

Hitachi Storage Navigator Modular 2 Command Line Interface Replication Reference Guide for AMS

FASTFIND LINKS

- [Document organization](#)
- [Release notes and readme](#)
- [Getting help](#)
- [Contents](#)

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Contents

1	CLI Commands for Local Replication	1-1
	Display pair and pool information	1-2
	Display volumes available for use in pairs	1-4
	Display or define the SnapShot logical unit (V-VOL)	1-6
	Display or set up the data pool	1-8
	Create pairs	1-9
	Split pairs	1-12
	Resynchronize pairs	1-15
	Restore pairs	1-17
	Delete pairs	1-19
	Edit pairs	1-21
	Monitor pair status—event wait	1-23
	CLI, CCI commands for local-replication	1-25
2	CLI Commands for Remote Replication	2-1
	Display pair and pool information	2-2
	Display volumes available for use in pairs	2-5
	Remote path—display, define, delete, repair	2-6
	Display remote path information	2-6
	Define the remote path	2-8
	Define, delete remote path target (CHAP secret)	2-10
	Reconstruct the remote path	2-12
	Delete the Remote Path	2-13
	Display or define TCE options	2-14
	Display TCE options	2-14
	Define TCE options	2-15
	Create pairs	2-16
	Split pairs	2-19
	Resynchronize pairs	2-21
	Swap pairs	2-23
	Delete pairs	2-25
	Edit pairs	2-27

Monitor pair status—synchronous wait	2-29
CLI, CCI commands for remote-replication	2-31

[Glossary](#)

[Index](#)



Preface

This document provides facilities requirements for preparing and installing Hitachi Adaptable Modular Storage (AMS) 2100, 2300, and 2500, and SMS 100 storage systems. In this document, the AMS storage systems are referred to collectively as the Hitachi AMS 2000 Family storage systems. If information pertains to certain members of this family, those systems are identified.

Using this document, you will be able to prepare your site for the arrival and installation of your units. To determine the total components your shipment will include, please consult your Hitachi Data Systems representative.

This preface includes the following information:

- [Intended audience](#)
- [Product version](#)
- [Document revision level](#)
- [Changes in this revision](#)
- [Document organization](#)
- [Document conventions](#)
- [Related documents](#)
- [Regulatory information](#)
- [Getting help](#)
- [Comments](#)

Notice: The use of the Hitachi AMS 2000 Family storage systems and all Hitachi Data Systems products is governed by the terms of your agreement(s) with Hitachi Data Systems.

Intended audience

This document is intended for personnel who will schedule, manage, and perform the tasks required to prepare your site for installing a Hitachi AMS 2000 Family storage systems.

Product version

This document applies to Hitachi AMS 2000 Family firmware version 0893 or later.

Release notes and readme

Read the release notes and readme file before installing and using this product. They may contain requirements or restrictions that are not fully described in this document and/or updates or corrections to this document.

Document revision level

This section provides a history of the revision changes to this document.

Revision	Date	Description
MK-97DF8153-00	April 2009	Initial release.
MK-97DF8153-01	May 2009	Revision 01, supersede and replaces MK-97DF8153-00.
MK-97DF8153-02	August 2009	Revision 02, supersedes and replaces MK-97DF8153-01.
MK-97DF8153-03	November 2009	Revision 03, supersedes and replaces MK-97DF8153-02.
MK-97DF8153-04	December 2009	Revision 04, supersedes and replaces MK-97DF8153-03.
MK-97DF8153-05	January 2010	Revision 05, supersedes and replaces MK-97DF8153-04.
MK-97DF8153-06	April 2010	Revision 06, supersedes and replaces MK-97DF8153-05.
MK-97DF8153-07	August 2010	Revision 07, supersedes and replaces MK-97DF8153-06.

Changes in this revision

- New output for the **aupool** command in [Display or set up the data pool on page 1-8](#).
- New output for the **aureplicationremote** command in [Display volumes available for use in pairs on page 2-5](#).
- New output and inclusion of the TrueCopy option for the **autruecopyopt** command in [Display or define TrueCopy options on page 2-14](#).

- New output for the -set option of the **autruecopyopt** command in [Options for autruecopyopt -refer on page 2-14](#).

Document organization

The following table provides an overview of the contents and organization of this document. Click the [chapter title](#) in the first column to go to that chapter. The first page of every chapter or appendix contains a brief list of the contents of that section of the manual, with links to the pages where the information is located.

Chapter	Description
Chapter 1, CLI Commands for Local Replication	Provides commands, syntax, options, and examples for Hitachi local replication software for modular storage.
Chapter 2, CLI Commands for Remote Replication	Provides commands, syntax, options, and examples for Hitachi remote replication software for modular storage.

Document conventions

This document uses the following conventions to draw your attention to certain information.

Safety and warnings

The following symbols are used to draw your attention to certain information.

