeZone=[*1] DaylightSaving=*2 NTP1=*3 NTP2=*4</td>
<td>Setting the time zone and NTP server</td>
</tr>
<tr>
<td>3EB201</td>
<td>Set Audit Log Options: Transfer=*1 Server1_IP=*2 Server2_IP=*3 Internal=*4</td>
<td>Setting the Audit Logging options</td>
</tr>
<tr>
<td>3EB301</td>
<td>Export Internal Log (*1 file(s) completed)</td>
<td>Exporting the Audit logged files</td>
</tr>
<tr>
<td>3EB401</td>
<td>Initialize Internal Log</td>
<td>Initializing the Audit logged data</td>
</tr>
</tbody>
</table>

**Notes:**
- **Note 9:**
- **Note 10:**
- **Note 22:**
<table>
<thead>
<tr>
<th>Code</th>
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<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3EB501 00</td>
<td>Set Account Authentication Parameters: SessionTimeout=*1</td>
<td>Setting the session time out (unit: minutes) *1 [20</td>
</tr>
<tr>
<td>3EB601 00</td>
<td>*1 User Account</td>
<td>Setting the Account Authentication information *1 [Add</td>
</tr>
<tr>
<td>3EB701 00</td>
<td>Login (Account Authentication)</td>
<td>Logged in as Account Authentication user ID</td>
</tr>
<tr>
<td>3EB702 00</td>
<td>Logout (Account Authentication)</td>
<td>Log out already logged in as Account Authentication user ID</td>
</tr>
<tr>
<td>3EB703 00</td>
<td>Force Logout of*1 (Account Authentication)</td>
<td>Forced log out already logged in as Account Authentication user ID *1 Forced log out user ID</td>
</tr>
<tr>
<td>3EB704 00</td>
<td>Start HSNM2 Alert Monitoring</td>
<td>Starting error monitoring</td>
</tr>
<tr>
<td>3EB704 00</td>
<td>Start HSNM2 Script</td>
<td>Starting script</td>
</tr>
<tr>
<td>3EB704 00</td>
<td>Start HSNM2 Script</td>
<td>Finish script</td>
</tr>
<tr>
<td>3EBB01 00</td>
<td>Spin Up RAID Group[*1]</td>
<td>Setting spin up *1 RAID group number</td>
</tr>
<tr>
<td>3EBB02 00</td>
<td>Spin Down RAID Group[*1] Mode=*2 IOMonitoringTime=*3</td>
<td>Setting spin down (I/O Link Disabled) *1 RAID group number *2 Detailed setting of spin down [Spindown Only</td>
</tr>
</tbody>
</table>

Table A-2: Audit Log Entry Details (Continued)
### Table A-2: Audit Log Entry Details (Continued)

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<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3EBB0300</td>
<td>Execute Power Saving: RAID Group [*1] Mode=*2</td>
<td>Setting power saving (I/O Link Disabled) in Power Saving Plus (Note 23)</td>
</tr>
<tr>
<td></td>
<td>SpindownIOMonitoringTime=*3</td>
<td>*1 RAID group number</td>
</tr>
<tr>
<td></td>
<td>PoweroffIOMonitoringTime=*4</td>
<td>*2 Detailed setting of Power Saving [Spindown/Poweroff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 Spindown I/O monitoring time [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*4 Drive power OFF I/O monitoring time [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3EBB0400</td>
<td>Change TrayPowerOff=*1 Unit[*2]</td>
<td>Setting for Tray Power Saving</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Tray Power Off [Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Tray number</td>
</tr>
<tr>
<td>3EBB0500</td>
<td>Execute Connection Test: Unit[*1]</td>
<td>Connection test for Tray Power Saving</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Tray number</td>
</tr>
<tr>
<td>3EBC0100</td>
<td>Start to Install Tray</td>
<td>Starting adding a tray</td>
</tr>
<tr>
<td>3EBD0100</td>
<td>Set LU Ownership: LUN=*1 CTL=*2 Core=*3</td>
<td>Setting an LU ownership</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 LUN for to be change a ownership</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Destination controller for to be change a ownership</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CTL[CTL0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 Destination core for to be change a ownership [MP0</td>
</tr>
<tr>
<td>3EBE0100</td>
<td>Enable Locate: Unit0-Unit7[*1] Unit8-Unit9[*2]</td>
<td>Specifying LED turning on (HUS110)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Information Unit 0 to Unit 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 information Unit 8 to Unit 9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Displaying 0 or 1 corresponding bit per 8 trays</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0: OFF 1: ON</td>
</tr>
</tbody>
</table>
Table A-2: Audit Log Entry Details (Continued)

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<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3EBE0200</td>
<td>Enable Locate: Unit0-Unit7[*1] Unit8-Unit15[*2] Unit16-Unit19[*3]</td>
<td>Specifying LED turning on (HUS130)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Information Unit 0 to Unit 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Information Unit 8 to Unit 15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 Information Unit 16 to Unit 19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Displaying 0 or 1 corresponding bit per 8 trays</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0: OFF 1: ON</td>
</tr>
<tr>
<td>3EBE0300</td>
<td>Enable Locate: CTU[*1] Unit0-Unit7[*2] Unit8-Unit15[*3] Unit16-Unit23[*4] Unit24-Unit31[*5] Unit32-Unit39[*6] Unit40-Unit47[*7] Unit48-Unit55[*8] Unit56-Unit63[*9] Unit64-Unit71[*10] Unit72-Unit79[*11]</td>
<td>Specifying LED turning on (HUS 100)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Information CTU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*2 Information Unit 0 to Unit 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*3 Information Unit 8 to Unit 15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*4 Information Unit 16 to Unit 23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*5 Information Unit 24 to Unit 31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*6 Information Unit 32 to Unit 39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*7 Information Unit 40 to Unit 47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*8 Information Unit 48 to Unit 55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*9 Information Unit 56 to Unit 63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*10 Information Unit 64 to Unit 71</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*11 Information Unit 72 to Unit 79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Displaying 0 or 1 corresponding bit per 8 trays</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0: OFF 1: ON</td>
</tr>
</tbody>
</table>
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3EBF0100</td>
<td>Set E-Mail Alerts: MailServerAddress=*1 DomainName=*2 FromAddress=*3</td>
<td>Setting E-Mail alerts *1 Mail server IP address *2 Mail server domain name *3 E-Mail sender address</td>
</tr>
<tr>
<td></td>
<td>SendToAddress1=*4:*5 SendToAddress2=*6:*7 SendToAddress3=*8:*9</td>
<td>*4 E-Mail sender classification 1 [TO</td>
</tr>
<tr>
<td></td>
<td>SendToAddress4=*10:*11 ReplyToAddress=*12 MailAdditionalInformation=*13</td>
<td>*7 E-Mail receiver address 2 *8 E-Mail sender classification 3 [TO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*11 E-Mail receiver address 4 *12 E-Mail return address *13 E-Mail additional information</td>
</tr>
<tr>
<td>3EBF0200</td>
<td>Set E-Mail Alerts: *1</td>
<td>Setting E-Mail alerts *1 Setting E-Mail alerts function [Enable E-Mail Alerts</td>
</tr>
<tr>
<td>3EBF0300</td>
<td>Send Test Mail From *1</td>
<td>Sending a test E-Mail alerts *1: Controller number [CTL0</td>
</tr>
<tr>
<td>3EC10100</td>
<td>Set TrueCopy Options: CycleTime=*1sec Message=*2 Queuing-InhibitingTime=*3msec</td>
<td>Setting of TrueCopy options *1 Cycle time *2 Cycle over message [Enable</td>
</tr>
<tr>
<td>3EC10200</td>
<td>Initialize TrueCopy Options</td>
<td>Initializing the setting options of TrueCopy</td>
</tr>
<tr>
<td>Code</td>
<td>Message</td>
<td>Explanation</td>
</tr>
<tr>
<td>----------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>3EC701</td>
<td>Set CTG Information: CopyType=*1 CTGNo=*2 CTGName=*3</td>
<td>Setting CTG definition information</td>
</tr>
<tr>
<td>00</td>
<td></td>
<td>*1 Copy type [LocalReplication</td>
</tr>
<tr>
<td>3EC901</td>
<td>Set Pair Information: CopyType=*1 P-VOL=*2 S-VOL=*3 PairName=*4 CopyPace=*5 GroupNumber=*6 LUNassign=*7</td>
<td>Setting a pair definition information</td>
</tr>
<tr>
<td>00</td>
<td></td>
<td>*1 Copy type [ShadowImage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*6 CTG number [Optional character string</td>
</tr>
<tr>
<td>3ECB01</td>
<td>Replacement of Array: Mode=*1 CopyPace=*2</td>
<td>Auto migration</td>
</tr>
<tr>
<td>00</td>
<td></td>
<td>*1 Process mode [FlagReset</td>
</tr>
</tbody>
</table>

Table A-2: Audit Log Entry Details (Continued)
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3ECB0200</td>
<td>Replacement of Array: Mode=ChangeAccessPath</td>
<td>Auto migration (changing the access path): Outputs together with 3ECB0300.</td>
</tr>
<tr>
<td></td>
<td>Target=*1 &lt;CTL0 ObtainAdd=*2 IPv4=*3 Subnet=*4 Gateway=*5</td>
<td>*1 Target array [Old]</td>
</tr>
<tr>
<td></td>
<td>&lt;CTL1 ObtainAdd=*2 IPv4=*3 Subnet=*4 Gateway=*5</td>
<td>*3 IPv4 address</td>
</tr>
<tr>
<td></td>
<td>ObtainAdd=*6 IPv6=*7 Subnet=*8 Gateway=*9</td>
<td>*4 Subnet mask</td>
</tr>
<tr>
<td></td>
<td>AUTO_CHNG=*11</td>
<td>*5 Default gateway address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*6 Setting method of IPv6 address [DHCP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*7 IPv6 address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*8 Subnet prefix</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*9 Default gateway address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*10 Negotiation mode [Auto</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*11 Maintenance port IP address automatic change mode [Enable</td>
</tr>
<tr>
<td>Code</td>
<td>Message</td>
<td>Explanation</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>3ECB0300</td>
<td>Replacement of Array: Mode=ChangeAccessPath</td>
<td>Auto migration (changing the access path): Outputs together with 3ECB0200.</td>
</tr>
<tr>
<td></td>
<td>Target=*1 &lt;CTL0 ObtainAdd=*2 IPv4=*3</td>
<td>*1 Target array [New]</td>
</tr>
<tr>
<td></td>
<td>&lt;CTL1 ObtainAdd=*2 IPv4=*3 Subnet=*4</td>
<td>*3 IPv4 address</td>
</tr>
<tr>
<td></td>
<td>Gateway=*5</td>
<td>ObtainAdd=*6 IPv6=*7 Subnet=*8</td>
</tr>
<tr>
<td></td>
<td>AUTO_CHNG=*11</td>
<td>*5 Default gateway address</td>
</tr>
<tr>
<td>3ECDO0100</td>
<td>Set Warning Banner=*1</td>
<td>Setting a banner *1 Warning banner [Enable</td>
</tr>
<tr>
<td>3ECE0100</td>
<td>Set Battery Valid Number=*1</td>
<td>Setting a valid battery number *1 Valid battery number [1</td>
</tr>
<tr>
<td>3ED0100</td>
<td>*1 iSCSI Remote Path: SerialNumber=*2</td>
<td>Setting a remote path information of TrueCopy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Operation [Set</td>
</tr>
<tr>
<td>3ED20100</td>
<td>Change User Certificate and PrivateKey</td>
<td>Updating the SSL user certificate</td>
</tr>
<tr>
<td>3ED30100</td>
<td>Expand RG: RG=*1, AddDrives=Unit[*2]HDU[*3]</td>
<td>Expansion of RAID group *1 RAID group number *2 Unit number *3 HDU number</td>
</tr>
</tbody>
</table>

Table A-2: Audit Log Entry Details (Continued)
<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3ED30200</td>
<td>Change Priority of RG Expansion: Priority=*1</td>
<td>Changing of RAID group expansion priority *1 Priority [HostAccess][RGExpansion]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3ED30300</td>
<td>Remove Instruction of RG Expansion: RG=*1 Mode=*2</td>
<td>Termination of RAID group expansion *1 RAID group number *2 Method to terminate [Normal][Return To Original RG Forcibly][Forced Termination]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3ED50100</td>
<td>Replacement of Array: Mode=ConnectNewArray SerialNumber=*1 &lt;Path0A IP=*2 Port=*3&gt; &lt;Path0B IP=*4 Port=*5&gt; &lt;Path1A IP=*6 Port=*7&gt; &lt;Path1B IP=*8 Port=*9&gt;</td>
<td>Auto migration (connection new array) *1 Remote array serial number *2 IP address *3 TCP port number *4 IP address *5 TCP port number *6 IP address *7 TCP port number *8 IP address *9 TCP port number</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3ED50200</td>
<td>Replacement of Array: Mode=CopyPace CopyPace=*1</td>
<td>Auto migration (changing copy pace) *1 Copy pace [Fast][Medium][Slow]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3ED50300</td>
<td>Replacement of Array: Mode=ResetMigrationStatus</td>
<td>Auto migration (reset migration status)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*16 Buffer Space for New Page Assignment (3rd tier)[Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*17 Buffer Space for Tier Relocation (1st tier)[Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*18 Buffer Space for Tier Relocation (2nd tier)[Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*19 Buffer Space for Tier Relocation (3rd tier)[Optional character string]</td>
</tr>
</tbody>
</table>
Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;ConsumedCapacityAlert: EarlyAlert=*3% Depletion=*4% Notification=*5&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;OverProvisioningThreshold: Warning=*6% Limit=*7% Notification=*8&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LimitEnforcement=*9&lt;ReplicationThreshold Depletion=*10% DataRelease=*11%&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Encryption=*12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AddDrives=Unit[*3]HDU[*4] OptimizingDP=*5</td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Message</td>
<td>Explanation</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>&lt;ConsumedCapacityAlert: EarlyAlert=*2% Depletion=*3%&gt;</td>
<td>*2 Early alert of consumed capacity [Optional character string]</td>
</tr>
<tr>
<td></td>
<td>Notification=*4&gt;&lt;OverProvisioningThreshold: Warning=*5% Limit=*6%&gt;</td>
<td>*3 Depletion alert of consumed capacity [Optional character string]</td>
</tr>
<tr>
<td></td>
<td>OverProvisioningNotice=*7&gt;LimitEnforcement=*8&gt;</td>
<td>*4 Threshold over notification of consumed capacity alert [Enable</td>
</tr>
<tr>
<td></td>
<td>&lt;Replication Threshold: Depletion=*9% DataRelease=*10%&gt;</td>
<td>*5 Warning of over provisioning [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*6 Limit of over provisioning [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*7 Limit alert notification of over provisioning [Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*8 Over Provisioning Limit Enforcement [Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*9 Replication Depletion Alert Threshold [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*10 Replication Data Released Threshold [Optional character string]</td>
</tr>
<tr>
<td>3ED60500</td>
<td>Restore DP_Pool: DP_Pool[*1]</td>
<td>Restore DP pool *1 DP pool number [Optional character string]</td>
</tr>
</tbody>
</table>
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
</table>
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
</table>

### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3ED60800</td>
<td>Change DP_Pool:</td>
<td>Changing of DP pool</td>
</tr>
<tr>
<td></td>
<td>DP_Pool[*1]&lt;ConsumedCapacityAlert:</td>
<td>*1 DP pool number</td>
</tr>
<tr>
<td></td>
<td>EarlyAlert=*2% Depletion=*3% Notification=*4&gt; &lt;OverProvisioningThreshold:</td>
<td>*2 Early alert of consumed capacity</td>
</tr>
<tr>
<td></td>
<td>Warning=*5% Limit=*6% Notification=*7&gt; &lt;ReplicationThreshold: Depletion=8%</td>
<td>*3 Depletion alert of consumed capacity</td>
</tr>
<tr>
<td></td>
<td>DataRelease=*9%&gt; &lt;BewOageL 1st=*10 2nd=*11 3rd=*12&gt; &lt;RelocationBuffer:</td>
<td>*4 Threshold over notification of consumed capacity alert</td>
</tr>
<tr>
<td></td>
<td>1st=*13 2nd=*14 3rd=*15&gt;</td>
<td>*5 Warning of over provisioning [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*6 Limit of over provisioning [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*7 Limit alert notification of over provisioning [Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*8 Replication Depletion Depletion Threshold [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*9 Replication Data Released Threshold [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*10 Buffer Space for New Page Assignment (1st tier) [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*11 Buffer Space for New Page Assignment (2nd tier) [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*12 Buffer Space for New Page Assignment (3rd tier) [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*13 Buffer Space for Tier Relocation (1st tier) [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*14 Buffer Space for Tier Relocation (2nd tier) [Optional character string]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*15 Buffer Space for Tier Relocation (3rd tier) [Optional character string]</td>
</tr>
<tr>
<td>Code</td>
<td>Message</td>
<td>Explanation</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3EDA0100</td>
<td>Optimize DP_Pool: AllLUsInTheDP_Pool=*1 OptimizingDP=*2 ReclaimingZeroPages=*3 LU[*4]</td>
<td>Optimizing of the DP pool *1 Batch specifying of the DP pool optimizing [Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3EDA0200</td>
<td>Cancel the Optimization of DP_Pool: AllLUsInTheDP_Pool=*1 LU[*2]</td>
<td>Cancellation of the DP pool optimizing *1 Batch specifying of cancellation of the DP pool optimizing [Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3EDA0300</td>
<td>Change the Priority of DP Optimization: *1</td>
<td>Changing a priority of the DP pool optimizing *1 Priority [Optimization</td>
</tr>
</tbody>
</table>