Symbol	Meaning	Description
	Tip	Tips provide helpful information, guidelines, or suggestions for performing tasks more effectively.
	Note	Notes emphasize or supplement important points of the main text.
	Caution	Cautions indicate that failure to take a specified action could result in damage to the software or hardware.
	WARNING	Warnings indicate that failure to take a specified action could result in loss of data or serious damage to hardware.
	DANGER	Danger warns users of possible injury or death if instructions are not followed.
	ELECTRIC SHOCK HAZARD!	This symbol warns users of electric shock hazard. Failure to take appropriate precautions such as not opening or touching hazardous areas of the equipment could result in injury or death.

Symbol	Meaning	Description
	Electrostatic Sensitive	The ESD symbol warns users that the equipment is sensitive to electrostatic discharge (ESD) and could be damaged if users do not take appropriate precautions such as using a grounded wrist strap when touching or handling the equipment.
	Sharp Edges or corners	This symbol warns that the equipment may have sharp edges or corners. Avoid touching. Also, you may want to wear gloves.

Typographic conventions

The following typographic conventions are used in this document.

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

Convention for storage capacity values

Storage capacity values for Hitachi Data Systems' AMS 2100, 2300, and 2500 storage products are calculated based on the following values.

Hard Disk Drives	Logical Units
1 KB = 1,000 bytes	1 KB (kilobyte) = 1,024 bytes
1 MB = 1,000 ² bytes	1 MB (megabyte) = 1,024 ² bytes
1 GB = 1,000 ³ bytes	1 GB (gigabyte) = 1,024 ³ bytes
1 TB = 1,000 ⁴ bytes	1 TB (terabyte) = 1,024 ⁴ bytes

For further information on Hitachi Data Systems products and services, please contact your Hitachi Data Systems account team, or visit Hitachi Data Systems online at <http://www.hds.com>.

Related documents

Hitachi Data Systems offers a complete library of user and online documentation to ensure you get the most out of the Hitachi AMS 2000 Family storage systems.

The entire documentation set for the Hitachi AMS 2000 Family storage systems can be accessed on the documentation CD supplied with your storage system and through downloads from the Hitachi Web Portal at:

<http://support.hds.com>

This documentation set consists of the following documents:

Release notes

- Hitachi Adaptable Modular Storage System Release Notes
- Hitachi Storage Navigator Modular 2 Release Notes



Please read the release notes before installing and/or using this product. They may contain requirements and/or restrictions not fully described in this document, along with updates and/or corrections to this document.

Installation and getting started

The following documents provide instructions for installing an AMS 2000 Family storage system. They include rack information, safety information, site-preparation instructions, getting-started guides for experienced users, and host connectivity information. The symbol  identifies documents that contain initial configuration information about Hitachi AMS 2000 Family storage systems.

 Hitachi AMS2100/2300 Getting Started Guide (MK-98DF8152)

Provides quick-start instructions for getting an AMS 2100 or AMS 2300 storage system up and running as quickly as possible.

 Hitachi AMS2500 Getting Started Guide (MK-97DF8032)

Provides quick-start instructions for getting an AMS 2500 storage system up and running as quickly as possible.

Hitachi AMS 2000 Family Site Preparation Guide (MK-98DF8149)

Contains initial site planning and pre-installation information for AMS 2000 Family storage systems, expansion units, and high-density expansion units. This document also covers safety precautions, rack information, and product specifications.

Hitachi AMS 2000 Family Fibre Channel Host Installation Guide
(MK-08DF8189)

Describes how to prepare Hitachi AMS 2000 Family Fibre Channel storage systems for use with host servers running supported operating systems.

Hitachi AMS 2000 Family iSCSI Host Installation Guide
(MK-08DF8188)

Describes how to prepare Hitachi AMS 2000 Family iSCSI storage systems for use with host servers running supported operating systems.

Storage and replication features

The following documents describe how to use Storage Navigator Modular 2 (Navigator 2) to perform storage and replication activities.

Hitachi Storage Navigator 2 Advanced Settings User's Guide
(MK-97DF8039)

Contains advanced information about launching and using Navigator 2 in various operating systems, IP addresses and port numbers, server certificates and private keys, boot and restore options, outputting configuration information to a file, and collecting diagnostic information.

Hitachi Storage Navigator Modular 2 User's Guide (MK-99DF8208)

Describes how to use Navigator 2 to configure and manage storage on an AMS 2000 Family storage system.

Hitachi AMS 2000 Family Dynamic Provisioning Configuration Guide
(MK-09DF8201)

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

Hitachi Storage Navigator 2 Storage Features Reference Guide for AMS (MK-97DF8148)

Contains concepts, preparation, and specifications for Account Authentication, Audit Logging, Cache Partition Manager, Cache Residency Manager, Data Retention Utility, LUN Manager, Performance Monitor, SNMP Agent, and Modular Volume Migration.

Hitachi AMS 2000 Family Copy-on-write SnapShot User Guide
(MK-97DF8124)

Describes how to create point-in-time copies of data volumes in AMS 2100, AMS 2300, and AMS 2500 storage systems, without impacting host service and performance levels. Snapshot copies are fully read/write compatible with other hosts and can be used for rapid data restores, application testing and development, data mining and warehousing, and nondisruptive backup and maintenance procedures.

Hitachi AMS 2000 Family ShadowImage In-system Replication User Guide (MK-97DF8129)

Describes how to perform high-speed nondisruptive local mirroring to create a copy of mission-critical data in AMS 2100, AMS 2300, and AMS 2500 storage systems. ShadowImage keeps data RAID-protected and fully recoverable, without affecting service or performance levels. Replicated data volumes can be split from host applications and used for system backups, application testing, and data mining applications while business continues to operate at full capacity.

Hitachi AMS 2000 Family TrueCopy Remote Replication User Guide
(MK-97DF8052)

Describes how to create and maintain multiple duplicate copies of user data across multiple AMS 2000 Family storage systems to enhance your disaster recovery strategy.

Hitachi AMS 2000 Family TrueCopy Extended Distance User Guide
(MK-97DF8054)

Describes how to perform bi-directional remote data protection that copies data over any distance without interrupting applications, and provides failover and recovery capabilities.

Hitachi AMS 2000 Data Retention Utility User's Guide (MK-97DF8019)

Describes how to lock disk volumes as read-only for a certain period of time to ensure authorized-only access and facilitate immutable, tamper-proof record retention for storage-compliant environments. After data is written, it can be retrieved and read only by authorized applications or users, and cannot be changed or deleted during the specified retention period.

Hitachi Storage Navigator Modular 2 online help

Provides topic and context-sensitive help information accessed through the Navigator 2 software.

Hardware maintenance and operation

The following documents describe how to operate, maintain, and administer an AMS 2000 Family storage system. They also provide a wide range of technical information and specifications for the AMS 2000 Family storage systems. The symbol  identifies documents that contain initial configuration information about Hitachi AMS 2000 Family storage systems.

Hitachi AMS 2100/2300 Storage System Hardware Guide (MK-97DF8010)

Provides detailed information about installing, configuring, and maintaining AMS 2100 and 2300 storage systems.

Hitachi AMS 2500 Storage System Hardware Guide (MK-97DF8007)

Provides detailed information about installing, configuring, and maintaining an AMS 2500 storage system.

Hitachi AMS 2000 Family Storage System Reference Guide (MK-97DF8008)

Contains specifications and technical information about power cables, system parameters, interfaces, logical blocks, RAID levels and configurations, and regulatory information about AMS 2100, AMS 2300, and AMS 2500 storage systems. This document also contains remote adapter specifications and regulatory information.

Hitachi AMS 2000 Family Storage System Service and Upgrade Guide (MK-97DF8009)

Provides information about servicing and upgrading AMS 2100, AMS 2300, and AMS 2500 storage systems.

Hitachi AMS 2000 Family Power Savings User Guide (MK-97DF8045)

Describes how to spin down volumes in selected RAID groups when they are not being accessed by business applications to decrease energy consumption and significantly reduce the cost of storing and delivering information.

Command and Control (CCI)

The following documents describe how to install the Hitachi AMS 2000 Family Command Control Interface (CCI) and use it to perform TrueCopy and ShadowImage operations.

Hitachi AMS 2000 Family Command Control Interface (CCI) Installation Guide (MK-97DF8122)

Describes how to install CCI software on open-system hosts.

Hitachi AMS 2000 Family Command Control Interface (CCI) Reference Guide (MK-97DF8121)

Contains reference, troubleshooting, and maintenance information related to CCI operations on AMS 2100, AMS 2300, and AMS 2500 storage systems.

Hitachi AMS 2000 Family Command Control Interface (CCI) User's Guide (MK-97DF8123)

Describes how to use CCI to perform TrueCopy and ShadowImage operations on AMS 2100, AMS 2300, and AMS 2500 storage systems.

Command Line Interface (CLI)

The following documents describe how to use Hitachi Storage Navigator Modular 2 to perform management and replication activities from a command line.

Hitachi Storage Navigator Modular 2 Command Line Interface (CLI) Unified Reference Guide (MK-97DF8089)

Describes how to interact with all Navigator 2 bundled and optional software modules by typing commands at a command line.

Hitachi Storage Navigator 2 Command Line Interface Replication Reference Guide for AMS (MK-97DF8153) - this document

Describes how to interact with Navigator 2 to perform replication activities by typing commands at a command line.

Hitachi Dynamic Replicator documentation

The following documents describe how to install, configure, and use Hitachi Dynamic Replicator to provide AMS Family storage systems with continuous data protection, remote replication, and application failover in a single, easy-to-deploy and manage platform.