Table A-2: Audit Log Entry Details (Continued)
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| 3EDA0400   | Change Provisioning Attribute:  
<AcceleratedWideStripingMode=*1 
OptimizingDP=*2>  
FullCapacityMode=*3 
<AutoDPoptimize=*4 AllLUsinTheDP_Pool=*6>  
<Promotion=*7 Tier=*8 <MonitoredIO: Read=*9 
Write=*10> DisablingTier=*11 
AllLUsInTheDP_Pool=*12> |
|            | Changing an attribute of the DP pool LU *(Note 14)*  
*1 Accelerated wide striping mode [Enable|Disable]  
*2 DP pool LU optimizing [Yes|No]  
*3 Full Capacity Mode [Enable|Disable]  
*4 Auto DP Optimize [Enable|Disable]  
*5 Threshold for Auto DP Optimize  
*6 Batch specifying of Auto DP optimize [Yes|No] *(Note 24)*  
*7 Promptly Promotion Mode *(Note 21)*[Enable|Disable|#]  
*8 New Page Assignment Tier *(Note 21)* [Middle|High|Low]  
*9 Monitored I/O (Read) *(Note 21)* [Enable|Disable]  
*10 Monitored I/O (Write) *(Note 21)* [Enable|Disable|#]  
*11 DisablingTier Relocation *(Note 21)* [Enable|Disable]  
*12 Batch specifying of Disabling Tier Relocation setting [Yes|No] Auto DP optimize[Yes|No] |  
| 3EDE0100   | Release the SCSI Reservation: LU[*1]                                      | Release the reservation LU forcibly  
*1 LU number [Optional character string]|  
| 3EE0100    | Set Port Error Count:  
<ResetCounter=*1>  
<Threshold Port0A=*2 Port0B=*2 Port0C=*2 Port0D=*2 Port0E=*2 Port0F=*2 Port0G=*2 Port0H=*2 Port1A=*2 Port1B=*2 Port1C=*2 Port1D=*2 Port1E=*2 Port1F=*2 Port1G=*2 Port1H=*2> |
|            | Setting of capture port error count  
*1 The port number that is reset the report counter.  
*2 The report counter threshold value [Optional character string]|  
| 3EE10100   | Back Up Master Authentication Key                                        | Back up Master Authentication Key for the Self-Encrypting Drive |
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3EE102</td>
<td>Restore Master Authentication Key</td>
<td>Restore Master Authentication Key for the Self-Encrypting Drive</td>
</tr>
<tr>
<td>3EE103</td>
<td>Refresh Authentication Keys</td>
<td>Refresh Master Authentication Key and Authentication Keys for the Self-Encrypting Drive</td>
</tr>
</tbody>
</table>
| 3EE301   | *1 I/F Module/Board <Location CTL[*2] Slot/Board[*3]> | I/F module board detach/add/remove information (Note 20)  
*1 Operation [Detach|Prepare adding|Start adding|Remove]  
*2 Controller number  
*3 Slot number |
| 3EE501   | Change SSD/FMD Options: SSD Threshold=*1% <FMD Threshold=*2% Battery=*3%> | Setting the SSD/FMD options Note 1  
*1 Threshold of Endurance for SSD  
*2 Threshold of Endurance for FMD  
*3 Threshold of Battery life for FMD |
| 3EE601   | Change Packet Filtering=*1            | Setting the packet filtering  
*1 Packet Filtering [Enable|Disable] |
| 3EE602   | Block Port 80=*1                      | Setting the port 80  
*1 80 port block [Enable|Disable] |
| 3EE701   | Edit Encryption Environment GEN=*1 Backup/Restore=*2 ProtectVolumesbyKMS=*3 LimitedKeyGentoKMS=*4 | Setting the encryption environment (Note 26)  
*1 The location where the keys are generated [Array|KMS|NotSpecify]  
*2 The backup/restore location of keys [File|File and KmS|KMS]  
*3 Protect the Volumes by the Key Management Server [Enable|Disable]  
*4 Limited Encryption Keys Generated on to the Key Management Server [Enable|Disable] |
| 3EE702   | Create Keys: NUM=*1                   | Creating keys  
*1 The number of keys which wants to create |
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| 3EE703 00 | Assign Keys: NUM=*1 Unit[*2]HDU[*3]                                        | Assigning keys to the drives  
*1 The number of keys which are assigned to the drives  
*2 Tray number  
*3 HDU number                              |
| 3EE704 00 | Remove Assigned Keys: NUM=*1 Unit[*2]HDU[*3]                               | Removing keys from the drives which are assigned keys  
*1 The number of keys which want to be removed from the drives  
*2 Tray number  
*3 HDU number                              |
| 3EE705 00 | Set KMS: IPaddress/host=*1 PortNumber=*2 TimeOut=*3 RetryInterval=*4 RetryCount=*5 ClientCert=*6 RootCert=*7 <Secondary: IPaddress/host=*8 PortNumber=*9 TimeOut=*10 RetryInterval=*11 RetryCount=*12 ClientCert=*13 RootCert=*14> | Setting KMS (Key Management Server)  
(Note 27)  
*1 IP address or hostname  
*2 Port number  
*3 Timeout value  
*4 Retry interval value  
*5 Retry count value  
*6 Changing client certification [Yes|No]  
*7 Changing root certification [Yes|No]  
*8 IP address or hostname (Secondary Server)  
*9 Port number (Secondary Server)  
*10 Timeout value (Secondary Server)  
*11 Retry interval value (Secondary Server)  
*12 Retry count value (Secondary Server)  
*13 Changing client certification (Secondary Server) [Yes|No]  
*14 Changing root certification (Secondary Server) [Yes|No]|
| 3EE801 00 | Back Up Encryption Keys                                                  | Backup the encryption keys                                                  |
| 3EE802 00 | Restore Encryption Keys                                                  | Restore the encryption keys                                                  |
| 3EE901 00 | System Start with KMS                                                    | Starting the system with Key Management Server                              |
| 3F0101 00 | Configuration failed: Inappropriate parameters                           | Configuration failed for inappropriate parameters                          |
### Table A-2: Audit Log Entry Details (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3F020100</td>
<td>Configuration failed: The Option[*1] is Disable or De-installed</td>
<td>Configuration failed for the priced option is disable or uninstalled <em>(Note 11)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 The priced option name</td>
</tr>
<tr>
<td>3F030100</td>
<td>Configuration failed: Temporary/Emergency Key[*1] expired</td>
<td>Configuration failed for the temporary or emergency key is expired <em>(Note 11)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 The priced option name</td>
</tr>
<tr>
<td>41040100</td>
<td>Session Timeout: *1</td>
<td>Session timeout occurs of the already logged in with Account Authentication user ID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 User ID</td>
</tr>
<tr>
<td>41090100</td>
<td>Reference/Modification failed: Authentication authority is insufficient</td>
<td>Referencing or modification failed for Authentication authority is insufficient</td>
</tr>
<tr>
<td>51010100</td>
<td>Start Online Microprogram Download</td>
<td>Starting the firmware downloading online</td>
</tr>
<tr>
<td>51010200</td>
<td>Start Online Microprogram Update: CTL*1</td>
<td>Starting the firmware updating online</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Controller number</td>
</tr>
<tr>
<td>51020100</td>
<td>Start ENC Microprogram Download</td>
<td>Starting ENC firmware downloading online</td>
</tr>
<tr>
<td>51020200</td>
<td>Start ENC Microprogram Update: ENC*1</td>
<td>Starting ENC firmware updating online</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 ENC number</td>
</tr>
<tr>
<td>51030100</td>
<td>System Reboot</td>
<td>Rebooting after the system configuration</td>
</tr>
<tr>
<td>51030200</td>
<td>Release Reboot Wait Condition: CTL*1</td>
<td>Releasing reboot wait condition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*1 Controller number</td>
</tr>
<tr>
<td>52010100</td>
<td>System Shutdown (Reboot Request)</td>
<td>Reboot request from Navigator 2</td>
</tr>
<tr>
<td>71010100</td>
<td>Subsystem is Ready</td>
<td>Array is ready</td>
</tr>
<tr>
<td>71020100</td>
<td>PS OFF</td>
<td>Array power off</td>
</tr>
</tbody>
</table>
Notes on the above table:

**Note 1:** If this is Disable, # is the output.

**Note 2:** When the *1 is Disable, # is the output.

**Note 3:** When the controller, which received the command, does not have the ownership of the LU, two or more logs of “Failed” may be collected in “Result of the audit event” of “COMMENT part in MSG” until the switching of the ownership is completed internally. Usually, it is retried in the upper application, and finally the log of “Success” is collected.

**Note 4:** When the MainLU value is invalid, # is the output for the SubLU.

**Note 5:** If there is only one CTL, # is the output.

**Note 6:** When the *6 is Disable, # is the output.

**Note 7:** If there is only one CTL, # is the output for all the parameters on the CTL1 side.

**Note 8:** If only one parameter is set, # is the output for the other one.

**Note 9:** When the *1 is OFF, # is the output.

**Note 10:** When the *1 is ON and the server 2 is not set, # is the output.

**Note 11:** Maximum three abbreviations of the priced options may be output. This shows that all or any of the priced options are the targets.

**Note 12:** The unmounted Fibre/iSCSI port, # is the output.

**Note 13:** When the *3 is RG, # is the output.

**Note 14:** When this is not changed, # is the output.

**Note 16:** When remote array is AMS/WMS series or AMS 2000 series, # is the output.

**Note 17:** When remote array is HUS100 series, # is the output.

**Note 18:** When the *5 is Disable, # is the output.

**Note 19:** When the result of the audit event is Failed, fourteen # is the output.

**Note 20:** When the *1 is Remove, # is output to *2. When the *1 is Prepare adding or Start adding, # is output on both *2 and *3.

**Note 21:** When Tier Mode is Disable, # is output.

**Note 22:** When it is not the change target of the operation mode, # is output.

**Note 23:** When *2 is Poweroff, # is output to *3, when *2 is Spindown, # is output to *4.

**Note 24:** When *8 is Disable, # is output to *9 and *10.
Note 25: When this array is HUS 150 and Data At Rest Encryption is enabled, it is output.

More Audit Log Notes:

Note 11: Maximum three abbreviations of the priced options may be output. This shows that all or any of the priced options are the targets.

Note 12: The unmounted Fibre/iSCSI port, # is the output.

Note 13: When the *3 is RG, # is the output.

Note 14: When this is not changed, # is the output.

Note 16: When remote array is AMS/WMS series or AMS 2000 series, # is the output.

Note 17: When remote array is HUS100 series, # is the output.

Note 18: When the *5 is Disable, # is the output.

Note 19: When the result of the audit event is Failed, fourteen # is the output.

Note 20: When the *1 is Remove, # is output to *2. When the *1 is Prepare adding or Start adding, # is output on both *2 and *3.

Note 21: When Tier Mode is Disable, # is output.

Note 22: When it is not the change target of the operation mode, # is output.

Note 23: When *2 is Poweroff, # is output to *3, when *2 is Spindown, # is output to *4.

Note 24: When *8 is Disable, # is output to *9 and *10.

Note 25: When this array is HUS 150 and Data At Rest Encryption is enabled, it is output.

Note 26: When *1 is NotSpecify, # is output to *2, *3, and *4. When *1 is Array, # is output to *3 and *4. When *1 and *2 is KMS and *3 is Disable, # is output to *4.

Note 27: When secondary server is disabled, # is output from *8 to *14.
Audit log setting example

This section provides a procedure for setting Audit Logging where the external Syslog server receives the log sent from the disk array. This procedure is uses a setup under the syslogd of Linux (Fedora Core and so forth).

NOTE: For the procedure for installing syslogd, refer to a manual of each OS. Since the procedure for setting the Syslog server depends on a user environment, it may be different from the one described here.

1. Edit "/etc/syslog.conf" file, and specify file name to be outputting log.

   (Example: output the log to "/var/log/Audit_logging.log")

   ```
   # Audit Logging
   user.* /var/log/Audit_logging.log
   ```

2. Set syslogd to accept log transfer from the outside.

   Edit "/etc/sysconfig/syslog" file. Add "-r" to "SYSLOGD_OPTIONS".

   ```
   # SYSLOGD_OPTIONS="-r -m 0"
   ```

3. Restart syslogd after setting.

   ```
   # service syslog restart
   ```

Cache Partition Manager

This section includes the following topics:

- Installing
- Enabling or disabling
- Adding a cache partition
- Assigning a cache partition
- Setting a pair cache partition
- Changing the cache partition owner controller

When the pair status of TrueCopy or TCE is Paired or Synchronizing, the state is changed to Failure.

When you perform the setting, deleting, or changing of Cache Partition Manager in the case where the array is used on the remote side of TrueCopy or TCE, the following phenomena occur with the restart of the array.

Both paths of TrueCopy or TCE are blocked. When a path is blocked, a TRAP occurs, that is, a notification to the SNMP Agent Support Function. Inform the departments concerned of the above beforehand. The path of TrueCopy or TCE is recovered from the blockade automatically after the array is restarted.
When you restart the array necessarily, perform the setting, deleting, or changing of Cache Partition Manager after changing the pair status of TrueCopy or TCE to Split.

If a Cache Partition is added, deleted, or changed during a spin-down instruction before completing the spin-down when Power Saving is enabled, the spin down may fail. If a spin-down fails, execute the spin-down again. Check that the spin-down instruction has not been issued or has been completed (no RAID group in the Power Saving Status of Normal(Command Monitoring) exists) before adding, deleting, or changing the Cache Partition.

NOTE: When the power saving instruction of the non I/O link is executed with the priced option, Power Saving, or Power Saving Plus, if a Cache Partition is added, deleted, or changed while the Power Saving status is Normal (Command Monitoring), the status changes to “Normal (Spin Down Failure: PS OFF/ON)”. The array reboot occurring at the time of the setting change returns the status change. After the change occurs, the spin-down may fail. When the spin-down fails, run the spin-down again. Before adding, deleting, or changing the Cache Partition, check that the spin-down instruction has not been issued by the Power Saving instruction of the non I/O link and no RAID group whose Power Saving status is Normal (Command Monitoring).

Installing

NOTE: To make the Cache Partition Manager functions available, you must install the Cache Partition Manager feature and make its functions selectable (unlocked). This requires a key code or key file.

To install the Cache Partition Manager feature:

1. From the command prompt, register the array in which you will install the Cache Partition Manager feature and connect to the array.

2. Install the optional feature by using the following:

```
% auopt -unit array-name -lock off -keycode manual-attached-keycode
Are you sure you want to install the option?
(y/n [n]): y
The option is unlocked.
%
%
% auopt -unit array-name -refer
Option Name  Type   Term     Status
Reconfigure Memory Status
CACHEPARTITIONPermanent ---    Enable
N/A
```

NOTE: To make the Cache Partition Manager functions available, you must install the Cache Partition Manager feature and make its functions selectable (unlocked). This requires a key code or key file.
Uninstalling

The capacity of the master partition must be the default partition size. The following conditions must be satisfied in order to uninstall Cache Partition Manager: All the sub-partitions other than the master partition must be deleted.

To uninstall Cache Partition Manager:
1. From the command prompt, register the array in which you will uninstall Cache Partition Manager, and connect to the array.
2. Uninstall the optional features by using the following:

   ```
   % auopt -unit array-name -lock on -keycode manual-attached-keycode
   Are you sure you want to de-install the option? 
   (y/n [n]): y
   The option is unlocked.
   %
   % auopt -unit array-name -refer
   DMBC002015: No information displayed.
   %
   ```

Enabling or disabling

Cache Partition Manager can be enabled or disabled without uninstalling this function.

The following conditions must be satisfied in order to disable Cache Partition Manager:
All the sub-partitions other than the master partition must be deleted.

The capacity of the master partition must be the default partition size.

To enable or disable Cache Partition Manager (without uninstalling this function):
1. From the command prompt, register the array in which you will change the status of the Cache Partition Manager feature and connect to the array.
2. Execute the `auopt` command to change the status (enable or disable) of the Cache Partition Manager feature.
3. The following is an example of how to change the status from enable to disable. To change the status from disable to enable, enter `enable` after the `-st` option.

   ```
   % auopt -unit array-name -option CACHEPARTITION -st disable
   Are you sure you want to disable the option? 
   (y/n [n]): y
   The option has been set successfully.
   %
   % auopt -unit array-name -refer
   Option Name Type Term Status
   Reconfigure Memory Status --- ---
   CACHEPARTITION Permanent --- Disable
   N/A
   %
   ```
Adding a cache partition

You must reboot the array for the changes to be effective. To add a cache partition:

1. From the command prompt, register the array in which you want to set Cache Partition Manager and connect to the array.