Hitachi Dynamic Replicator - Scout Release Notes (RN-99DF8211)

Hitachi Dynamic Replicator - Scout Host Administration Guide
(MK-98DF8212)

Hitachi Dynamic Replicator - Scout Installation and Configuration Guide (MK-98DF8213)

Hitachi Dynamic Replicator - Scout Quick Start Guide (MK-98DF8214)

Hitachi Dynamic Replicator - Scout Host Troubleshooting Guide
(MK-98DF8215)

Hitachi Dynamic Replicator DR-Scout ICAT Utility Guide
(MK-98DF8216)

Hitachi Dynamic Replicator - Scout RX Server Deployment Guide
(MK-98DF8217)

Hitachi Dynamic Replicator VX Solution for Oracle (Solaris)
(MK-98DF8218)

Hitachi Dynamic Replicator - Scout Solution for SharePoint 2007
(MK-98DF8219)

Hitachi Dynamic Replicator - Scout Solution for MySQL (Windows)
(MK-98DF8220)

Protecting Citrix XenServer Using Hitachi Dynamic Replicator - Scout (MK-98DF8221)

Hitachi Dynamic Replicator Quick Install/Upgrade Guide
(MK-98DF8222)

Hitachi Dynamic Replicator - Scout Protecting MS SQL Server
(MK-98DF8223)

Hitachi Dynamic Replicator - Scout - Protecting Microsoft Exchange Server (MK-98DF8224)

Hitachi Dynamic Replicator - Scout File Server Solution
(MK-98DF8225)

Hitachi Dynamic Replicator - Scout ESX - Protecting ESX Server (RCLI) (MK-99DF8226)

Regulatory information

The Hitachi AMS 2000 Family storage systems comply with the following regulations:

- US FCC - Class A, Part 15
- Canadian DOC - Class A
- European Declaration of Conformity - EN 55022 class A for ITE
- China RoHS

For more information, refer to the *Hitachi AMS 2100/2300 Storage System Hardware Guide* (MK-97DF8010) and *Hitachi AMS 2500 Storage System Hardware Guide* (MK-97DF8007).

Getting help

If you have questions after reading this guide, contact an HDS authorized service provider or visit the HDS support website: <http://support.hds.com>

Support contact information

If you purchased this product from an authorized HDS reseller, contact that reseller for support. For the name of your nearest HDS authorized reseller, refer to the HDS support web site for locations and contact information.

To contact the Hitachi Data Systems Support Center, please visit the HDS website for current telephone numbers and other contact information.
<http://support.hds.com>

Please provide at least the following information about the problem:

- Product name, model number, part number (if applicable) and serial number
- System configuration, including names of optional features installed, host connections, and storage configuration such as RAID groups and LUNs
- Operating system name and revision or service pack number
- The exact content of any error message(s) displayed on the host system(s)
- The circumstances surrounding the error or failure
- A detailed description of the problem and what has been done to try to solve it
- Confirmation that the HDS Hi-Track remote monitoring feature has been installed and tested.



NOTE: To help improve the quality of our service and support, your calls may be recorded or monitored.

HDS support web site

The following pages on the HDS support web site contain other further help and contact information:

- Home Page: <http://support.hds.com>

Interoperability information

Hitachi Data Systems believes that interoperability and industry standards are the keys to simplifying storage management software, exceeding customer expectations, and driving down customer costs. By working with other storage industry leaders, Hitachi Data Systems demonstrates how heterogeneous storage systems can work in concert seamlessly under an open hardware/software umbrella, to the benefit of our mutual customers. Interoperability information about the Hitachi AMS 2100/2300 base and expansion units and other products from Hitachi Data Systems can be obtained from www.hds.com/products/interoperability.

Comments

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

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

CLI Commands for Local Replication

This chapter provides the commands used for carrying out pair operations for SnapShot and ShadowImage. Command syntax, options, and examples are provided.

- ❑ [Display pair and pool information](#)
- ❑ [Display volumes available for use in pairs](#)
- ❑ [Display or define the SnapShot logical unit \(V-VOL\)](#)
- ❑ [Display or set up the data pool](#)
- ❑ [Create pairs](#)
- ❑ [Split pairs](#)
- ❑ [Resynchronize pairs](#)
- ❑ [Restore pairs](#)
- ❑ [Delete pairs](#)
- ❑ [Edit pairs](#)
- ❑ [Monitor pair status—event wait](#)
- ❑ [CLI, CCI commands for local-replication](#)

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 1-1: Options for aureplicationlocal -refer

Option	Description
-unit <i>unit_name</i>	Specify the array unit name. Must 64 characters or fewer, with alphanumeric and special symbols "-", "_", ".", "@", or " (space)". A space in front and back of the character string is removed.
-refer	Displays the pair information.
-si	Specify for ShadowImage pair.
-ss	Specify for SnapShot pair.
-pvol <i>lun</i>	Specify the logical unit number of the P-VOL.
-svol <i>lun</i>	Specify the logical unit number of the ShadowImage S-VOL or SnapShot V-VOL.
-detail	Specify to display detailed pair information.