2. Execute the `aucachept` command to investigate the cache memory.

   ```bash
   % aucachept -unit array-name -refer
   Current Information
   User Capacity[MB]  ? 1000
   Free Size[MB]
   CTL0? 0
   CTL1? 0
   No.  CTL       Partition Size[10MB]  Segment Size[KB]
   0    0              50                 16
   1    1              50                 16
   Reserved Information
   No.  CTL       Partition Size[10MB]  Segment Size[KB]
   0    0              50                 16
   1    1              50                 16
   %
   ``

   Area sizes of the master partitions (Nos. 1 and 2) are changed to 20 respectively, because no free area is left.

   ```bash
   % aucachept -unit array-name -chg -pt 0 -ptsize 20
   The size of cache partition 0 is changed into 200MB.
   Do you want to continue processing? (y/n [n]): y
   The pair cache partition may be changed into "Auto". Please confirm pair cache partition after reboot.
   Do you want to continue processing? (y/n [n]): y
   In order to complete the changing, it is necessary to reboot the subsystem.
   When not restarting, the changing will be registered, but it will not become effective on the subsystem.
   Please execute this command again without restarting, if you want to continue setting of the cache partition.
   Do you restart the subsystem? (y/n [n]): n
   The cache partition has been changed successfully.
   Please restart the subsystem to enable the setting.
   % aucachept -unit array-name -chg -pt 1 -ptsize 20
   The size of cache partition 1 is changed into 200MB.
   Do you want to continue processing? (y/n [n]): y
   The pair cache partition may be changed into "Auto". Please confirm pair cache partition after reboot.
   Do you want to continue processing? (y/n [n]): y
   In order to complete the changing, it is necessary to reboot the subsystem.
   When not restarting, the changing will be registered, but it will not become effective on the subsystem.
   Please execute this command again without restarting, if you want to continue setting of the cache partition.
   Do you restart the subsystem? (y/n [n]): y
   Host will be unable to access the subsystem while restarting.
   Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
   Also, if you are logging in, the login status will be canceled when restarting begins.
   When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
   Remote Replication pair status will be changed to "Failure(PSUB)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
   When load balancing of tuning parameter is enabled, LU partition may move to pair partition automatically according to state of CPU load. In order to disable movement of pair partition, it is necessary to disable load balancing of tuning parameter.
   Do you agree with restarting? (y/n [n]): y
   Are you sure you want to execute? (y/n [n]): y
   ```
A cache partition is added (partition size: 20, segment size: 8 kB, owner controller: 0).

% aucachept -unit array-name -add -ptsize 20 -segsize 8 -ctl0
The reserved cache partition 2 in size 200MB is set up to CTL0.
Do you want to continue processing? (y/n [n]): y
In order to complete the setting, it is necessary to reboot the subsystem.
When not restarting, the setting will be registered, but it will not become effective on the subsystem.
Please execute this command again without restarting, if you want to continue setting of the cache partition.
Do you restart the subsystem? (y/n [n]): y
Host will be unable to access the subsystem while restarting.
Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting begins.
When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
When load balancing of tuning parameter is enabled, LU partition may move to pair automatically according to state of CPU load. In order to disable movement of pair partition, it is necessary to disable load balancing of tuning parameter.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min.
The subsystem restarted successfully.

Deleting a cache partition

To delete the created cache partition, it is required to move the logical unit that has been assigned to the created cache partition to the other partition.

To delete a cache partition:

1. From the command prompt, register the array in which you want to set Cache Partition Manager and connect to the array.
2. Execute the aucachept command to delete the created cache partition. See following example.

% aucachept -unit array-name -rm -pt 2
The cache partition 2 is deleted.
Do you want to continue processing? (y/n [n]): y
The pair cache partition may be changed into "Auto". Please confirm pair cache partition after reboot.
Do you want to continue processing? (y/n [n]): y
In order to complete the deleting, it is necessary to reboot the subsystem.
When not restarting, the deleting will be registered, but it will not become effective on the subsystem.
Please execute this command again without restarting, if you want to continue setting of the cache partition.
Do you restart the subsystem? (y/n [n]): y
Host will be unable to access the subsystem while restarting.
Host applications that use the subsystem will terminate abnormally. Please
stop
host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting
begins.
When using Remote Replication, restarting the remote subsystem will cause
both Remote Replication paths to fail.
Remote Replication pair status will be changed to "Failure(PSUE)" when pair
status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication
pair status to "Split(PSUS)" before restart.
When load balancing of tuning parameter is enabled, LU partition may move to
pair partition automatically according to state of CPU load. In order to disable
movement of pair partition, it is necessary to disable load balancing of tuning parame
parameter.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min.
The subsystem restarted successfully.

Assigning a cache partition

If you do not assign an LU to a specified cache partition, it will be assigned
to the master partition.

To assign a cache partition:
1. From the command prompt, register the array in which you want to set
   Cache Partition Manager, and connect to the array.
2. Execute the aulucachept command to assign the cache memory. First, verify the status.

   % aulucachept -unit array-name -refer
   Cache Partition Pair Cache Current Cache
   LUN   Partition Partition   Partition
   0     0       Auto 0
   1     0       Auto 0
   :     :       :     :
   50    0       Auto 0
   :     :       :     :
   %

   Following shows logical unit 50 is assigned to cache partition 2.

   % aulucachept -unit array-name -set -lu 50 -pt 2
   Are you sure you want to assign the cache partition? (y/n [n]): y
   The pair cache partition may be changed into "Auto". Please confirm pair cache
   partition after reboot.
   Do you want to continue processing? (y/n [n]): y
   In order to complete the setting, it is necessary to reboot the subsystem. When not restarting, the setting will be registered, but it will not become effective on the subsystem.
   Do you restart the subsystem? (y/n [n]): y
   Host will be unable to access the subsystem while restarting.
   Host applications that use the subsystem will terminate abnormally. Please stop
   host access before you restart the subsystem.
   Also, if you are logging in, the login status will be canceled when restarting
   begins.
   When using Remote Replication, restarting the remote subsystem will cause
   both Remote Replication paths to fail.
   Remote Replication pair status will be changed to "Failure(PSUE)" when pair
   status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication
   pair status to "Split(PSUS)" before restart.
When load balancing of tuning parameter is enabled, LU partition may move to
pair partition automatically according to state of CPU load. In order to disable
movement of pair partition, it is necessary to disable load balancing of tuning parame
ter.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min.
The subsystem restarted successfully.

Assigning a cache partition

If you do not assign an LU to a specified cache partition, it will be assigned
to the master partition.

To assign a cache partition:
1. From the command prompt, register the array in which you want to set
   Cache Partition Manager, and connect to the array.
2. Execute the aulucachept command to assign the cache memory. First, verify the status.

   % aulucachept -unit array-name -refer
   Cache Partition Pair Cache Current Cache
   LUN   Partition Partition   Partition
   0     0       Auto 0
   1     0       Auto 0
   :     :       :     :
   50    0       Auto 0
   :     :       :     :
   %

   Following shows logical unit 50 is assigned to cache partition 2.

   % aulucachept -unit array-name -set -lu 50 -pt 2
   Are you sure you want to assign the cache partition? (y/n [n]): y
   The pair cache partition may be changed into "Auto". Please confirm pair cache
   partition after reboot.
   Do you want to continue processing? (y/n [n]): y
   In order to complete the setting, it is necessary to reboot the subsystem. When not restarting, the setting will be registered, but it will not become effective on the subsystem.
   Do you restart the subsystem? (y/n [n]): y
   Host will be unable to access the subsystem while restarting.
   Host applications that use the subsystem will terminate abnormally. Please stop
   host access before you restart the subsystem.
   Also, if you are logging in, the login status will be canceled when restarting
   begins.
   When using Remote Replication, restarting the remote subsystem will cause
   both Remote Replication paths to fail.
   Remote Replication pair status will be changed to "Failure(PSUE)" when pair
   status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication
   pair status to "Split(PSUS)" before restart.
When load balancing of tuning parameter is enabled, LU partition may move to
pair partition automatically according to state of CPU load. In order to disable
movement of pair partition, it is necessary to disable load balancing of tuning parameter.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min.
The subsystem restarted successfully.
us is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
When load balancing of tuning parameter is enabled, LU partition may move to pair partition automatically according to state of CPU load. In order to disable movement of pair partition, it is necessary to disable load balancing of tuning parameter.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min. The subsystem restarted successfully.
Setting a pair cache partition

Use the pair cache partition in the “Auto” mode. We recommend you set the Load Balancing to Disable when using Cache Partition Manager. However, set the pair cache partition only when you use Cache Partition Manager when Load Balancing is set to Enable and want to specify the partition to be changed with Load Balancing. The owner controller must be different for the partition to which the logical unit belongs and the pair cache partition.

To set a pair cache partition, complete the following steps:

1. From the command prompt, register the array in which you want to set Cache Partition Manager and connect to the array.
2. Execute the `aulucachept` command to set the pair cache partition.

   ```
   % aulucachept -unit array-name -set -lu 50 -pairpt auto
   Are you sure you want to register the pair cache partition assignment?
   (y/n [n]): y
   The pair cache partition assignment has been changed successfully.
   ```

Changing the cache partition owner controller

To change the cache partition owner controller:

1. From the command prompt, register the array in which you want to set Cache Partition Manager and connect to the array.
2. Execute the `aucachept` command to change the cache partition owner controller. See following example.

   ```
   % aucachept -unit array-name -chg -pt 2 -ctl1
   The cache partition 2 is changed into CTL1.
   Do you want to continue processing? (y/n [n]): y
   The pair cache partition may be changed into “Auto”. Please confirm pair cache partition after reboot.
   Do you want to continue processing? (y/n [n]): y
   In order to complete the changing, it is necessary to reboot the subsystem.
   When not restarting, the changing will be registered, but it will not become effective on the subsystem.
   Please execute this command again without restarting, if you want to continue setting the cache partition.
   Do you restart the subsystem? (y/n [n]): y
   Host will be unable to access the subsystem while restarting.
   Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
   Also, if you are logging in, the login status will be canceled when restarting begins.
   When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail.
   Remote Replication pair status will be changed to “Failure(PSUE)” when pair status is “Paired(PAIR)” or “Synchronizing(COPY)”. Please change Remote Replication pair status to “Split(PSUS)” before restart.
   When load balancing of tuning parameter is enabled, LU partition may move to pair partition automatically according to state of CPU load. In order to disable movement of pair partition, it is necessary to disable load balancing of tuning parameter.
   Do you agree with restarting? (y/n [n]): y
   Are you sure you want to execute? (y/n [n]): y
   Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min.
   The subsystem restarted successfully.
   ```
Cache Residency Manager

This section includes the following:

- Installing
- Enabling or disabling
- Operations of cache residency manager

Installing

The Cache Residency Manager feature is usually not selectable (locked). To make the Cache Residency Manager available, you must install the Cache Residency Manager feature and make its functions selectable (unlocked). **To install this function, the key code or key file provided with the optional feature is required.**

Cache Residency Manager is installed and uninstalled using Storage Navigator Modular 2. Before installing and uninstalling, make sure that the array is in normal operating condition. If a failure such as a controller blockade has occurred, installation and un-installation operations cannot be performed.

To install the Cache Residency Manager using the CLI version of Storage Navigator Modular 2:

1. From the command prompt, register the array in which you will install the Cache Residency Manager feature and connect to the array.
2. Install the optional features by using the following:

```
% auopt -unit array-name -lock off -keycode manual-attached-keycode
```

Are you sure you want to install the option? (y/n [n]): y

Cache Partition Manager is enabled. If the option using data pool will be unlocked or enabled, the default cache partition information will be restored.

Do you want to continue processing? (y/n [n]): y

The option is unlocked.

In order to complete the setting, it is necessary to reboot the subsystem. Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.

Also, if you are logging in, the login status will be canceled when restarting begins.

When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail. Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.

Are you sure you want to execute? (y/n [n]): y

Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min. The subsystem restarted successfully.

```
% auopt -unit array-name -refer
Option Name  Type   Term   Status
Reconfigure Memory Status   N/A
CACHERESIDENCYPermanent   ---   Enable
```

CLI-based storage feature tasks
Uninstalling

To uninstall Cache Residency Manager using the CLI version of Storage Navigator Modular 2:

1. From the command prompt, register the array in which you will uninstall Cache Residency Manager and connect to the array.

2. Lock the optional features by using the following:

```sh
% auopt -unit array-name -lock on -keycode manual-attached-keycode
Are you sure you want to de-install the option? (y/n [n]): y
The option is de-installed successfully.
In order to complete the setting, it is necessary to reboot the subsystem.
Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting begins.
When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail. Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.
Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min.
The subsystem restarted successfully.
```

Enabling or disabling

Cache Residency Manager can be enabled or disabled without uninstalling this function.

To enable or disable Cache Residency Manager (without uninstalling this function) using the CLI version of Storage Navigator Modular 2:

1. From the command prompt, register the array in which you will change the status of the Cache Residency Manager feature and connect to the array.

2. Execute the `auopt` command to change the status (enable or disable) of the Cache Residency Manager feature.

The following example shows how to change the status from enable to disable. To change the status from disable to enable, enter `enable` after the `--st` option.

```sh
% auopt -unit array-name -option CACHERESIDENCY -st disable
Are you sure you want to disable the option? (y/n [n]): y
The option has been set successfully.
In order to complete the setting, it is necessary to reboot the subsystem.
Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem.
Also, if you are logging in, the login status will be canceled when restarting begins.
```
When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail. Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.

Do you agree with restarting? (y/n [n]): y
Are you sure you want to execute? (y/n [n]): y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min. The subsystem restarted successfully.

% auopt -unit array-name -refer
Option Name Type Term Status
Reconfigure Memory Status --- Disable N/A
%

Operations of cache residency manager

You can set an LU using Storage Navigator Modular 2 by installing the Cache Residency Manager function. The LU that is set for the Cache Residency Manager function must be previously defined. If the LU is not defined, define the LU (choose an LU that already exists and that you would like to be a Cache Residency Manager LU). Confirm that the conditions required for Cache Residency Manager operations are present before performing the operation (refer to the Storage Navigator Modular 2 online Help.).

1. From the command prompt, register the array in which you want to set Cache Residency Manager and connect to the array.

2. Execute the auturbolu command to specify the array.

% auturbolu -unit array-name -set -ctl1 assign enable -ctl1 _lu 0
Are you sure you want to set the Cache Residency information? [y/n [n]]: y
In order to complete the setting, it is necessary to reboot the subsystem. When not restarting, the setting will be registered, but it will not become effective on the subsystem.
Do you restart the subsystem? [y/n [n]]: y
Host will be unable to access the subsystem while restarting. Host applications that use the subsystem will terminate abnormally. Please stop host access before you restart the subsystem. Also, if you are logging in, the login status will be canceled when restarting begins.

When using Remote Replication, restarting the remote subsystem will cause both Remote Replication paths to fail. Remote Replication pair status will be changed to "Failure(PSUE)" when pair status is "Paired(PAIR)" or "Synchronizing(COPY)". Please change Remote Replication pair status to "Split(PSUS)" before restart.

Do you agree with restarting? [y/n [n]]: y
Are you sure you want to execute? [y/n [n]]: y
Now restarting the subsystem. Start Time hh:mm:ss Time Required 7 - 25min. The subsystem restarted successfully.

Specify as shown in the following example. Check the information that has been set.

% auturbolu -unit array-name -refer
Controller 0
Current Configuration
Assignment : off
LUN :
Data Retention Utility

This section includes the following:

- Installing
- Enabling or disabling
- Setting an attribute
- Setting an S-VOL
- Setting the expiration lock

Installing

The Data Retention Utility option is usually not selectable (locked). To make this option available, you must install Data Retention Utility and make its functions selectable (unlocked). To install this function, use the key code or key file provided with the optional feature.

Data Retention Utility is installed and uninstalled through Storage Navigator Modular 2 (CLI).

To install this function, the key code or key file provided with this optional feature is required.

NOTE: Before installing/uninstalling Data Retention Utility, verify that the array unit to be operated is functioning normally. If a failure such as a controller blockage has occurred, installation/un-installation cannot be performed.

To install Data Retention Utility using the CLI version of Storage Navigator Modular 2:

1. From the command prompt, register the array in which the Data Retention Utility feature is to be installed. Connect to the array.

2. Install the optional features by executing the auopt command as follows:

Cache Partition Manager is enabled

% auopt -unit array-name -lock off -keycode Key code
Are you sure you want to install the option?
(y/n [n]): y
When Cache Partition Manager is enabled, if the option using data pool will be unlocked or enabled the default cache partition information will be restored.

Do you want to continue processing? (y/n [n]): y

The option is unlocked.

% auopt -unit array-name -refer
Option Name Type Term Status
Reconfigure Memory Status
DATA-RETENTION Permanent --- Enable N/A
%

Uninstalling

When the Data Retention Utility feature is uninstalled, the Data Retention Utility feature is not available (locked) until it is installed by the key code or key file.

NOTE: Before installing/uninstalling Data Retention Utility, verify that the array unit to be operated is functioning normally. If a failure such as a controller blockage has occurred, installation/uninstallation cannot be performed.

To uninstall Data Retention Utility, use the key code provided with the optional feature.

Data Retention Utility is installed and uninstalled through Storage Navigator Modular 2.

To uninstall Data Retention Utility using the CLI version of Storage Navigator Modular 2:

1. From the command prompt, register the array in which Data Retention Utility is to be uninstalled, then connect to the array.

2. Uninstall the optional features by executing the auopt command as follows:

   % auopt -unit array-name -lock on -keycode Key code
   Are you sure you want to de-install the option? (y/n [n]): y
   The option is de-installed successfully.
%

   % auopt -unit array-name -refer
   DMBCD02015: No information displayed.
%

Enabling or disabling

Data Retention Utility can be set to enable or disable after installation. This allows Data Retention Utility to be activated or deactivated without the necessity of using the key code or key file.

NOTE: When disabling or uninstalling this Data Retention Utility feature, LU attributes that have been set must be returned to the initial attribute (Read/Write).
To enable/disable Data Retention Utility using the CLI version of Storage Navigator Modular 2:

1. From the command prompt, register the array (array unit) in which the status of the Data Retention Utility is to be changed, then connect to the array.
2. Execute the `auopt` command to change the status (enable or disable) of the Data Retention Utility feature.

The following is an example of how to change the status from enable to disable. To change the status from disable to enable, enter `enable` after the `-st` option.