Table 1-1: Options for aureplicationlocal -refer (Continued)

Option	Description
-splitinfo	Specify to display split information.
-poolinfo	Specify to display pool information.
-pairname <i>pair_name</i>	Specify the pair name (see note).
-gno <i>group_no</i>	Specify the group number.
-gname <i>group_name</i>	Specify the group name (see note.).



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       :
Copy Pace          : Normal
%
```

```
% aureplicationlocal -unit array1 -refer -splitinfo -ss
```

Pair Name	LUN	Pair LUN	Split Time	Split String
SS_LU0005_LU0015	5	15	2007/09/11 18:06:47	backupdata1
SS_LU0006_LU0016	6	16	---	

```
%
```

```
% aureplicationlocal -unit array1 -refer -poolinfo -ss
```

Pair Name	LUN	Pair LUN	Data Pool	Data Pool Usage Rate
SS_LU0005_LU0015	5	15	0	0%
SS_LU0006_LU0016	6	16	1	0%

```
%
```

:

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 1-2: Options for aureplicationlocal -availablelist

Option	Description
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in fewer 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
-availablelist	Displays a list of the volumes that can be used in a pair.
-si	Specify for a ShadowImage pair.
-ss	Specify for a SnapShot pair.
-pvol <i>lun</i>	Specify to display the luns available for use as a P-VOL.
-svol <i>lun</i>	Specify to indicate luns available for use as an S-VOL.
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in fewer 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

Returned values

- Normal termination: 0.
- Abnormal termination: Other than 0

Example

% aureplicationlocal -unit array1 -availablelist -si -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	
5	1.0 GB		0		N/A	6 (	4D+2P)	SAS	Normal	
6	1.0 GB		0		N/A	6 (	4D+2P)	SAS	Normal	
%										

Display or define the SnapShot logical unit (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:

```
aureplicationvvol  -unit unit_name -refer [ -m | -g | -t |  
                                         -auto ]
```

- To create a new SnapShot logical unit:

```
aureplicationvvol  -unit unit_name -add [ -lu lun ]  
                                         -size num[ m | g | t ]
```

- To delete a SnapShot logical unit:

```
aureplicationvvol  -unit unit_name -rm -lu lun
```

Options

Table 1-3: Options for aureplicationvvol

Options	Description
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols "-", "_", ".", "@", or " (space)". Space in front and back of the character string is removed.
-refer	Displays the SnapShot logical unit (V-VOL).
-add	Creates the SnapShot logical unit (V-VOL).
-rm	Deletes the SnapShot logical unit (V-VOL).
-lu <i>lun</i>	Specify the logical unit number to be used or deleted. When this options is omitted when create SnapShot logical unit, Navigator 2 wil assigned the lowest number of the available LUNs.
-size num[m g t]	Specify the capacity of SnapShot logical unit. When specifying the capacity in MB, add "m" or "M" to the command option. When specifying the capacity in GB, add "g" or "G" to the command option. When specifying the capacity in TB, add "t" or "T" to the command option.
-m -g -t -auto	Specify the capacity unit. When this option is omitted, the capacity is expressed in blocks. -m: MB -g: GB -t: TB -auto: If the capacity is 1 TB or more, it is displayed in TB. If 1 GB or more and fewer than 1 TB, it is displayed in GB. If fewer than 1 GB, it is displayed in GB.

Returned values

- Normal termination: 0
- Abnormal termination: Other than 0

Example

```
% 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.
%
```

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 1-4: Options for aupool

Options	Description
-unit <i>unit_name</i>	Specify the name of the array unit. 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.
-refer	Displays data pool information.
-add	Adds an LU to the data pool.
-rm	Deletes the LU from the data pool.
-chg	Changes the threshold of the data pool usage rate.
-poolno <i>pool_no</i>	Specify the data pool number.
-availablelist	Displays a list of LU numbers available for use in a data pool.

Table 1-4: Options for aupool (Continued)

Options	Description
-lu <i>lun ...</i>	Specify the LU number to be added to the data pool. Single or multiple LU numbers can be specified. - Examples: -lu 3 -lu 0 1 2 3 4 5 8 -lu 0-5 8
-thres <i>num</i>	Specify the threshold percentage for data pool usage rate. 70-percent is the default.

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 ]
```

- To create a new group and create a pair belonging to the group:

```
aureplicationlocal -unit unit_name -create -si
```

```

pair_name ]                -pvol lun -svol lun [ -pairname
                             -gno group_no
                             [ -pace prior | normal | slow ]
                             [ -noread ]
                             [ -nocopy ]
- To create a pair and add the pair to an existing group:
aureplicationlocal -unit unit_name -create -si
pair_name ]        -pvol lun -svol lun [ -pairname
                    -gno group_no | -gname group_name
                    [ -pace prior | normal | slow ]
                    [ -noread ]
                    [ -nocopy ]

```

• SnapShot

```

- To create a pair that is not in a group:
aureplicationlocal -unit unit_name -create -ss
pair_name ]        -pvol lun -svol lun [ -pairname
                    [ -localpoolno pool_no ]
                    [ -pace prior | normal | slow ]
                    [ -compsplit ]
- To create a new group and create a pair belonging to the
group:
aureplicationlocal -unit unit_name -create -ss
pair_name ]        -pvol lun -svol lun [ -pairname
                    -gno group_no
                    [ -localpoolno pool_no ]
                    [ -pace prior | normal | slow ]
- To create a pair and add the pair to an existing group:
aureplicationlocal -unit unit_name -create -ss
pair_name ]        -pvol lun -svol lun [ -pairname
                    -gno group_no | -gname group_name
                    [ -localpoolno pool_no ]
                    [ -pace prior | normal | slow ]

```

Options

Table 1-5: Options for aureplicationlocal -create

Options	Description
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols "-", "_", ".", "@", or " (space)". Space in front and back of the character string is removed.
-create	Specify this option to create pairs.

Table 1-5: Options for aureplicationlocal -create (Continued)

Options	Description
-si	Specify for ShadowImage.
-ss	Specify for SnapShot.
-pvol <i>lun</i>	Specify the logical unit number to be the P-VOL.
-svol <i>lun</i>	Specify the logical unit number to be the S-VOL.
-pairname <i>pair_name</i>	Specify the pair name (see note). When this option is omitted, Navigator 2 adds the following name. - ShadowImage pair: SI_LUXXXX_LUYYYY - SnapShot pair: SS_LUXXXX_LUYYYY - XXXX: Logical unit number of the P-VOL (4 digits with 0) - YYYY: Logical unit number of the S-VOL (4 digits with 0)
-localpoolno <i>pool_no</i>	Specify the data pool number when creating a SnapShot pair. If this option is omitted, Navigator 2 uses the lowest available number.
-gno <i>group_no</i>	Use when creating pair that belongs to the specified group. When the specified group does not exist, a new group is created.
-gname <i>group_name</i>	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).
-pace prior normal slow	Specify the copy pace at the time of initial copy or when restoring a copy. When this option is omitted, Navigator 2 sets Normal. prior: Fast normal: Medium slow: Slow
-compsplit	Specify to split a pair automatically, immediately after pair creation.
-noread	Specify to make the S-VOL unavailable for reads after pair creation. This option is for ShadowImage only.
-nocopy	Specify when not copying from the S-VOL to the P-VOL after the pair creation.



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: %, *, +, -, ., /, =, @, _, :, [,]. Do not use "Ungrouped" in the group name with this command.

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 1-6: Options for aureplicationlocal -split

Options	Description
-unit <i>unit_name</i>	The array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols "-", "_" (underline), ".", "@", or " (space)". Space in front and back of the character string is removed.
-split	Specify to split pairs.
-si	Specify for ShadowImage pairs.
-ss	Specify for SnapShot pairs.
-pvol <i>lun</i>	The logical unit number to be the P-VOL.
-svol <i>lun</i>	The logical unit number to be the S-VOL.
-pairname <i>pair_name</i>	The name of the pair to be split (see note).
-gno <i>group_no</i>	Use to split pairs in the specified group. When the pair name is not specified, all pairs in the group are split.
-gname <i>group_name</i>	Use to split pairs in the specified group. When the pair name is not specified, all pairs in the group are split (see note).
-force	Use to split pairs forcibly. This option is for ShadowImage only.
-splitstr <i>split_str</i>	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:

```
aureplicationlocal -unit unit_name -resync
                    -si | -ss
                    -gno group_no | -gname group_name
```

Options

Table 1-7: Options for aureplicationlocal -resync

Option	Description
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols "-", "_", ".", "(", ")", "@", or " ". Space in front and back of the character string is removed.
-resync	Use to resynchronize pairs.
-si	Specify for ShadowImage pairs.
-ss	Specify for SnapShot pairs.
-pvol <i>lun</i>	Specify the logical unit number of the P-VOL.
-svol <i>lun</i>	Specify the logical unit number of the S-VOL.
-pairname <i>pair_name</i>	Specify the pair name. When this option is omitted, all pairs in the specified group are resynchronized (see note).
-gno <i>group_no</i>	Resynchronize pairs in the specified group. When the pair name is not specified, all pairs in the specified group are resynchronized.

Table 1-7: Options for aureplicationlocal -resync (Continued)

Option	Description
-gname <i>group_name</i>	Resynchronize pairs in the specified group. When the pair name is not specified, all pairs in the specified group are resynchronized (see note).