```plaintext
% auopt -unit array-name -option DATA-RETENTION -st disable
Are you sure you want to disable the option? (y/n [n]): y
The option has been set successfully.
%
% auopt -unit array-name -refer
Option Name Type      Term    Status
Reconfigure Memory Status                      ---       Disable
DATA-RETENTIONPermanent                      Permanent Disable
N/A
%
```

### Setting an attribute

To set an attribute:

1. From the command prompt, register the array to which you want to set the attribute of the Data Retention Utility feature, then **connect to the array**.

   Execute the `auluguard` command to set the attribute of the Data Retention Utility feature.

   An example, in which an attribute type of the LU 1 is changed from Read/Write (default attribute) to Read/Write Inhibition (Protected), is shown here. Specify it as the `-term` option on years (0 to 60) and days (0 to 21,900).

   ```plaintext
   % auluguard -unit array-name -set -lu 1 -attr Protect -term 0 0
   Are you sure you want to change the access level of logical unit? (y/n [n]): y
   When setting starts, the subsystem stops accepting access to the logical unit from the host. Do you want to continue processing? (y/n [n]): y
   The access level of logical unit has been successfully changed.
   %
   ```

   When setting the attribute as Read Only, specify `-attr Read-Only`; when setting the attribute as Read/Write, specify `-attr Read Write`.

2. Execute the `auluguard` command to confirm whether an attribute has been set.

   ```plaintext
   % auluguard -unit array-name -refer
   Expiration Lock = OFF
   LUN Attribute    Capacity   S-VOL     Retention Term   Mode
   0 Can't Guard     1.0 GB  ---       ---              ---
   1 Protect         2.0 MB  Disable   0 days           ---
   2 Read/Write      2.0 MB  Enable    ---              ---
   %
   **LUN:** LU number is displayed.
   ```
**Attribute:** Attribute (Read/Write, Read Only, Protect, or Can't Guard) is displayed.

**Capacity:** Capacity of the LU is displayed.

**S-VOL:** Whether the LU can be set to S-VOL (Enable) or is inhibited from being set to S-VOL (Disable) is displayed.

**Mode:** Mode (Read Capacity 0 (Zero), hiding from Inquiry Command Mode (Zer/Inv), or un-specifying (---)) is displayed. (For reference only.)

**Retention:** The length of time for retention (Unlimited or ---) is displayed.

---

**NOTE:** When Read only or Protect is set as the attribute, S-VOL will be disabled.

### Setting an S-VOL

The following steps describe the procedure to set an S-VOL:

1. From the command prompt, register the array to which you want to set the attribute of the Data Retention Utility feature, then **connect to the array**.
2. Execute the `auluguard` command to set the attribute of the Data Retention Utility feature.
3. An example in which the LU 2 is made unable to be assigned to an S-VOL is shown here.

   ```
   % auluguard -unit array-name -set -lu 2 -svol disable
   Are you sure you want to change the access level of logical unit?
   (y/n [n]); y
   When setting starts, the subsystem stops accepting access to the logical unit from the host.
   Before setting, stop access to the logical unit from the host.
   Do you want to continue processing? (y/n [n]); y
   The access level of logical unit has been successfully changed. %
   ```

   When setting up so that it can be specified as an S-VOL, it is specified `-svol enable`.

4. Execute the `auluguard` command to confirm whether an attribute has been set. An example is shown below.

   ```
   % auluguard -unit array-name -refer
   Expiration Lock = OFF
   LUN  Attribute    Capacity   S-VOL     Retention Term   Mode
   0  Can't Guard     1.0 GB  ---       ---              ---
   1  Read/Write      2.0 MB  Disable   0 days           ---
   2  Read/Write      2.0 MB  Disable   ---              ---
   %
   ```

### Setting S-VOL Disable

The following steps describe the procedure to set S-VOL Disable:
1. From the command prompt, register the array to which you want to set the attribute of the Data Retention Utility feature, then connect to the array.

2. Execute the `auluguard` command to set the attribute of the Data Retention Utility feature.

   An example in which a volume (LU) 2 is made unable to be assigned to an S-VOL is shown here.

   ```
   % auluguard -unit array-name -set -lu 2 -svol disable
   Are you sure you want to change the access level of logical unit? (y/n [n]): y
   When setting starts, the subsystem stops accepting access to the logical unit from the host.
   Before setting, stop access to the logical unit from the host.
   Do you want to continue processing? (y/n [n]): y
   The access level of logical unit has been successfully changed.
   %
   ```

   To set up the volume to be specified as an S-VOL, specify `-svol enable`.

3. Execute the `auluguard` command to confirm whether an attribute has been set. An example is shown below.

   ```
   % auluguard -unit array-name -refer
   Expiration Lock = OFF
   LUN  Attribute    Capacity   S-VOL    Retention Term   Mode
   0  Can't Guard     1.0 GB  ---      ---              ---
   1  Read/Write      2.0 MB  Disable  0 days           ---
   2  Read/Write      2.0 MB  Disable  ---              ---
   %
   ```

Changing the retention term

**NOTE:** Data Retention Utility cannot shorten the Retention Term.

To change the retention term:

1. From the command prompt, register the array in which you will set the Data Retention Utility attribute. **Connect to the array.**

2. Execute the `auluguard` command to set the Data Retention Utility attribute.

3. The following is an example of changing the LU 1 retention term. Specify it as the `-term` option on years (0 to 60) and days (0 to 21,900).

   ```
   % auluguard -unit array-name -set -lu 1 -term 0 1
   Are you sure you want to change the retention term of logical unit? (y/n [n]): y
   The retention term of logical unit has been successfully changed.
   %
   ```

4. Execute the `auluguard` command to confirm that an attribute has been set. An example is shown below.

   ```
   % auluguard -unit array-name -refer
   Expiration Lock = OFF
   LUN  Attribute    Capacity   S-VOL    Retention Term   Mode
   0  Can't Guard     1.0 GB  ---      ---              ---
   1  Protect         2.0 MB  Disable  0 days           ---
   2  Read/Write      2.0 MB  Disable  1 days           ---
   %
   ```
Setting the expiration lock

To set the expiration lock:

1. From the command prompt, register the array in which you will set the Data Retention Utility attribute. **Connect to the array.**

2. Execute the `auluguard` command to set the Data Retention Utility attribute.

   ```bash
   % auluguard -unit array-name -set -exlock on
   Are you sure you want to set the expiration lock to ON?
   (y/n [n]): y
   If the expiration lock is set to ON, you cannot change access level of the logical unit to Read/Write after the retention term expires. Are you sure?
   (y/n [n]): y
   The expiration lock has been set successfully.
   %
   
   Execute the `auluguard` command to confirm that an attribute has been set. An example is shown below.

   ```bash
   % auluguard -unit array-name -refer
   Expiration Lock = ON
   LUN  Attribute    Capacity   S-VOL    Retention Term   Mode
   0  Can't Guard     1.0 GB  ---      ---              ---
   1  Protect         2.0 MB  Disable  1 days           ---
   2  Read/Write      2.0 MB  Disable  ---              ---
   %
   ```
LUN Manager (Fibre Channel)

When following the command-line examples in this appendix, be sure to replace the parameters shown with the correct parameters for your systems.

This section includes the following:

- Installing
- Enabling or disabling
- Creating a host group
- Setting a host group option
- Setting logical units (LU mapping)
- Adding a WWN
- Changing a WWN when an HBA is Replaced
- Initializing the host group 0
- Changing a WWN nickname
- Deleting a detected WWN

Installing

The LUN Manager option is usually not selected (locked). To make this option available, you must install LUN Manager and make its functions selectable (unlocked). To install this function, use the required key code or key file provided with the optional feature.

LUN Manager is installed and uninstalled through Storage Navigator Modular 2. Before installing and uninstalling, make sure that the array is in normal operating condition. If a failure such as a controller blockade has occurred, installation and un-installation operations cannot be performed.

To install the LUN Manager feature using the CLI version of Storage Navigator Modular 2:

1. From the command prompt, register the array in which you will install the LUN Manager feature. Connect to the array.
2. Install the optional features by executing the auopt command as follows:

```bash
% auopt -unit array-name -lock off -keycode manual-attached-keycode
Are you sure you want to install the option?
(y/n [n]): y
The option is unlocked successfully.
%

% auopt -unit array-name -refer
Option Name  Type     Term      Status
LUN-MANAGER Permanent ---      Enable
N/A
```

A–82 CLI-based storage feature tasks
Uninstalling

To uninstall LUN Manager, use the key code provided. After uninstalling LUN Manager, the software is locked and not available until it is installed by a key code or key file. When disabling or uninstalling LUN Manager, you must first disable the host group security for all ports.

LUN Manager is installed and uninstalled through Storage Navigator Modular 2.

To uninstall LUN Manager using the CLI version of Storage Navigator Modular 2:

1. From the command prompt, register the array in which you will uninstall the LUN Manager feature and connect to the array.

2. Uninstall the optional features by executing the `auopt` command as follows:

   ```
   % auopt --unit array-name --lock on --keycode manual-attached-keycode
   Are you sure you want to de-install the option?
   (y/n [n]): y
   The option is unlocked successfully.
   %
   
   % auopt -unit array-name -refer
   DMEC002015: No information displayed.
   %
   ```

Enabling or disabling

LUN Manager can be set to enable or disable after installation. This allows LUN Manager to be activated or deactivated without using a key code or key file. When disabling or uninstalling this LUN Manager feature, you must disable the host group security for all ports.

To enable/disable LUN Manager using the CLI version of Storage Navigator Modular 2:

1. From the command prompt, register the array in which you will change the status of the LUN Manager feature and connect to the array.

2. Execute the `auopt` command to change the status (enable or disable) of the LUN Manager feature.

The following is an example of how to change the status from enable to disable. To change the status from disable to enable, enter `enable` after the `-st` option.

   ```
   % auopt -unit array-name -option LUN-MANAGER -st disable
   Are you sure you want to disable the option?
   (y/n [n]): y
   The option has been set successfully.
   %
   
   % auopt -unit array-name -refer
   Option Name  Type    Term    Status
   Reconfigure Memory Status
   LUN-MANAGER  Permanent ---    Disable
   N/A
   %
   ```
Adding a host group

To create a host group for each port, you must:
1. Set the host group security to enable for each port
2. Create a host group

Setting the host group security

The host group default setting is disable for each port.

To set the host group Security to be valid or invalid:
1. From the command prompt, register the array in which you want to set the host group security information and connect to the array.
2. Execute the auhgwwn command to specify the array.
3. Use the following settings:
   - Array name: HUS
   - Controller: 0
   - Port: A

Use off with -hgs option, when disabled LUN Manager is changed.

```bash
$ auhgwwn - unit hus100 - set - hgs 0 A on
Are you sure you want to enable the host group security on port 0A?
(y/n [n]): y
When setting starts, the subsystem stops accepting access to the port from the host.
Before setting, stop access to the port from the host.
Do you want to continue processing? (y/n [n]): y
The security information has been set successfully.
```

Specify as shown, when the checking information has been set:

```bash
$ auhgwwn - unit hus100 - refer
Port 0A Host Group Security ON
  Detected WNN
  Name
  Assigned WNN Name
  Assigned WNN Name
  Assigned WNN Name
Port 0B Host Group Security OFF
Port 1A Host Group Security OFF
Port 1B Host Group Security OFF
```

Creating a host group

To create host groups for each Port:
1. From the command prompt, register the array in which you want to set the host group information and connect to the array.
2. Execute the auhgdef command to specify the array.
3. Use the following settings:
   - Array name: ams2300
   - Controller: 0
   - Port: A
• Host group number: 1
• Host group name: win001

% auhdef -unit ams2300 -add 0 A -gno 1 -gname win001
Host group information has been set successfully.
%

4. Specify as shown, when setting the following information:

% auhdef -unit ams2300 -refer
Port 0A
  Group  Host Group Name
  0  G000
  1  win001
Port 0B
  Group  Host Group Name
  0  G000
Port 1A
  Group  Host Group Name
  0  G000
Port 1B
  Group  Host Group Name
  0  G000
%

**Setting a host group option**

**To set a host group option for each host group:**

1. From the command prompt, register the array in which you want to set the host group option information and connect to the array.
2. Execute the `auhgopt` command to specify the array. Use the following settings:
   • Array name: HUS100
   • Controller: 0
   • Port: A
   • Host group number: 1
   • Host Connection Mode 1: Standard
   • Host Connection Mode 2: HP-UX Mode

% auhgopt -unit ams2300 -set 0 A -gno 1 -HostConnection standard -HP enable
Are you sure you want to set the host group option? {y/n [n]}: y
When setting starts, the subsystem stops accepting access to the host group from the host.
Before setting, stop access to the host group from the host.
Do you want to continue processing? {y/n [n]}: y
The host group option has been set successfully.
%

**Setting logical units (LU mapping)**

**To set Logical Units to be recognized by each host to each host group:**

1. From the command prompt, register the array in which you want to set the logical unit mapping information and connect to the array.
2. Execute the `auhgmapp` command to specify the array.
3. Use the following settings:
- Array name: HUS100
- Controller: 0
- Port: A
- Host group number: 1
- Logical unit to be recognized by the host: 0
- Array
- internal logical unit: 0

```
% auhkgmap -unit hus100 -add 0 A 1 0 0
Are you sure you want to add the mapping information?
[y/n] [n]: y
The mapping information has been set successfully.
```

5. Specify as shown, when setting the following information:

```
% auhkgmap -unit hus100 -refer
Mapping mode = ON
Port Group H-LUN LUN
0A 001:win001 0 0
%
```

### Adding a WWN

Set the WWN of the HBA which allows the access per host group.

When the port is not connected to the host (HBA), enter the WWN (port name) and set it. Refer to section below, **Adding WWNs**.

Also, when the port is connected to the host (HBA) and the WWN of the host (HBA) is listed on the Assignable WWN, specify the WWN (port name) and assign it. Refer to the section below, **Selecting and adding an assignable WWN on page A-87**.

### Adding WWNs

The WWNs of HBAs are set to each host group (see following section, **Adding a WWN**).

When a Port is connected to a host, WWNs of HBAs that are listed in **Detected WWN** can be selected and added to the host group (see **Selecting and adding an assignable WWN on page A-87**).

#### To add a WWN:

1. From the command prompt, register the array in which you want to set the WWN information and connect to the array.
2. Execute the
3. `auhgwwn` command to specify the array.
4. Use the following settings:
   - Array name: HUS100
   - Controller: 0
   - Port: A
   - Host group number: 1
- Host information (port name): 200000e069402a08
- WWN nickname: win001

```
% auhgwwn -unit ams2300 -set -permhg 0 A 200000e069402a08 -wname win001
-gno 1
The security information has been set successfully.
```

5. Specify the following information:

```
% auhgwwn -unit hus100 -refer
Port  0A  Host Group Security  ON
Detected WWN
Name                  Port Name
Assigned WWN
Name                  Port Name                  Host Group
win001                      200000E069402A08   001:win001
Assignable WWN
Name                  Port Name
Port  0B  Host Group Security  OFF
Port  1A  Host Group Security  OFF
Port  1B  Host Group Security  OFF
```

Selecting and adding an assignable WWN

To display the Assignable WWN (port name) list and to assign the WWN on the Assignable WWN (port name) list:

1. From the command prompt, register the array in which you want to set the WWN information and connect to the array.
2. Execute the auhgwwn command to specify the array. Use the following settings:
   - Array name: HUS100
   - Controller: 0
   - Port: A
   - Host group number: 0

After assigning the WWN (port name) to the host group, refer to Changing a WWN nickname on page A-91 to set a nickname (name) to the WWN (port name).

```
% auhgwwn -unit hus100 -refer -permhg 0 A -gno 0
Port  0A  Host Group Security  ON
Assigned WWN
Name                  Port Name
Assigned WWN
Name                  Port Name                  Host Group
 assignable WWN
Name                  Port Name
Port  0B  Host Group Security  OFF
Port  1A  Host Group Security  OFF
Port  1B  Host Group Security  OFF
```

Changing a WWN when an HBA is Replaced

To change the WWN and/or the nickname of an HBA:
1. Confirm the WWN of a new HBA. If the WWN is not described, confirm it with step 7.
2. Confirm the WWN of the HBA before performing a replacement.
3. Shut down the host server.
4. Replace the HBA.
5. Connect the fibre channel switch or the port of the array to the HBA with the fibre cable.
6. Start the host (server).
7. If the WWN of the new HBA not confirmed in the first step, confirm the WWN here.
8. Specify the name of the storage system connected to the new HBA and refer to the information on the host group (controller number, port number, and host group number) in which the WWN of the HBA before replacement is registered.
9. Specify the WWN of the HBA before replacement and cancel the assignment to the host group.
10. Check that the WWN was moved from the Assigned WWN to the Assignable WWN before the replacement procedure.
11. Check that the host group number of the WWN of the HBA before replacement is not displayed.

NOTE: When the selected WWN is assigned to the host group, you cannot cancel the WWN. When the selected WWN is listed on the Assigned WWN, specify the name of the array connected to the new HBA as detailed in Step 8.

```
% auhgwwn -unit df850 -refer -permhg 0 A -gno 1
Port 0A Host Group Security ON
Assigned WWN
   Name          Port Name          Host Group
   win001       1000000000C9290680   001:G001
Assignable WWN
   Name          Port Name
   win001       200000E069402A08
%
% auhgwwn -unit df850 -rm -permhg 0 A 1000000000C9290680 -gno 1
The security information has been set successfully.
%
% auhgwwn -unit df850 -refer -permhg 0 A -gno 1
Port 0A Host Group Security ON
Assigned WWN
   Name          Port Name          Host Group
   win001       1000000000C9290680   001:G001
Assignable WWN
   Name          Port Name
   win001       200000E069402A08
%
```

12. Specify the WWN of the HBA before replacing it and delete it from the port.

```
% auhgwwn -unit df850 -refer -login 0 A
Port 0A Host Group Security ON
Detected WWN
```
13. Refer to the information on the host group in units of ports and find the WWN of the new HBA from the list. The WWN of the new HBA is the one that you checked in steps 1 through 7.

NOTE: If you do not find the WWN of the new HBA in the list, add the WWN manually.

14. Specify the name of the storage system connected to the new HBA and add it to the host group (controller number, port number, and host group number) which registers the WWN of the HBA after replacement.

15. Check that the WWN of the new HBA is listed on the Assigned WWN. Also, check that the assigned host group number displays.

16. Rescan the device configuration from the host server and confirm that the host server can recognize the same volume as the one before the HBA replacement.

NOTE: The host server may not be able to recognize the volume only by rescanning the device, depending on the host. In that case, disconnect the fibre channel cable and connect it again.

17. After assigning the WWN of the new HBA to the host group, specify the following when setting a nickname (Name) to the WWN (Port Name).

NOTE: If you do not find the WWN of the new HBA in the list, add the WWN manually.

In this case, the device authentication of the new HBA may not be performed. Reconfirm that the route from the new HBA to the port of the storage system is connected correctly.

% auhgwwn -unit df850 -set -permhg 0 A 2000000E069402A08 ?name win002 -gno 1
The security information has been set successfully.

% auhgwwn -unit df850 -refer -login 0 A
Port 0A Host Group Security ON
Detected WWN
Name                  Port Name
2000000E069402A08

% auhgwwn -unit df850 -rm -perm 0 A 10000000C9290680
Are you sure you want to delete selected WWN? (y/n [n]): y
The security information has been set successfully.

% auhgwwn -unit df850 -refer -login 0 A
Port 0A Host Group Security ON
Assigned WWN
Name                  Port Name          Host Group
2000000E069402A08   001:G001

Assignable WWN
Name                  Port Name
%
Changing a host group name

To change a Host Group name:

1. From the command prompt, register the array in which you want to change the host group name and connect to the array.
2. Execute the `aughdef` command to specify the array.
3. Use the following settings:
   - Array name: HUS100
   - Controller: 0
   - Port: A
   - Host group number: 1
   - New host group name: win00

   ```
   $ aughdef -unit hus100 -chg 0 A -gno 1 -newgname win00
   Are you sure you want to change the name of host group? (y/n [n]): y
   Host group information has been set successfully.
   ```

Deleting a host group

To delete a host group:

1. From the command prompt, register the array in which you want to delete the host group and connect to the array.
2. Execute the `aughdef` command to specify the array. Use the following settings:
   - Array name: HUS100
   - Controller: 0
   - Port: A
   - Host group number: 1

   ```
   $ aughdef -unit hus100 -rm 0 A -gno 1
   Are you sure you want to delete specified host group(s)? (y/n [n]): y
   After setting, access from hosts associated with the host group will be denied.
   Do you want to continue processing? (y/n [n]): y
   When setting starts, the subsystem stops accepting access to the host group from the host. Do you want to continue processing? (y/n [n]): y
   Host group information has been set successfully.
   ```

Initializing the host group 0

To initialize the Host Group 0:

```
1. From the command prompt, register the array in which you want to initialize the specified host group 0 and connect to the array.

2. Execute the `auhgdef` command to specify the array. Use the following settings:
   - Array name: HUS100
   - Controller: 0
   - Port: A

   ```
   % auhgdef -unit hus100 -init 0 A
   Are you sure you want to initialize host group 0? (y/n [n]): y
   After setting, access from hosts associated with the host group 0 will be denied. Do you want to continue processing? (y/n [n]): y
   When setting starts, the subsystem stops accepting access to the host group from the host. Do you want to continue processing? (y/n [n]): y
   Host group information has been set successfully.
   