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 -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.
%
```

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 1-8: Options for aureplicationlocal -restore

Options	Description
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in fewer 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.
-restore	Use to restore pairs.
-si	Specify for ShadowImage pairs.
-ss	Specify for SnapShot pairs.
-pvol <i>lun</i>	Specify the logical unit number of the P-VOL.
-svol <i>lun</i>	Specify the logical unit number of the S-VOL.
-pairname <i>pair_name</i>	Specify the pair name. When this option is omitted, all pairs in the specified group are restored (see note).
-gno <i>group_no</i>	Restore pairs in the specified group. When the pair name is not specified, all pairs in the specified group are restored.
-gname <i>group_name</i>	Restore pairs in the specified group. When the pair name is not specified, all pairs in the specified group are restored (see note).



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 -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

```
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:

```
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:

```
aureplicationlocal -unit unit_name -simplex
                    -si | -ss
                    -pvol lun -svol lun
```
- To delete all pair in a group:

```
aureplicationlocal -unit unit_name -simplex
                    -si | -ss
                    -gno group_no | -gname group_name
```

Options

Table 1-9: Options for aureplicationlocal -simplex

Options	Description
-unit <i>unit_name</i>	Specify the array unit name that delete pairs. 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.
-simplex	Release pairs.
-si	Specify for ShadowImage pairs.
-ss	Specify for the SnapShot pairs.
-pvol <i>lun</i>	Specify the logical unit number to be the P-VOL.
-svol <i>lun</i>	Specify the logical unit number to be the S-VOL.
-pairname <i>pair_name</i>	Specify the pair name. When this option is omitted, all pairs in the specified group are deleted (see note).
-gno <i>group_no</i>	Specify the group number. If the pair name is not specified, all pairs in the specified group are deleted.
-gname <i>group_name</i>	Specify the group name. If the pair name is not specified, all pairs in the specified group are deleted (see note).



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 1-10: Options for aureplicationlocal -chg

Options	Description
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in fewer 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.
-chg	Changes the group information or pair information.
-si	Specify for ShadowImage pairs.
-ss	Specify for SnapShot pairs.
-pvol <i>lun</i>	Specify the logical unit number to be the P-VOL.
-svol <i>lun</i>	Specify the logical unit number to be the S-VOL.
-pairname <i>pair_name</i>	Specify the current pair name (see note).

Table 1-10: Options for aureplicationlocal -chg (Continued)

Options	Description
-gno <i>group_no</i>	Specify the group number.
-gname <i>group_name</i>	Specify the current group name. *
-pace prior normal slow	Changes the copy pace. prior: Fast normal: Medium slow: Slow
-newgname <i>new_group_name</i>	Changes the group name to the new name. **
-newpairname <i>new_pair_name</i>	Changes the pair name to the new name (see note).



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 is used to display the current pair status.

Syntax

- Display current status for the specified pair:

```
aureplicationmon -unit unit_name -evwait
                    -si | -ss
                    -pairname pair_name
                    -gno group_no | -gname group_name
                    -nowait
```

Options

Table 1-11: Options for aureplicationmon -evwait

Options	Description
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in fewer than or equal to 64 characters using alphanumeric characters, special symbols "-", "_", ".", "@", or " (space)". Space in front and back of the character string is removed.
-evwait	Waits for the specified status or gets the current status.
-si	Specify for ShadowImage pairs.
-ss	Specify for SnapShot pairs.
-pairname <i>pair_name</i>	Specify the pair name (see note).
-gno <i>group_no</i>	Specify the group number (see note)
-gname <i>group_name</i>	Specify the group name (see note)
-st [simplex] [sync] [paired] [split] [failure] [takeover]	Specify the pair status that you want to wait for.
-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 <i>time</i>	Specify time-out time. When this option is omitted, the time-out time set 3 seconds. 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.

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 1-12: Returned Values for -evwait

Monitoring Volume	Status	Returned Value
P-VOL or S-VOL	Simplex	10
P-VOL	Synchronizing	11
	Reverse Synchronizing	11
	Paired	12
	Split	13
	Failure	14
	Threshold Over	15
	Pool Full	16
	Inconsistent	17
	Busy	18
S-VOL	Synchronizing	21
	Paired	22
	Split	23
	Failure	24
	Takeover	25
	Pool Full	26
	Inconsistent	27
	Busy	28

Example

```
% 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 1-13: CLI, CCI Commands for Remote Repl.

Description	CLI Command	CCI Command
Display pair information	aureplicationlocal -refer	pairdisplay
Create pairs	aureplicationlocal -create	paircreate
Split pairs	aureplicationlocal -split	pairsplit
Resynchronize pairs	aureplicationlocal -resync	pairresync
Restore pairs	aureplicationlocal -restore	pairresync -restore
Delete pairs	aureplicationlocal -simplex	pairsplit -S
Event wait	aureplicationmon -evwait	pairevtwait

CLI Commands for Remote Replication

This chapter contains the commands and their syntax and options, plus examples, for carrying out pair operations for TrueCopy and TrueCopy Extended Distance (TCE).