   Changing a WWN nickname
   
   To change a WWN nickname:
   1. From the command prompt, register the array in which you want to change the WWN information and connect to the array.
   2. Execute the `auhgwwn` command to specify the array. Use the following settings:
      - Array name: HUS100
      - Controller: 0
      - Port: A
      - Host group number: 1
      - Host information (port name): 200000e069402a08
      - WWN nick name: winNT01

   ```
   % auhgwwn -unit hus100 -chg -rename 0 A 200000e069402a08 -gno 1 -newwname winNT01
   The security information has been set successfully.
   
   3. Specify as shown when setting the following information:

   ```
   % auhgwwn -unit hus100 -refer
   Port  0A  Host Group Security  ON
   Detected WWN
   Name                  Port Name
   Assigned WWN
   Name                  Port Name  Host Group
   winNT01               200000E069402A08  001:win001
   Assignable WWN
   Name                  Port Name
   Port  0B  Host Group Security  OFF
   Port  1A  Host Group Security  OFF
   Port  1B  Host Group Security  OFF
   
   Deleting a WWN
   
   To delete the WWN on the assigned WWN list:
1. From the command prompt, register the array in which you want to delete the WWN information and connect to the array.

2. Execute the `auhgwwn` command to specify the array. Use the following settings:
   - Array name: HUS100
   - Controller: 0
   - Port: A
   - Host
   - group number: 0
   - Host information (port name): 200000e069402a08

   ```
   % auhgwwn -unit hus100 -rm -permhg 0 A 200000e069402a08 -gno 0
   The security information has been set successfully.
   %
   ```

3. Specify as shown when setting the following information:

   ```
   % auhgwwn -unit hus100 -refer -permhg 0 A -gno 0
   Port  0A  Host Group Security  ON
   Assigned WWN
   Name                              Port Name         Host Group
   Assignable WWN
   Name                              Port Name
   200000E069402A08
   %
   ```

**Deleting a detected WWN**

To display and delete the detected WWN on the detected WWN list:

1. From the command prompt, register the array in which you want to delete the WWN information and connect to the array.

2. Execute the `auhgwwn` command to specify the array.
   - Use the following settings:
   - Array name: HUS100
   - Controller: 0
   - Port: A
   - Host information (port name): 200000e069402a08

   ```
   % auhgwwn -unit hus100 -refer -login 0 A
   Port  0A  Host Group Security  ON
   Detected WWN
   Name                              Port Name
   Linux                             200000E069402A08
   10000000C9290680
   %
   % auhgwwn -unit hus100 -rm -perm 0 A 200000e069402a08
   Are you sure you want to delete selected WWN? (y/n [n]): y
   The security information has been set successfully.
   %
   ```
LUN Manager (iSCSI)

This section includes the following:

- Creating targets
- Setting the target security
- Adding a target
- Setting logical units
- Adding an initiator
- Changing target information
- Deleting a target
- Initializing target 000
- Changing initiator information
- Deleting an initiator
- Adding a CHAP user
- Changing CHAP user information

**NOTE:** When following the command-line examples in this appendix, be sure to replace the parameters shown with the correct parameters for your systems.

### Creating targets

To create a target for each port, you must create a target:

Using LUN Manager, you must connect a port of the array to a host using the switching-hub or connecting the host directly to the port, and then sets a data input/output path between the host and the logical unit. This setting specifies which host can access which logical unit.

To set a data input/output path, the hosts that are authorized to access the logical unit must be classified as a target. That target is then set to the port.

For example, when a Windows® Host (initiator iSCSI Name A) and a Linux Host (initiator iSCSI Name B) are connected to Port A, you must create targets of logical units to be accessed from the Windows® Host (initiator iSCSI Name A) and by the Linux Host (initiator iSCSI Name B).

Set a **Target** option (Host Connection Mode) to the newly created target to confirm the setting.
Setting the target security

The target security default is set to **disable** for each port.

To enable or disable the target security for each port:

1. From the command prompt, register the array in which you want to set the target security information and connect to the array.
2. Execute the `autargetini` command to specify the array. Use the following settings:
   - Array name: **HUS100**
   - Controller: **0**
   - Port: **A**
   - Use `off` with `-tgs` option, when disabled LUN Manager is changed.

   ```%
   auttargetini -unit hus100 -set 0 A -tgs on
   Are you sure you want to enable the target security on port0A?
   (y/n [n]): y
   When setting starts, the subsystem stops accepting access to the port from the host.
   Before setting, stop access to the port from the host.
   Do you want to continue processing? (y/n [n]): y
   The target security has been changed successfully.
   %
   ```

3. Specify when the information has been set:

   ```%
   auttargetini -unit hus100 -refer
   Port 0A Target Security ON Target Name iSCSI Name
   Port 0B Target Security OFF
   Port 1A Target Security OFF
   Port 1B Target Security OFF
   %
   ```

Adding a target

To create targets for each port:

1. From the command prompt, register the array in which you want to set the target information and connect to the array.
2. Execute the `autargetdef` command to specify the array.
3. Use the following settings:
   - Array name: **HUS100**
   - Controller: **0**
   - Port: **A**
   - Target number: **1**
   - Target 1 alias: **win001**
   - Target 1 iSCSI name: **iqn.hus100-1**
   - Authentication Method: **None**
4. Specify the `-talias` option for the tail end.

   ```%
   auttargetdef -unit hus100-add 0 A -tno 1 -iname iqn.hus100-1 -authmethod None -talias win001
   Are you sure want to add the target?
   (y/n [n]): y
   The target has been added successfully.
   %
   ```
5. Specify when the information has been set:

```
% autargetdef -unit hus100 -refer
Port 0A
Target: 000:T000
Authentication: CHAP, None
CHAP Algorithm: MD5
Authentication: Disable
User Name: ---
iSCSI Name: iqn.1994-04.jp.co.hitachi:rsd.d9a.t.00007.0a000
001: win001
Authentication: None
CHAP Algorithm: ---
Authentication: ---
User Name: ---
iSCSI Name: iqn.hus100-1
```

### Setting logical units

The following procedure describes how to set logical units to be recognized by each host to each target. This process is called logical unit mapping.

1. From the command prompt, register the array in which you want to set the logical unit mapping information and connect to the array.
2. Execute the `autargetmap` command to specify the array.
3. Use the following settings:
   - Array name: **HUS100**
   - Controller: 0
   - Port: A
   - Target number: 1
   - Logical unit to be recognized by the host: 0
   - Array internal logical unit: 0

```
% autargetmap -unit hus100 -add 0 A 1 0 0
Are you sure you want to add the mapping information? (y/n [n]): y
The mapping information has been set successfully.
```
4. Specify when the information has been set:

```
% autargetmap -unit hus100 -refer
Mapping Mode = ON
Port Target H-LUN LUN
0A 001:win001 0 0
%```
Adding an initiator

The iSCSI Name of each HBA is set to each target and is used to identify hosts.

When a port is connected to a host, an iSCSI name of an HBA listed in Detected Initiator can be selected and added to the target.

1. From the command prompt, register the array in which you want to set the initiator information and connect to the array.

2. Execute the autargetini command to specify the array. Use the following settings:
   - Array name: HUS100
   - Controller: 0
   - Port: A
   - Target number: 1
   - Initiator name: Linux
   - Initiator iSCSI Name: iqn.1991-05.com

   ```bash
   $autargetini -unit hus100 -add 0 A -tno 1 -iname iqn.1991-05.com -ininame Linux
   Are you sure you want to add the initiator information? (y/n [n]): y
   The initiator information has been added successfully.
   ```

Changing target information

To change target information:

1. From the command prompt, register the array in which you want to change the target information and connect to the array.

2. Execute the autargetdef command to specify the array. Use the following settings:
   - Array name: hus100
   - Controller: 0
   - Port: A
   - Target number: 1
   - New target alias: win002

   ```bash
   $autargetdef -unit hus100 -chg 0 A -tno 1 -newtalias win002
   Are you sure you want to change the target information? (y/n [n]): y
   After setting except Alias, access from hosts associated with the target will be denied.
   Do you want to continue processing? (y/n [n]): y
   When setting starts, the subsystem stops accepting access from its related hosts to the target abnormally.
   Before setting, be sure to stop access from the hosts to the target.
   Do you want to continue processing? (y/n [n]): y
   The target information has been changed successfully.
   ```
Deleting a target

To delete a target:

1. From the command prompt, register the array in which you want to delete the target and connect to the array.
2. Execute the `autargetdef` command to specify the array. Use the following settings:
   - Array name: HUS100
   - Controller: 0
   - Port: A
   - Target number: 1

   ```
   % autargetdef -unit hus100 -rm 0 A -tno 1
   Are you sure you want to delete the target(s)? (y/n [n]): y
   After setting, access from hosts associated with the target will be denied.
   Do you want to continue processing? (y/n [n]): y
   When setting starts, the subsystem stops accepting access from its related hosts
to the target abnormally.
   Do you want to continue processing? (y/n [n]): y
   The target(s) have been deleted successfully.
   %
   ```

Initializing target 000

To initialize Target 000:

1. From the command prompt, register the array in which you want to initialize the specified Target 0 and connect to the array.
2. Execute the `autargetdef` command to specify the array. Use the following settings:
   - Array name: HUS100
   - Controller: 0
   - Port: A

   ```
   % autargetdef -unit hus100 -init 0 A
   Are you sure you want to initialize target 000? (y/n [n]): y
   After setting, access from hosts associated with the target 000 will be denied.
   Do you want to continue processing? (y/n [n]): y
   When setting starts, the subsystem stops accepting access from its related hosts
to the target abnormally.
   Do you want to continue processing? (y/n [n]): y
   The target 000 has been initialized successfully.
   %
   ```

Changing initiator information

To change initiator information:

1. From the command prompt, register the array in which you want to change the initiator information and connect to the array.
2. Execute the `autargetini` command to specify the array. Use the following settings:
   - Array name: **HUS100**
- Controller: 0
- Port: A
- Current Initiator iSCSI Name: Linux
- New Initiator Initiator iSCSI Name: Linux 001

%autargetini -unit hus100 -chg 0 A -iname Linux -newininame Linux001
Are you sure you want to change the initiator information?
(y/n [n]): y
The initiator information has been changed successfully.
%

Deleting an initiator

To delete an initiator:

1. From the command prompt, register the array in which you want to delete the initiator and connect to the array.

2. Execute the autargetini command to specify the array. Use the following settings:
   - Array name: HUS100
   - Controller: 0
   - Port: A
   - Target number: 1
   - Initiator iSCSI name: Linux

%autargetini -unit hus100 -rm 0 A -tno 1 -iname Linux
Are you sure you want to delete the initiator information?
(y/n [n]): y
The initiator information has been deleted successfully.
%

Adding a CHAP user

To add a CHAP user:

1. From the command prompt, register the array in which you want to add the CHAP User and connect to the array.

2. Execute the aucharuser command to specify the array. Use the following settings:
   - Array name: HUS100
   - Controller: 0
   - Port: A
   - Target number: 1
   - CHAP user name: mng001

%aucharuser -unit hus100 -add 0 A -user mng001 -tno 0
Are you sure you want to add the CHAP user information?
(y/n [n]): y
Please input Secret.
Secret: authentication-password
Re-enter Secret: authentication-password
The CHAP user information has been added successfully.
%
Changing CHAP user information

To change CHAP User information:
1. From the command prompt, register the array in which you want to change the CHAP User information and connect to the array.
2. Execute the `auchapuser` command to specify the array. Use the following settings:
   - Array name: **HUS100**
   - Controller: **0**
   - Port: **A**
   - CHAP user name: **mng001**
   - Current assigned target number: **0**
   - New assigned target number: **1**

```
auchapuser -unit hus100 -assign 0 A -user mng001 -tno 1
Are you sure you want to assign the target(s)? (y/n [n]): y
The target(s) have been assigned successfully.
```

Deleting CHAP user

To delete a CHAP user:
1. From the command prompt, register the array in which you want to delete the CHAP User and connect to the array.
2. Execute the `auchapuser` command to specify the array. Use the following settings:
   - Array name: **HUS100**
   - Controller: **0**
   - Port: **A**
   - CHAP user name: **mng001**

```
auchapuser -unit hus100 -rm 0 A -user mng001
Are you sure you want to delete the CHAP user information? (y/n [n]): y
The CHAP user information has been deleted successfully.
```
Modular Volume Migration

This section provides details on using the CLI for the following volume migration tasks:

- Installing
- Enabling or disabling
- Setting the DMLU
- Setting a reserved LU
- Executing Volume Migration
- Changing the copy pace
- Confirming Volume Migration pairs
- Splitting Volume Migration Pairs

Installing

The Volume Migration feature is usually not selected (locked). To make it available, you must install the Volume Migration feature and make its functions selectable (unlocked). To install this function, the key code or key file provided with the optional feature is required.

Before installing and uninstalling, make sure that the array is in normal operating condition. If a failure such as a controller blockade has occurred, installation and un-installation operations cannot be performed.

The following procedure describes how to install Volume Migration using Storage Navigator Modular 2 CLI:

1. From the command prompt, register the array in which you will install the Volume Migration feature. Connect to the array.
2. Install the optional features by using the following:

   The text in gray displays when the Cache Partition Manager is enabled.

   ```
   % auopt -unit array-name -lock off -keycode manual-attached-keycode
   Are you sure you want to install the option?
   (y/n [n]): y
   When Cache Partition Manager is enabled, if the option using data pool will be unlocked the default cache partition information will be restored.
   Do you want to continue processing? (y/n [n]): y
   The option is unlocked successfully.
   
   % auopt -unit array-name -refer
   Option Name     Type      Term     Status
   Reconfigure Memory Status
   VOL-MIGRATION Permanent --- Enable
   N/A
   
   %
   ```

Uninstalling

To uninstall Volume Migration, the key code provided with the optional feature is required. Once uninstalled, Volume Migration cannot be used (locked) until it is again installed using the key code or key file.
The following conditions must be satisfied in order to uninstall Volume Migration. All the Volume Migration pairs must have been released (including the pair whose statuses are Completed or Error). There should be no LUs registered as reserved LUs.

The following procedure describes how to uninstall Volume Migration, using Storage Navigator Modular 2 CLI:

1. From the command prompt, register the array in which you will uninstall the Volume Migration feature. Connect to the array.
2. Uninstall the optional features by using the following:

   % auopt -unit array-name -lock on -keycode manual-attached-keycode
   Are you sure you want to de-install the option?
   (y/n [n]): y
   The option is de-installed successfully.
   %

   % auopt -unit array-name -refer
   DMBC002015: No information displayed.

   %

### Enabling or disabling

Volume Migration can be enabled or disabled without uninstalling this function. The following procedure describes how to enable or disable Volume Migration without uninstalling this function using the CLI version of Storage Navigator Modular 2.

The following conditions must be satisfied in order to disable Volume Migration. All of the Volume Migration pairs must have been released (including the pair whose statuses are Completed or Error). There should be no LUs registered as reserved LUs.

1. From the command prompt, register the array in which you will change the status of the Volume Migration feature. Connect to the array.
2. Execute the auopt command to change the status (enable or disable) of the Volume Migration feature.

   The following example shows how to change the status from enable to disable. To change the status from disable to enable, enter `enable` after the `-st` option.

   % auopt -unit array-name -option VOL-MIGRATION -st disable
   Are you sure you want to disable the option?
   (y/n [n]): y
   The option has been set successfully.
   %

3. Execute the auopt command to verify that the Volume Migration feature status has changed.

   % auopt -unit array-name -refer
   Option Name    Type      Term     Status
   Reconfigure Memory Status
   VOL-MIGRATION Permanent ---    Disable
   N/A

   %
Setting the DMLU

The DMLU (Differential Management Logical Unit) is an exclusive logical unit for storing the differential data during migration and is treated in the same way as the other logical units. The DMLU must be created if it has not been set. However, a logical unit that is set as the DMLU is not recognized by a host (it is hidden).

Set a logical unit with a size of 10 GB minimum as the DMLU. It is recommended that two DMLUs are set with the second one used for mirroring.

To designate DMLUs:
1. From the command prompt, register the array on which you want to create the DMLU and connect to that array.
2. Execute the `audmlu` command to create a DMLU.
   This command first displays LUs that can be assigned as DMLUs and later creates a DMLU.

   ```
   % audmlu -unit array-name -availablelist
   Available Logical Units
   LUN Capacity     RAID Group  DP Pool RAID Level  Type  Status
   0    10.0 GB            0      N/A   5( 4D+1P)  SAS   Normal
   %
   % audmlu -unit array-name -set -lu 0
   Are you sure you want to set the DM-LU? (y/n [n]): y
   The DM-LU has been set successfully.
   %
   ```

3. To release an already set DMLU, specify the `-rm` and `-lu` options in the `audmlu` command.

   ```
   % audmlu -unit array-name -rm -lu 0
   Are you sure you want to release the DM-LU? (y/n [n]): y
   The DM-LU has been released successfully.
   %
   ```

The following restrictions apply when Volume Migration, ShadowImage, or SnapShot, TrueCopy, or TCE pairs exist, or SnapShot data pool is defined, or the remote path of TrueCopy or TCE is defined.

- When two DMLUs are set, only one differential management LU can be released.
- When only one DMLU is set, the DMLU cannot be released.
Setting a reserved LU

**NOTE:** When the mapping mode is disabled, the host cannot access the LU if it has been allocated to the reserved LU. Also when the mapping mode is enabled, the host cannot access the LU if the mapped LU has been allocated to the reserved LU.

**WARNING!** Systems or applications that use the specified LU may terminate abnormally. Ensure that you stop host access to the LU before performing this operation.

To set a reserved LU for Migration:

1. From the command prompt, register the array to which you want to set a reserve LU, and then connect to the array.
2. Execute the `aumvolmigration` command to set a reserve LU.

```bash
% aumvolmigration -unit array-name -availablelist -reservelu
Available Logical Units
LUN Capacity RAID Group DP Pool RAID Level Type Status
0 1.0 GB 0 N/A5 (4D+1P) SAS Normal
1 1.0 GB 0 N/A5 (4D+1P) SAS Normal
2 1.0 GB 0 N/A5 (4D+1P) SAS Normal
3 1.0 GB 0 N/A5 (4D+1P) SAS Normal
10 1.0 GB 1 N/A5 (4D+1P) SAS Normal
11 1.0 GB 1 N/A5 (4D+1P) SAS Normal
12 1.0 GB 1 N/A5 (4D+1P) SAS Normal
13 1.0 GB 1 N/A5 (4D+1P) SAS Normal
%
% aumvolmigration -unit array-name -add -lu 10
Are you sure you want to add the reserve LU? (y/n [n]): y
If the mapping mode is disabled, host will be unable to access. Or if the mapped logical unit will be added to the reserve LU when the mapping mode is enabled, host will be unable to access. Systems or applications that use the specified logical unit will terminate abnormally. Please make sure to stop host access to this logical unit before performing this operation.
Do you want to continue processing? (y/n [n]): y
The reserve LU has been added successfully.
%
```

CLI-based storage feature tasks
Deleting the reserved LU

Be careful when the host recognizes the LU that has been used by Volume Migration. After releasing the Volume Migration pair or canceling Volume Migration, delete the reserve LU or change the LU mapping.

To delete the reserved LU:
1. From the command prompt, register the array to which you want to delete the reserve LU, and then connect to the array.
2. Execute the `aumvolmigration` command to delete the reserve LU.

   ```
   % aumvolmigration -unit array-name -rm -lu 10
   Are you sure you want to delete the reserve LU?
   (y/n [n]): y
   The reserve LU has been deleted successfully.
   %
   ```

Executing Volume Migration

To execute Volume Migration:
1. From the command prompt, register the array to which you want to execute the migration, and then connect to the array.
2. Execute the `aumvolmigration` command to execute the migration.
3. Specify an S-VOL to be set as the reserve LU.

   ```
   % aumvolmigration -unit array-name -availablelist -pvol
   Available Logical Units
   LUN Capacity     RAID Group DP PoolRAID Level  Type Status
   0    1.0 GB     0   N/A5( 4D+1P)   SAS  Normal
   1    1.0 GB     0   N/A5( 4D+1P)   SAS  Normal
   2    1.0 GB     0   N/A5( 4D+1P)   SAS  Normal
   3    1.0 GB     0   N/A5( 4D+1P)   SAS  Normal
   11   1.0 GB     1   N/A5( 4D+1P)   SAS  Normal
   12   1.0 GB     1   N/A5( 4D+1P)   SAS  Normal
   13   1.0 GB     1   N/A5( 4D+1P)   SAS  Normal
   %
   % aumvolmigration -unit array-name -create -pvol 0 -svol 10
   Are you sure you want to create the pair and start the copy?
   (y/n [n]): y
   The copy has been started.
   %
   ```

**NOTE:** Normal is selected for the Copy Pace in standard. If the copying is made in Normal mode when the host I/O load is heavy, the host I/O performance may deteriorate remarkably. Select Slow to prevent the deterioration of the performance. Select Prior only when you want to shorten the time to the completion of the copying in priority to the host I/O performance in the time period when the P-VOL is rarely accessed.

4. Execute the `aumvolmigration` command to display the pair status.

   ```
   % aumvolmigration -unit array-name -refer -pair
   Pair S-VOL Capacity   Owner  Pair Status
   P-VOL S-VOL Capacity Copy Pace Owner  Pair Status
   0    10     1.0 GB     Normal  AMS/WMS        Completed
   %
   ```
Changing the copy pace

For the copy pace to be changed, a pair must be in the Copy or Waiting status. Normal is selected for the Copy Pace in standard. If the copying is made in Normal mode when the host I/O load is heavy, the host I/O performance may deteriorate remarkably. Select Slow to prevent the deterioration of the performance. Select Prior only when you want to shorten the time to the completion of the copying in priority to the host I/O performance in the time period when the P-VOL is rarely accessed.

To change the copy pace:

1. From the command prompt, register the array to which you want to change the copy pace, and then connect to the array.
2. Execute the aumvolmigration command to change the copy pace.

```
% aumvolmigration -unit array-name -chg -pvol 0 -svol 10 -pace slow
Are you sure you want to change the copy pace?
(y/n [n]): y
The copy pace has been changed.
```

Confirming Volume Migration pairs

To confirm the Volume Migration pairs:

1. From the command prompt, register the array to which you want to confirm the volume migration pairs, and then connect to the array.
2. Execute the aumvolmigration command to confirm the volume migration pairs.

```
% aumvolmigration -unit array-name -refer
Reserve LU
Status      LUN  Capacity      RAID Group  DP Pool RAID Level   Type
Reserve     10     1.0 GB              1   N/A  5(4D+1P)  SAS

Pair
P-VOL  S-VOL  Capacity      Copy Pace  Owner    Pair Status
0     10     1.0 GB     Slow        AMS/WMS        Completed
```

Splitting Volume Migration Pairs

A pair can be released if it is in the Completed or Error status. To release the Volume Migration pair:

1. From the command prompt, register the array to which you want to release the volume migration pairs, and then connect to the array.
2. Execute the aumvolmigration command to release the volume migration pairs.

```
% aumvolmigration -unit array-name -split -pvol 0 -svol 10
Are you sure you want to split the pair?
(y/n [n]): y
The pair has been split.
```
## Canceling Volume Migration pairs

A pair can be cancelled if it is in the Copy or Waiting status. The migration cannot be temporarily stopped or resumed once it has been executed. When the migration is canceled and then executed again, Volume Migration copies of all the data again.

To cancel the Volume Migration pairs:

1. From the command prompt, register the array to which you want to cancel the volume migration pairs, and then connect to the array.
2. Execute the `aumvolmigration` command to cancel the volume migration pairs.

   % aumvolmigration -unit array-name -cancel -pvol 0 -svol 10
   Are you sure you want to cancel the copy?
   {y/n [n]}: y
   The copy has been canceled.

## Limitations of Dirty Data Flush Number

The Dirty Data Flush Number is a setting that determines whether to limit the number of process executions for initializing, or *flushing*, the used or, *dirty*, data in the cache to the drive at the same time. This setting is effective when Volume Migration is enabled. If the setting is enabled in an instance when all the LUs in the array are created in the RAID group where the SAS drives in the DP pool are configured with RAID 1 or RAID 1+0, the Dirty Data Flush Number is limited. Also, the Write I/O time increases.

To address these conditions, disable the Dirty Data Flush Number Limit when using Volume Migration. When the Dirty Data Flush Number Limit is enabled in ShadowImage, disable the setting once, and then execute Volume Migration. After completing this task, set the Dirty Data Flush Number Limit to Enabled again.
**SNMP Agent Support Function**

This section describes the basic operation procedures for SNMP Agent Support Function. The following sections are included:

- Installing
- Enabling or disabling
- Registering or referencing SNMP environment information

**Installing**

The SNMP Agent Support Function is usually non-selectable (locked); to make it available, you must install the SNMP Agent Support Function and make its functions selectable (unlocked). To install this function, an option key code or key file provided with the optional feature is required.

The SNMP Agent Support Function is installed and uninstalled using Storage Navigator Modular 2.

1. From the command prompt, register the array in which you will install the SNMP Agent Support Function feature. Connect to the array.

2. Install the optional features by using the following examples:

```bash
% auopt -unit array-name -lock off -keycode manual-attached-keycode
Are you sure you want to install the option?
[y/n [n]]: y
The option is unlocked.
%
```

```bash
% auopt -unit array-name -refer
Option Name  Type       Term     Status
Reconfigure Memory Status    SNMP-AGENT
Permanent  ---      Enable
N/A
%
```

**Uninstalling**

The following steps describe SNMP Agent Support Function un-installation using the CLI version of Storage Navigator Modular 2:

1. From the command prompt, register the array in which you will uninstall the SNMP Agent Support Function feature. Connect to the array.

2. Uninstall the optional features by using the either of the following examples:

```bash
% auopt -unit array-name -refer
Option Name  Type       Term     Status
Reconfigure Memory Status    SNMP-AGENT
Permanent  ---      Enable
N/A
%```
Enabling or disabling

The SNMP Agent Support Function can be enabled or disabled without un-installation. The following instructions describe how to enable or disable it without un-installation using the CLI version of Storage Navigator Modular 2.

1. From the command prompt, register the array in which you will change the SNMP Agent Support Function status. Connect to the array.
2. Execute the `auopt` command to change the status (enable or disable).
3. To change the status from
4. `disable` to `enable`, enter “enable” after the `-st` option, and see the following examples:

```
% auopt -unit array-name -lock on -keycode manual-attached-keycode
Are you sure you want to de-install the option?
(y/n [n]): y
The option is de-installed successfully.
%

% auopt -unit array-name -refer
DMEC002015: No information displayed.
%
```

Registering or referencing SNMP environment information

To register an array in which you want to enable SNMP Agent Support feature:

1. From the command prompt, register the array in which you want to set the SNMP Agent Support Function. Connect to the array.
2. Execute the `ausnmp` command to specify the array.

```
% ausnmp -unit array-name -set -config config.txt -name name.txt
The SNMP environment information has been set successfully.
%
```

To reference an array:

1. From the command prompt, register the array in which you want to set the SNMP Agent Support Function. Connect to the array.
2. Execute the `ausnmp` command to specify the array.

```
% ausnmp -unit array-name -get -config config.txt -name name.txt
Are you sure you want to save the SNMP environment information to the file? (y/n [n]): y
The SNMP environment information has been saved to the file successfully.
%
```
Fibre Channel Option

This section describes the basic operation procedures for the Fibre Channel Option. For a full description of the Fibre Channel option, see the Hitachi Unified Storage User's Guide. The following sections are included:

- Installing
- Uninstalling
- Enabling or Disabling
- Confirming after Installation

Installing

Fibre Channel Option feature is usually un-selectable (locked); to make it available, you must install Fibre Channel Option feature and make its functions selectable (unlocked). To install this function, the key code or key file provided with the optional feature is required.

Follow the instructions below to install Fibre Channel Option feature. Fibre Channel Option is installed and uninstalled using the CLI version of Navigator 2.

NOTE: The following are notes to consider for installing the Fibre Channel option:

- Installing, uninstalling, enabling, and disabling of Fibre Channel Option feature are set for each disk array.
- Before installing and uninstalling, make sure that the disk array is in normal operating condition. If a failure such as a controller blockade has occurred, installation and un-installation operations cannot be performed.

The following instructions describe how to install Fibre Channel Option, using the CLI version of Navigator 2:

1. From the command prompt, register the disk array in which you will install Fibre Channel Option feature. Connect to the disk array.

2. Install the optional feature by using the following:

   % auopt -unit array-name -lock off -keycode manual-attached-keycode
   Are you sure you want to unlock the option? (y/n [n]): y
   The option is unlocked.
   %

   % auopt -unit array-name -refer
   Option Name Type Term Status
   Reconfigure Memory Status
   FC-OPTION Permanent --- Enable
   N/A
   %

   The Fibre Channel Option is installed and the status is “Enable”. Installation of Fibre Channel Option is now complete.
Uninstalling

Follow the instructions below to uninstall Fibre Channel Option. When it is uninstalled, Fibre Channel Option is not available (locked) until it is installed by the key code.

To uninstall Fibre Channel Option, the key code provided with the Fibre Channel Option feature is required. Follow the instructions below to uninstall Fibre Channel Option.

1. From the command prompt, connect the disk array in which you will uninstall Fibre Channel Option feature.

2. Uninstall the optional features by using the following:

   % auopt -unit array-name -lock on -keycode manual-attached-keycode
   Are you sure you want to lock the option? (y/n [n]): y
   When the option to lock is Fibre Channel Option, it becomes unusable from PortA to PortD.
   Please make sure that Fibre Channel Cable is not connected to these ports.
   Do you want to continue processing? (y/n [n]): y
   The option is locked.
   
   % auopt -unit array-name -refer
   DMEC002015: No information displayed.
   %

Enabling or Disabling

Fibre Channel Option feature can be set to Disable or Enable depending on the conditions in which the feature has been installed. The following paragraphs describe a CLI procedure for setting the feature to Disable or Enable while Fibre Channel Option feature stays in an installed state.

1. From the command prompt, connect the disk array in which you will change the status of Fibre Channel Option feature.

2. Execute the auopt command to change the status (enable or disable) of Fibre Channel Option feature.

   The following is an example of how to change the status from enable to disable. To change the status from disable to enable, enter enable after the -st option.

   % auopt -unit array-name -option FC-OPTION -st disable
   Are you sure you want to disable the option? (y/n [n]): y
   After you disable Fibre Channel Option, it becomes unusable from PortA to PortD.
   Please make sure that Fibre Channel Cable is not connected to these ports.
   Do you want to continue processing? (y/n [n]): y
   The option has been set successfully.
   
   %

3. Execute the auopt command to verify that Fibre Channel Option feature status has changed.

   % auopt -unit array-name -refer
   Option Name Type Term Status
   Reconfigure Memory Status
   FC-OPTION Permanent --- Disable
   N/A
   %
Confirming after Installation

To confirm the Host Connectors status:

1. From the command prompt, connect the disk array in which you will display the status of Host Connectors.

2. Execute the `auparts` command to display Host Connectors information. The example is shown below.

```
% auparts -unit disk array-name
Controller
_CTL   Status
 0   Normal
 1   Normal

Cache
_CTL   Slot  Capacity(MB) Status
 0   0     4096  Normal
 1   0     4096  Normal

Interface Board
_CTL   Interface Board Type   Status
 0     1 Fibre Channel  Normal
 1     1 Fibre Channel  Normal

Battery
Battery Status
 0   Normal
 1   Normal

Host Connector
_Port Status
 0A  Normal
 0B  Normal
 0C  Normal
 0D  Normal
 1A  Normal
 1B  Normal
 1C  Normal
 1D  Normal

Fan
  :
  :
  
%```
Power Saving

This section describes the basic operation procedures for Power Saving feature. The following sections are included:

Installing

The Power Saving feature is usually unselectable (locked). To make it available, install the Power Saving feature and make its functions selectable (unlocked). To install this function, the key code or key file provided with the optional feature is required.

Follow the instructions below to install the Power Saving feature. You install the feature using Navigator 2.

```
NOTE: The following are notes to consider for installing the Fibre Channel option:

- Installing, uninstalling, enabling, and disabling of the Power Saving option feature are set for each disk array.
- Before installing and uninstalling, make sure that the disk array is in normal operating condition. If a failure such as a controller blockade has occurred, installation and un-installation operations cannot be performed.
```

The following instructions describe how to install Power Saving, using the CLI version of Navigator 2.

1. From the command prompt, register the disk array in which you will install the Power Saving feature. Connect to the disk array.

2. Install the optional feature by using the following:

   ```
   % auopt -unit array-name -lock off -keycode manual-attached-keycode
   Are you sure you want to unlock the option? (y/n [n]): y
   The option is unlocked.
   %
   ```

   ```
   % auopt -unit array-name -refer
   Option NameType Term Status
   Reconfigure Memory Status
   POWER-SAVING Permanent --- Enable
   N/A
   %
   ```

   Power Saving is installed and the status is Enable. Installation of Power Saving is now complete.

Uninstalling

Follow the instructions below to uninstall Power Saving. When it is uninstalled, Power Saving is not available (locked) until it is installed by the key code or key file.

To uninstall Power Saving, the key code or key file provided with the feature is required.

Follow the instructions below to uninstall Power Saving.
1. From the command prompt, connect the disk array in which you will uninstall the Power Saving feature.

2. Uninstall the optional features by using the following:

```
% auopt -unit array-name -lock -keycode manual-attached-keycode
Are you sure you want to lock the option? (y/n [n]): y
When the option to lock is Fibre Channel Option, it becomes unusable from PortA to PortD.
Please make sure that Fibre Channel Cable is not connected to these ports.
Do you want to continue processing? (y/n [n]): y
The option is locked.
%
```

```
% auopt -unit array-name -refer
DMEC002015: No information displayed.
%
```

### Enabling or Disabling

The Power Saving feature can be set to Disable or Enable, depending on the condition in which the feature has been installed.

The following paragraphs describe a CLI procedure for setting the feature to Disable or Enable while the Power Saving feature stays in an installed state.

1. From the command prompt, connect the disk array in which you will change the status of the Power Saving feature.

2. Execute the `auopt` command to change the status (enable or disable) of the Power Saving feature.

3. The following is an example of how to change the status from Enable to Disable. to change the status from Disable to enable, enter `enable` after the `-st` option.

```
% auopt -unit array-name -option POWER-SAVING -st disable
Are you sure you want to disable the option? (y/n [n]): y
The option has been set successfully.
%
```

4. Execute the `auopt` command to verify that the Power Saving feature status has changed.

```
% auopt -unit array-name -refer
Option Name|Type      | Term     | Status
Reconfigure Memory Status | POWER-SAVING Permanent --- | Disable
N/A
%
```

### Displaying Power Saving information

To display Power Saving information:

From the command prompt, connect the disk array in which you will display the status of Power Saving.
Execute the **aupowersave** command to display Power Saving information. The following example details typical information displayed.

```
% aupowersave –unit disk array-name –refer -lu -fmtext
Power Saving Information of RAID Group
Remaining I/O

RAID Group  Power Saving Status MonitorTime[min.]
1  Normal(Spin Up) N/A
2  Power saving(Spin Down) N/A
3  Power saving(Spin Down Executing) N/A
4  Normal(Command Monitoring) 120

Power Saving Information of Logical Unit
LUN  RAID Group  Power Saving Status
0  0      Normal
1  0      Normal
2  1      Power saving
```

**Specifying Spin Down**

To spin down the RAID Group:

1. From the command prompt, connect the disk array that the Power Saving feature will spin down.
2. Execute the **aupowersave** command to spin down the specified RAID Group. The following example details typical information displayed.

```
% aupowersave –unit array-name –spindown –rg 4
Are you sure you want specified RAID group(s) to spin down? (y/n [n]): y
If you spin down the RAID group(s), logical units will stop accepting access from the host.
Please confirm host is not using logical units.
The RAID group(s) will be spun down.
Are you sure you want to execute? (y/n [n]): y
The spin down of RAID group 4 has been required.
The spin down of RAID group(s) have been required successfully.
```

3. You can specify the **-powersaving** option instead of the **-spindown** option. In addition, you can specify the **-monitortime** option.

```
% aupowersave –unit array-name –powersaving –rg 4 –monitortime 1
Are you sure you want specified RAID group(s) to be Power Saving state? (y/n [n]): y
If you change to Power Saving state the RAID group(s), logical units will stop accepting access from the host.
Please confirm host is not using logical units.
The RAID group(s) will be Power Saving state.
Are you sure you want to execute? (y/n [n]): y
The changing RAID group 4 to Power Saving state has been required.
The changing to Power Saving state has been required successfully.
```

4. When you run a spin-down operation on one RAID Group, check the Power Saving status after the specified minutes or more passed. When you run the spin-down for two or more RAID Groups, check the status after several minutes passed. Take appropriate actions if a phrase other than Normal (Spin Down Failure: Host Command), Normal (Spin Down Failure: Non-Host Command), Normal (Spin Down Failure: Error), or Normal (Spin Down Failure: PS OFF/ON) is displayed.

**Specifying Spin Up**

To spin up the RAID Group:
1. From the command prompt, connect the disk array that the Power Saving feature will spin down.

2. Execute the `aupowersave` command to spin up the specified RAID Group. The following example display typical information returned from this operation.

   ```
   % aupowersave –unit array-name –spinup –rg 2
   Are you sure you want specified RAID group(s) to to spin up?
   (y/n [n]): y
   The spin up of RAID group 4 has been required.
   The spin up of RAID group(s) have been required successfully.
   %
   
   You can specify the -normal option instead of the -spinup option.
   
   % aupowersave –unit array-name –spinup –rg 4
   Are you sure you want to spin up RAID Group to be Normal state?
   (y/n [n]): y
   The changing RAID group 4 to Normal state has been required.
   The changing to Normal state has been required successfully.
   %
   
   When you refer to the Power Saving Status and see that Normal (Spin Up) displays after a while, the spin-up is complete.
   
   3. Run the aupowersave command even if the spin-up operation is not complete. Direct a host to mount the volume included in the RAID Group if the host uses the volume.
Power Saving Plus

This section describes the basic operation procedures for Power Saving Plus feature. The following sections are included:

- Installing
- Uninstalling
- Disabling or Enabling
- Displaying Power Saving Information
- Requesting Non I/O-linked Spin Down
- Requesting I/O-linked Spin Down
- Requesting I/O-linked Drive Power OFF
- Requesting I/O-linked Spin Down with Drive Power OFF
- Requesting Remove Power Saving (Spin Up)

Installing

Power Saving Plus is usually un-selectable (locked); to make it available, you must install Power Saving Plus and make its functions selectable (unlocked). To install this function, the key file or key code provided with the optional feature is required.

Before installing and uninstalling, make sure that the disk array is in normal operating condition. If a failure such as a controller blockade has occurred, installation and un-installation operations cannot be performed.

1. From the command prompt, register the disk array in which you will install Power Saving Plus. Connect to the disk array.

2. Execute the `auopt` command to unlock the option. An example of input and results are provided below.

   Example of the path to the key file
   
   E:\license\PowerSaving Plus\XS\Windows\keyfile

   E represents the drive letter where CD-ROM or DVD-ROM is used that comes with Power Saving Plus.

   % auopt -unit array-name -lock off -keycode manual-attached-keycode
   Are you sure you want to unlock the option? [y/n] [n]: y
   The option is unlocked.

3. Execute the `auopt` command to check if the option is unlocked. An example of input and results are provided below. (The following shows how items are output.)

   % auopt -unit array-name -refer
   Option Name Type Term Status Reconfigure Memory Status
   PWR-SAVING-PLSPermanent --- Enable N/A

Uninstalling

To uninstall Power Saving Plus, the key code or key file provided with the Power Saving Plus is required. When it is uninstalled, Power Saving Plus is not available (locked) until it is installed by the key code or key file.
You can not uninstall Power Saving Plus if a RAID group exists that is in the following conditions.

- **< Non host I/O link mode>**
  Normal (Command Monitoring), Power Saving (Spin Down Executing), Power Saving (Spin Down), Power Saving (Spin Up Executing), Power Saving (Recovering), Power Saving (Health Checking)

- **<Host I/O link mode>**
  Normal (Command Monitoring), Power Saving (Spin Down Executing), Power Saving (Spin Down), Power Saving (Power OFF), Power Saving (Spin Up Executing), Power Saving (Recovering), Power Saving (Health Checking)

Follow the instructions below to uninstall Power Saving Plus.

1. From the command prompt, connect the disk array in which you will uninstall Power Saving Plus.
2. Execute the `auopt` command to unlock the option. An example of input and results are provided below.
   
   **Example of the path to the key file**
   
   E:\license\key\PowerSaving Plus\XS\Windows\keyfile
   
   E represents the drive letter where CD-ROM or DVD-ROM is used that comes with Power Saving Plus.

   ```
   % auopt -unit array-name -lock on -keycode manual-attached-keycode
   Are you sure you want to lock the option? [y/n [n]]: y
   The option is locked.
   %
   ```

3. Execute the `auopt` command to check if the option is unlocked. An example of input and results are provided below. (The following shows how items are output.)
   ```
   % auopt -unit array-name -refer
   DMEO02015: No information displayed.
   %
   ```

**Disabling or Enabling**

Power Saving Plus can be set to Disable or Enable depending on the conditions in which the feature has been installed.

You can not disable Power Saving Plus if a RAID group exists that is in the following conditions.

- **< Non host I/O link mode>**
  Normal (Command Monitoring), Power Saving (Spin Down Executing), Power Saving (Spin Down), Power Saving (Spin Up Executing), Power Saving (Recovering), Power Saving (Health Checking)

- **<Host I/O link mode>**
  Normal (Command Monitoring), Power Saving (Spin Down Executing), Power Saving (Spin Down), Power Saving (Power OFF), Power Saving (Spin Up Executing), Power Saving (Recovering), Power Saving (Health Checking)
The following paragraphs describe a CLI procedure for setting the feature to Disable or Enable while Power Saving Plus stays in an installed state.

1. From the command prompt, connect the disk array in which you will change the status of Power Saving Plus.

2. Execute the `auopt` command to change the status (enable or disable) of Power Saving Plus.

   The following is an example of how to change the status from enable to disable. To change the status from disable to enable, enter `enable` after the `-st` option.

   ```bash
   % auopt -unit array-name -option PWR-SAVING-PLS -st disable
   Are you sure you want to disable the option? (y/n [n]): y
   The option has been set successfully.
   %
   ```

3. Execute the `auopt` command to verify that Power Saving Plus status has changed. An example of input and results are provided below. (The following shows how items are output.)

   ```bash
   % auopt -unit array-name -refer
   Option Name Type Term Status Reconfigure Memory Status
   PWR-SAVING-PLS Permanent --- Disable N/A
   %
   ```

### Displaying Power Saving Information

To display the specified power saving information in RAID group:

The following instructions describe how to display the power saving information.

1. From the command prompt, connect the disk array in which you will display the power saving information.

2. Execute the `aupowersave` command to display the power saving information. The example is shown below. (The following shows how items are output.)

   ```bash
   % aupowersave –unit disk array-name –refer -lu -fmtext
   Power Saving Information of RAID Group
   Remaining I/O
   RAID  Power Saving Status Monitor Time [min.]
   1 Normal (Spin Up) N/A
   2 Power saving (Command Monitoring) 55
   3 Power saving (Spin Down) N/A
   4 Normal (Power OFF) N/A
   Power Saving Information of Logical Unit
   LUN RAID Group Power Saving Status
   0 0 Normal
   1 1 Normal
   2 2 Power saving
   3 3 Power saving
   %
   ```

3. You can display more detailed information.

   ```bash
   % aupowersave –unit disk array-name –refer -fmtextio
   Power Saving Information of RAID Group
   Spin Down Power OFF
   Remaining I/O
   RAID Power Saving I/O I/O I/O I/O I/O
   %
   ```
The following instructions describe how to request non I/O-linked spin down.

1. From the command prompt, connect the disk array in which power saving is to request non I/O-linked spin down.

2. Execute the `aupowersave` command to spin down the specified RAID group. The example is shown below.

   The following table shows the option to change the power saving state in the `aupowersave` command.

   The command option `-spindown`, `-powersaving`, or `-powersaving_spindown` are specified at instructing the spin down.

   **Table A-3: aupowersave command options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-spindown</code></td>
<td>Changes the RAID group to spin down state.</td>
</tr>
<tr>
<td></td>
<td>Same as <code>-powersaving</code>, <code>-powersaving_spindown</code> option.</td>
</tr>
<tr>
<td><code>-powersaving</code></td>
<td>Changes the RAID group to spin down state.</td>
</tr>
<tr>
<td></td>
<td>Same as <code>-spindown</code>, <code>-powersaving_spindown</code> option.</td>
</tr>
<tr>
<td><code>-powersaving_spindown</code></td>
<td>Changes the RAID group to spin down state.</td>
</tr>
<tr>
<td></td>
<td>Same as <code>-spindown</code>, <code>-powersaving_spindown</code> option.</td>
</tr>
<tr>
<td><code>-monitortime</code></td>
<td>Specify the I/O monitoring time by a minute.</td>
</tr>
</tbody>
</table>
   |                          | The time can be specified between 0 to 720 in minutes. (If the time is not specified, it is set to 1 minute, which is the default value of non I/O-linked spin down request.)

   `% aupowersave --unit array-name --spindown --rg 4
   Are you sure you want specified RAID group(s) to spin down?
   (y/n [n]): y
   If you spin down the RAID group(s), logical units will stop accepting access from the host.
   Please confirm host is not using logical units.
   Are you sure you want to spin down the RAID group(s)? (y/n [n]): y
   The RAID group(s) will be spun down.
   Are you sure you want to execute? (y/n [n]): y
   The spin down of RAID group 4 has been required.
   The spin down of RAID group(s) have been required successfully.
   `%`

   `% aupowersave --unit array-name --powersaving --rg 4 --monitortime 1
   Are you sure you want specified RAID group(s) to be Power Saving state?
   (y/n [n]): y
   If you change to Power Saving state the RAID group(s), logical units will stop accepting access from the host.

   `%`
host.
Please confirm host is not using logical units.
Are you sure you want the RAID group(s) to be Power Saving state? (y/n [n]): y
The RAID group(s) will be Power Saving state.
Are you sure you want to execute? (y/n [n]): y
The changing RAID group 4 to Power Saving state has been required.
The changing to Power Saving state has been required successfully.
%

If you specify several RAID groups concurrently, specify those RAID group numbers after the -rg option.

3. If you have request spin down to only one RAID group, check the Power Saving state after the command monitoring time has passed. If you request spin down to several RAID groups, check the Power Saving state after a few minutes.

If the aupowersave command (see section Displaying Power Saving Information) displays Normal (Spin Down Failure: Host Command), Normal (Spin Down Failure: Non-Host Command), Normal (Spin Down Failure: Error), or Normal (Spin Down Failure: PS OFF/ON) as the Power Saving state, address this according to 4.2.

**Requesting I/O-linked Spin Down**

The following instructions describe how to request I/O-linked spin down.

1. From the command prompt, connect the disk array in which power saving is to request I/O-linked spin down.

2. Execute the aupowersave command to spin down the specified RAID group. The example is shown below.

   The following table shows the option to change the power saving state in the aupowersave command.

   **Table A-4: Power Saving state change options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>-iolink</td>
<td>Specify this option when specifying I/O link.</td>
</tr>
<tr>
<td>-spindown</td>
<td>Changes the RAID group to spin down state.</td>
</tr>
</tbody>
</table>
   | -monitortime | Specify the I/O monitoring time by a minute.  
   |              | The time can be specified between 0 to 720 in minutes. (If the time is not specified, it is set to 30 minutes, which is the default value of non I/O-linked spin down request.) |

   % aupowersave --unit array-name -iolink -rg 2 -spindown -monitortime 30
   Are you sure you want to execute power saving the RAID group(s)? (y/n [n]): y
   When the power saving starts, the access from its related hosts to the volumes may take 1 to 5 minutes.
   Are you sure you really want to execute power saving the RAID group(s)? (y/n [n]): y
   The RAID group(s) will be power saving state.
   Are you sure you want to execute? (y/n [n]): y
   The power saving execution of RAID group 2 has been required.
   The power saving execution has been required successfully.
   %

   If you specify several RAID groups concurrently, specify those RAID group numbers after the -rg option.
Requesting I/O-linked Drive Power OFF

The following instructions describe how to request I/O-linked drive power OFF.

1. From the command prompt, connect the disk array in which Power Saving is to request I/O-linked drive power OFF.

2. Execute the aupowersave command to request I/O-linked drive power OFF to the specified RAID group. The example is shown below.

The following table shows the option to change the power saving state in the aupowersave command.

<table>
<thead>
<tr>
<th>Option</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>-iolink</td>
<td>Specify this option when specifying I/O link.</td>
</tr>
<tr>
<td>-poweroff</td>
<td>Changes the RAID group to power OFF state.</td>
</tr>
<tr>
<td>-poweroff_monitortime</td>
<td>Specify the I/O monitoring time of power off by a minute. The time can be specified between 0 to 720 in minutes. (If the time is not specified, it is set to 60 minutes, which is the default value of non I/O-linked spin down request.)</td>
</tr>
</tbody>
</table>

% aupowersave –unit array-name -iolink -rg 2 -poweroff -poweroff_monitortime 60
Are you sure you want to execute power saving the RAID group(s)? (y/n [n]): y
When the power saving starts, the access from its related hosts to the volumes may take 1 to 5 minutes.
Are you sure you really want to execute power saving the RAID group(s)? (y/n [n]): y
The RAID group(s) will be power saving state.
Are you sure you want to execute? (y/n [n]): (y/n [n]): y
The power saving execution of RAID group 2 has been required.
The power saving execution has been required successfully.
%

If you specify several RAID groups concurrently, specify those RAID group numbers after the -rg option.

Requesting I/O-linked Spin Down with Drive Power OFF

The following instructions describe how to request I/O-linked spin down with drive power OFF.

1. From the command prompt, connect the disk array in which Power Saving is to request I/O-linked spin down with drive power OFF.

2. Execute the aupowersave command to spin up the specified RAID group. The example is shown below.

The following table shows the option to change the power saving state in the aupowersave command.

<table>
<thead>
<tr>
<th>Option</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>-iolink</td>
<td>Specify this option when specifying I/O link.</td>
</tr>
<tr>
<td>-spindown</td>
<td>Changes the RAID group to spin down state.</td>
</tr>
</tbody>
</table>
Table A-6: Power Saving state command options

<table>
<thead>
<tr>
<th>Option</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>-poweroff</td>
<td>Changes the RAID group to power OFF state.</td>
</tr>
<tr>
<td>-monitortime</td>
<td>Specify the I/O monitoring time by a minute.</td>
</tr>
<tr>
<td></td>
<td>The time can be specified between 0 to 720 in minutes.</td>
</tr>
<tr>
<td></td>
<td>(If the time is not specified, it is set to 30 minutes,</td>
</tr>
<tr>
<td></td>
<td>which is the default value of non I/O-linked spin down</td>
</tr>
<tr>
<td></td>
<td>request.)</td>
</tr>
<tr>
<td>-poweroff_monitortime</td>
<td>Specify the I/O monitoring time of power off by a minute.</td>
</tr>
<tr>
<td></td>
<td>The time can be specified between 0 to 720 in minutes.</td>
</tr>
<tr>
<td></td>
<td>(If the time is not specified, it is set to 60 minutes,</td>
</tr>
<tr>
<td></td>
<td>which is the default value of non I/O-linked spin down</td>
</tr>
<tr>
<td></td>
<td>request.)</td>
</tr>
</tbody>
</table>

If you request spin down with drive power OFF, the following restriction applies to the I/O monitoring time.
Spin down < Drive power OFF

% aupowersave –unit array-name -iok -rg 2 -spindown -monitortime 30 -poweroff -poweroff_monitortime 60
Are you sure you want to execute power saving the RAID group(s)? (y/n [n]): y
When the power saving starts, the access from its related hosts to the volumes may take 1 to 5 minutes.
Are you sure you really want to execute power saving the RAID group(s)? (y/n [n]): y
The RAID group(s) will be power saving state.
Are you sure you want to execute? (y/n [n]): (y/n [n]): y
The power saving execution of RAID group 2 has been required.
The power saving execution has been required successfully.
%

If you specify several RAID groups concurrently, specify those RAID group numbers after the -rg option.

**Requesting Remove Power Saving (Spin Up)**

The following instructions describe how to request the remove power saving (spin up).

1. From the command prompt, connect the disk array in which you will request the remove power saving (spin up).
2. Execute the `aupowersave` command to request the remove power saving (spin up). The example is shown below.

The following table shows the option to change the remove power saving (spin up) state in the `aupowersave` command.

<table>
<thead>
<tr>
<th>Option</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>-spinup</td>
<td>Changes the RAID group to spin up state. Same as -normal option.</td>
</tr>
<tr>
<td>-normal</td>
<td>Changes the RAID group to spin up state. Same as -spinup option.</td>
</tr>
</tbody>
</table>

% aupowersave –unit array-name –spinup –rg 2
Are you sure you want to spin up RAID Group selected? (y/n [n]): y
Instructed RAID Group 2 to spin up.
The spin up of RAID group(s) have been required successfully.
%

If you see **Normal (Spin Up)** in the Power Saving state after a while, spin up is completed.
If you specify several RAID groups concurrently, specify those RAID group numbers after the -rg option.

3. **Execute** `-fmtext` or `-fmtextio` option in the `aupowersave` command to check if the spin up is completed. (See section Displaying Power Saving Information)
Data At Rest Encryption

This section describes the basic operation procedures for Power Saving Plus feature. The following sections are included:

- Installing Data At Rest Encryption
- Uninstalling Data At Rest Encryption
- Uninstalling Data At Rest Encryption
- Disabling and Enabling Data At Rest Encryption
- Creating Encrypted RAID Groups/DP Pools
- Creating an Encrypted RAID Group and Encrypted Volume
- Creating Encrypted DP Pools and Encrypted Volumes
- Deleting Encrypted RAID Groups/DP Pools

Installing Data At Rest Encryption

Data At Rest Encryption is an optional feature; initially, it cannot be used (locked). To use this optional feature, you need to have your purchased Data At Rest Encryption usable (unlocked).

- Verify that the array is in the normal state before installing (unlocking). If a failure such as controller blockage has occurred, the operation fails.
- To install Data At Rest Encryption, the array must have four units of "Drive I/O Module (encryption)" (DW-F700-BS6GE). If not, installation fails with an error.
- The array must support dual controllers to install Data At Rest Encryption.
- In Data At Rest Encryption, the array records and updates when Encryption Keys are used and backed up. Differences in clocks between the array and a server may cause confusion.

When you use a Key Management Server, you should synchronize the clocks of the array and the clock of the Navigator 2 with the clock of the Key Management Server.

When you do not use a Key Management Server, synchronize the clock of the array and the clock of the Navigator 2 server. This does not need to be precise.

You need a key file or key code that comes with Data At Rest Encryption to install it. To install Data At Rest Encryption, follow these steps.

1. At the command prompt, register an array where you want to install Data At Rest Encryption, and then connect to the array.
2. Run the `auopt` command to install Data At Rest Encryption. An example is shown below.

   ```bash
   % auopt -unit array-name -lock off -keycode manual-attached-keycode
   Are you sure you want to unlock the option? [y/n]: y
   The option is unlocked.
   %
   ``

3. Run the `auopt` command to verify that Data At Rest Encryption has been installed. An example is shown below.
Uninstalling Data At Rest Encryption

To uninstall Data At Rest Encryption, you need a key file or key code. Once uninstalled, it becomes unable to be used (locked) until it is unlocked again with a key file or key code.

- Verify that the array is in the normal state before uninstalling. If a failure such as controller blockage has occurred, the operation fails.
- Be sure to back up your Encryption Keys before uninstalling (locking) Data At Rest Encryption.
- To uninstall (lock) Data At Rest Encryption, the encryption environment needs to be disabled. (See section ). Disable encryption in all the drives and delete RAID groups and DP pools. If you fail to meet this condition, uninstallation fails.

To uninstall Data At Rest Encryption, follow these steps.
1. At the command prompt, register an array where you want to uninstall Data At Rest Encryption, and then connect to the array.
2. Run the `auopt` command to uninstall Data At Rest Encryption. An example is shown below.

   ```
   % auopt -unit array-name -lock on -keycode manual-attached-keycode
   Are you sure you want to lock the option? (y/n [n]): y
   The option is locked.
   %
   ```

3. Run the `auopt` command to verify Data At Rest Encryption has been uninstalled. An example is shown below.

   ```
   % auopt -unit array-name -refer
   DMEC002015: No information displayed.
   %
   ```

Disabling and Enabling Data At Rest Encryption

Data At Rest Encryption can be enabled or disabled while it is still installed (unlocked).

- Verify that the array is in the normal state before enabling/disabling. If a failure such as controller blockage has occurred, this operation fails.
- Be sure to back up your Encryption Keys before disabling Data At Rest Encryption.
- To disable Data At Rest Encryption, the encryption environment needs to be disabled. (See section ). Disable encryption in all the drives and delete RAID groups and DP pools where encryption is disabled. If you fail to meet these conditions, disabling fails with an error.

To enable or disable Data At Rest Encryption, follow these steps.
1. In the command prompt, register an array where you want to enable/disable Data At Rest Encryption, and then connect to the array.
2. Run the `auopt` command to enable/disable it. An example of input and output when the enabled option is disabled is provided below. To change the disabled state to enabled state, follow the `-st` options with `enable`.

```
% auopt –unit array-name –option DAR_ENCRYPT –st disable
Are you sure you want to disable the option? (y/n [n]): y
The option has been set successfully.
%
```

3. Run the `auopt` command to verify the state of the option. An example of input and output is shown below. (The following represents how each item is displayed.)

```
% auopt -unit array-name -refer
Option Name     Type     Term     Status        Reconfigure Memory Status
DAR-ENCRYPT      Permanent ---      Disable        N/A
%
```

**Creating Encrypted RAID Groups/DP Pools**

To create an encrypted RAID group, DP pool, or volume with CLI, use the option that enables encryption with the commands.

**Creating an Encrypted RAID Group and Encrypted Volume**

1. In CLI, run the `aurgadd` command with `encryption enable` to create an encrypted RAID group.

```
% aurgadd –unit array-name –rg rgn –RAID(N) –drive unit_no.hdu_no . . .
–pnum 1 –encryption enable
```

2. Run the `aurgref` command to verify the status of a created RAID group. If **Encryption** is **Enable**, encryption is enabled in the RAID group.

```
% aurgref –unit array-name
RAID   RAID      Parity                Rotational
Group  Level      Groups  Type         speed          Encryption  Total Capacity . . .
0      5(3D+1P)       1      SAS7K    7200rpm     Enable       11466074112 blocks . . .
```

If the number of created Encryption Keys is smaller than that of drives in an encrypted RAID group to be created, the RAID group cannot be created with an error. Create Encryption Keys as in section , and then retry creating an encrypted RAID group.

3. Run the `auluadd` CLI command to create a volume in the created encrypted RAID group.

```
% auluadd –unit array-name –lu lun –rg rgn –size N(m,g,t)
```

4. For a created volume, run the `auluref` command to verify its status. Verify that **Encryption** is **Enable**.

```
% auluref –unit array-name
Stripe  RAID    DP    Tier     RAID           Rotational
LU  Capacity        Size    Group   Pool  Mode     Level     Type    Speed     Encryption . . .
0   102400 blocks  256KB     0      N/A    N/A   5(2D+1P) SAS7K       7200rpm   Enable . . .
```

**Creating Encrypted DP Pools and Encrypted Volumes**

1. In CLI, run the `audppool` command with the `encryption enable` to create an encrypted DP pool.

```
```

2. Run the `audppool` command with the `-refer` option to verify the status of a created DP pool. Verify that Encryption is Enable.

```bash
% audppool -unit array-name -refer -t
DP  RAID . . .  
P  Tier Mode  Level . . .  Speed  Encryption Status . . .
1 N/A  5(3D+1P) . . . 7200rpm  Enable Normal . . .
```

If the number of created Encryption Keys is smaller than that of drives to be created in an encrypted DP pool, the encrypted DP pool cannot be created with an error. Create Encryption Keys as in section , and then retry creating an encrypted DP pool.

3. Run the `auluadd` CLI command to create a volume in the created DP pool.

```bash
% auluadd -unit array-name -lu lun -dppoolno N -size n(m,g,t)
```

4. Run the `auluref` command to verify the status of the created volume. Verify that the encryption is enabled.

```bash
% auluref -unit array-name
```

**Deleting Encrypted RAID Groups/DP Pools**

When you delete a RAID group or DP pool where encryption is enabled, its encryption is disabled in its member drives. At this time, data in those drives becomes unable to be read because the assigned Encryption Keys are deleted from the array.

To delete a RAID group or DP pool, you need to delete all the volumes in it. However, the data in those drives remains. It becomes unable to be read when Encryption Keys are deleted. This is done by Crypt Shredding when an encrypted RAID group or encrypted DP pool is deleted. You can delete an encrypted RAID group or DP pool in the same way as for one that is not encrypted.

**NOTE:** If a volume exists in a RAID group, the RAID group cannot be deleted. Delete all the volumes in the RAID group before deleting the RAID group. (If necessary, perform backup or migration of the volume in advance.)

1. Run the `auludel` CLI command to delete the volume in the encrypted RAID group or encrypted DP pool to be deleted. Type `y` for the confirmation message.

```bash
% auludel -unit array-name
```

2. Run the `aurgdel` CLI command to delete the encrypted RAID group. Type `y` for the confirmation message.

```bash
% aurgdel -unit array-name
```

3. Run the `audppool` CLI command to delete the encrypted DP pool. Type `y` for the confirmation message.

```bash
% audppool -unit array-name -rm -dppoolno pool_no
```
Glossary

This glossary provides definitions of general storage networking terms as well as specific terms related to the technology that supports Hitachi Data Systems products. Click the letter of the glossary section to display that page.

1000BASE-T
A specification for Gigabit Ethernet over copper wire. The standard defines 1 Gbps data transfer over distances of up to 100 meters using four pairs of Category 5 balanced copper cabling and a 5-level coding scheme.

A

Array
A set of hard disks grouped logically together to function as one contiguous storage space.

ATA
Advanced Technology Attachment, a disk drive implementation that integrates the controller on the disk drive.

B

BIOS
Basic Input Output System, built-in software code that determines the functions that a computing device can perform without accessing programs from a disk.
Bps
Bits per second, the standard measure of data transmission speeds.

BSD syslog protocol
This protocol has been used for the transmission of event notification messages across networks for many years. While this protocol was originally developed on the University of California Berkeley Software Distribution (BSD) TCP/IP system implementations, its value to operations and management has led it to be ported to many other operating systems as well as being embedded into many other networked devices.

C

Cache
A temporary, high-speed storage mechanism. It is a reserved section of main memory or an independent high-speed storage device. Two types of caching are found in computers: memory caching and disk caching. Memory caches are built into the architecture of microprocessors and often computers have external cache memory. Disk caching works like memory caching; however, it uses slower, conventional main memory that on some devices is called a memory buffer.

Capacity
The amount of information (usually expressed in megabytes) that can be stored on a disk drive. It is the measure of the potential contents of a device; the volume it can contain or hold. In communications, capacity refers to the maximum possible data transfer rate of a communications channel under ideal conditions.

Challenge Handshake Authentication Protocol
A security protocol that requires users to enter a secret for access.

CHAP

command control interface (CCI)
Hitachi’s Command Control Interface software provides command line control of Hitachi array and software operations through the use of commands issued from a system host. Hitachi’s CCI also provides a scripting function for defining multiple operations.

command line interface (CLI)
A method of interacting with an operating system or software using a command line interpreter. With Hitachi’s Storage Navigator Modular
Command Line Interface, CLI is used to interact with and manage Hitachi storage and replication systems.

D

DHCP
Dynamic Host Configuration Protocol, allows a computer to join an IP-based network without having a pre-configured IP address. DHCP is a protocol that assigns unique IP addresses to devices, then releases and renews these addresses as devices leave and re-join the network.

Differential Management Logical Unit (DMLU)
The volumes used to manage differential data in a storage system. In a TrueCopy Extended Distance system, there may be up to two DM logical units configured per storage system. For Copy-on-Write and ShadowImage, the DMLU is an exclusive volume used for storing data when the array system is powered down.

Duplex
The transmission of data in either one or two directions. Duplex modes are full-duplex and half-duplex. Full-duplex is the simultaneous transmission of data in two direction. For example, a telephone is a full-duplex device, because both parties can talk at once. In contrast, a walkie-talkie is a half-duplex device because only one party can transmit at a time.

E

Ethernet
A local area network technology based on packetized transmissions between physical ports over a variety of electrical and optical media.

F

Fabric
The hardware that connects workstations and servers to storage devices in a SAN. The SAN fabric enables any-server-to-any-storage device connectivity through the use of fibre channel switching technology.

FC
Fibre channel.
Firmware
Software embedded into a storage device. It may also be referred to as Microcode.

Full-duplex
The concurrent transmission and the reception of data on a single link.

G
Gbps
Gigabit per second.

GUI
Graphical user interface.

H
HBA
Host bus adapter, a circuit board and/or integrated circuit adapter installed in a workstation or server that provides input/output processing and physical connectivity between a server and a storage device. An iSCSI HBA implements the iSCSI and TCP/IP protocols in a combination of a software storage driver and hardware.

HDD
Hard disk drive.

I
Initiator
A system component that originates an I/O command over an I/O bus or network, such as an I/O adapters or network interface cards.

I/O
Input/output.

IP
Internet Protocol, specifies the format of packets and addressing scheme. Most networks combine IP with a higher-level protocol called Transmission Control Protocol (TCP), which establishes a virtual connection between a destination and a source.
**IP address**

An identifier for a computer or device on a TCP/IP network. Networks using the TCP/IP protocol route messages based on the IP address of the destination. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be zero to 255 (for example, 192.168.0.200).

**IP-SAN**

Block-level Storage Area Networks over TCP/IP using the iSCSI protocol.

**iSCSI**

Internet SCSI, an IP-based standard for connecting data storage devices over a network and transferring data using SCSI commands over IP networks. iSCSI enables a Storage Area Network to be deployed in a Local Area Network.

**iSNS**

Internet Storage Name Service, a protocol that allows automated discovery, management and configuration of iSCSI devices on a TCP/IP network.

**L**

**LAN**

Local Area Network, a computer network that spans a relatively small area, such as a single building or group of buildings.

**LU**

Logical unit.

**LUN**

Logical unit number.

**M**

**Middleware**

Software that connects two otherwise separate applications. For example, a middleware product can be used to link a database system to a Web server. Using forms, users request data from the database;
then, based on the user's requests and profile, the Web server returns dynamic Web pages to the user.

**MIB**

Message Information Block.

**N**

**NIC**

Network Interface Card, an expansion board in a computer that allows the computer to connect to a network.

**NTP**

Network Time Protocol, a protocol for synchronizing the clocks of computer systems over packet-switched, variable-latency data networks. NTP uses UDP port 123 as its transport layer. It is designed particularly to resist the effects of variable latency (jitter).

**P**

**Pool volume**

A pool volume is used to store backup versions of files, archive copies of files, and files migrated from other storage.

**primary volume (P-VOL)**

The storage volume in a volume pair. It is used as the source of a copy operation. In copy operations a copy source volume is called the P-VOL while the copy destination volume is called S-VOL (secondary volume).

**R**

**RAID**

Redundant Array of Independent Disks, a disk array in which part of the physical storage capacity is used to store redundant information about user data stored on the remainder of the storage capacity. The redundant information enables regeneration of user data in the event that one of the array's member disks or the access path to it fails. SNIA.
RAID 6
An extension of the RAID 5 array, that allows for two simultaneous drive failures without downtime or data loss. Recovery point objective (RPO).

After a recovery operation, the recovery point objective (RPO) is the maximum desired time period, prior to a disaster, in which changes to data may be lost. This measure determines up to what point in time data should be recovered. Data changes preceding the disaster are preserved by recovery.

S

SAN
Storage Area Network, a network of shared storage devices that contain disks for storing data.

SAS
Serial Attached SCSI, an evolution of parallel SCSI into a point-to-point serial peripheral interface in which controllers are linked directly to disk drives. SAS delivers improved performance over traditional SCSI because SAS enables up to 128 devices of different sizes and types to be connected simultaneously.

SCSI
Small Computer System Interface, a parallel interface standard that provides faster data transmission rates than standard serial and parallel ports.

Session
A series of communications or exchanges of data between two end points that occurs during the span of a single connection. The session begins when the connection is established at both ends, and terminates when the connection is ended. For some applications each session is related to a particular port. In this document a session is the exchange of data between groups of primary and secondary volumes.

secondary volume (S-VOL)
A replica of the primary volume (P-VOL) at the time of a backup and is kept on a standby storage system. Recurring differential data updates are performed to keep the data in the S-VOL consistent with data in the P-VOL.

SMTP
Simple Mail Transfer Protocol, a protocol used to receive and store email data directly from email servers.
Software initiator

A software application initiator communicates with a target device. A software initiator does not require specialized hardware because all processing is done in software, using standard network adapters.

Storage Navigator Modular 2

A multi-featured scalable storage management application that is used to configure and manage the storage functions of Hitachi arrays. Also referred to as Navigator 2.

Subnet

In computer networks, a subnet or subnetwork is a range of logical addresses within the address space that is assigned to an organization. Subnetting is a hierarchical partitioning of the network address space of an organization (and of the network nodes of an autonomous system) into several subnets. Routers constitute borders between subnets. Communication to and from a subnet is mediated by one specific port of one specific router, at least momentarily. SNIA.

Switch

A network infrastructure component to which multiple nodes attach. Unlike hubs, switches typically have internal bandwidth that is a multiple of link bandwidth, and the ability to rapidly switch node connections from one to another. A typical switch can accommodate several simultaneous full link bandwidth transmissions between different pairs of nodes. SNIA.

T

Target

Devices that receive iSCSI requests that originate from an iSCSI initiator.

TCP Offload Engine (TOE)

A dedicated chip or adapter that handles much of the TCP/IP processing directly in hardware. TCP/IP transmission is inherently a CPU-intensive operation. Therefore, using dedicated hardware that can operate in parallel with the main processor allows for superior system performance. Although all iSCSI HBAs have a TOE, a generic TOE only implements TCP/IP, while an iSCSI HBA implements the iSCSI protocol in addition to TCP/IP.

U

User Datagram Protocol (UDP)

UDP is one of the core protocols of the Internet protocol suite. Using UDP, programs on networked computers can send short messages.
sometimes known as datagrams (using Datagram Sockets) to one another.

UDP does not guarantee reliability or ordering in the way that TCP does. Datagrams may arrive out of order, appear duplicated, or go missing without notice. Avoiding the overhead of checking whether every packet actually arrived makes UDP faster and more efficient, at least for applications that do not need guaranteed delivery. Time-sensitive applications often use UDP because dropped packets are preferable to delayed packets. UDP's stateless nature is also useful for servers that answer small queries from huge numbers of clients. Unlike TCP, UDP is compatible with packet broadcast (sending to all on local network) and multicasting (send to all subscribers).

W

World Wide Name (WWN)

A unique identifier for an open systems host. It consists of a 64-bit physical address (the IEEE 48-bit format with a 12-bit extension and a 4-bit prefix). The WWN is essential for defining the SANtinel™ parameters because it determines whether the open systems host is to be allowed or denied access to a specified logical unit or a group of logical units.
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