- ❑ [Display pair and pool information](#)
- ❑ [Display volumes available for use in pairs](#)
- ❑ [Remote path—display, define, delete, repair](#)
- ❑ [Create pairs](#)
- ❑ [Display or define TrueCopy options](#)
- ❑ [Split pairs](#)
- ❑ [Resynchronize pairs](#)
- ❑ [Swap pairs](#)
- ❑ [Delete pairs](#)
- ❑ [Edit pairs](#)
- ❑ [Monitor pair status—synchronous wait](#)
- ❑ [CLI, CCI commands for remote-replication](#)

Display pair and pool information

Command name

`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:

```
aureplicationremote -unit unit_name -refer [-tc] [-tce]
                    [ -pvol lun ] [ -svol lun ]
```

- To display pair information in detail for each pair, include the `-detail` option:

```
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:

```
aureplicationremote -unit unit_name -refer -detail
                    -pvol lun -svol lun
```

- To display the pool list that a pair uses, specify as shown:

```
aureplicationremote -unit unit_name -refer -poolinfo
```

- To display the split time and the characters string added at the time of the split pair:

```
aureplicationremote -unit unit_name -refer -splitinfo
```

Options

Table 2-1: Options for aureplicationremote -refer

Option	Description
<code>-unit unit_name</code>	Specify the array unit name. Must be 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.
<code>-refer</code>	Displays the pair information.
<code>-tc</code>	Specify for TrueCopy pairs.
<code>-tce</code>	Specify for TrueCopy Extended Distance pairs.
<code>-pvol lun</code>	Specify the logical unit number of the P-VOL.
<code>-svol lun</code>	Specify the logical unit number of the S-VOL or SnapShot Logical Unit (V-VOL).

Table 2-1: Options for aureplicationremote -refer (Continued)

Option	Description
-detail	Specify for detailed pair information.
-poolinfo	Specify for pool information.
-pairname <i>pair_name</i>	Specify the pair name (see note).
-gno <i>group_no</i>	Specify the group number.
-gname <i>group_name</i>	Specify the group name (see note).)



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
%
```

```
% aureplicationremote -unit localarray -refer -detail -pairname TCE_LU0000_LU0000
-gno 0
Pair Name          : TCE_LU0000_LU0000
Local Information
  LUN              : 0
  Attribute        : P-VOL
Remote Information
  Array ID         : 85000007
  Path Name        : N/A
  LUN              : 0
Capacity          : 50.0 GB
Status            : Paired(100%)
Copy Type         : TrueCopy Extended Distance
Group             : 0:TCE_Group1
Data Pool         : 0
Data Pool Usage Rate : 0%
Consistency Time  : N/A
Difference Size    : 0.0 MB
Copy Pace         : Prior
Fence Level       : N/A
Previous Cycle Time : 0 sec.
%
```

```
% aureplicationremote -unit localarray -refer -poolinfo
Pair name      Local LUN  Attribute  Remote LUN  Data Pool  DP Usage Rate
TCE_LU0000_LU0000 0    P-VOL          0 0      10%
%
```

```
% aureplicationremote -unit localarray -refer -groupinfo
Group      CTL  Lapsed Time  Diffnce Size[MB]  Transf Rate[KB/s]  Transf
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

Table 2-2: Options for aureplicationremote -availablelist

Options	Description
-unit <i>unit_name</i>	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
-availablelist	Displays volumes available for use in pairs.
-tc	Specify for TrueCopy pairs.
-tce	Specify for TCE pairs.
-pvol	Specify when displaying luns 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

```
aurmtpath -refer
```

Description

The `aurmtpath -refer` command displays remote path information.

Syntax

```
aurmtpath -unit unit_name -refer
```

Options

Table 2-3: Options for `aurmtpath -refer`

Options	Description
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols "-", "_", ".", "@", or " " (space)". Space in front and back of the character string is removed.
-refer	Displays path information.

Returned values

- Normal termination: 0.
- Abnormal termination: Other than 0

Examples

For iSCSI

```
% aurmtpath -unit array1 -refer
Initiator Information
  Local Information
    Array ID      : 85000002
    Distributed Mode : N/A

  Path Information
    Interface Type      : iSCSI
    Remote Array ID     : 85022345
    Remote Path Name    : Array_85022345
    Bandwidth [0.1 Mbps] : 15
    iSCSI CHAP Secret   : Disable

    Path  Status      Local      Remote      Remote Port      TCP Port No. of
    0     Normal      0A       N/A        192.168.0.201    Remote Port
    1     Normal      1A       N/A        192.168.0.209    3260
                                           3260

Target Information
  Local Array ID : 85000002
%
```

For fibre channel

```
% aurmtpath -unit array1 -refer
Initiator Information
  Local Information
    Array ID      : 85000002
    Distributed Mode : N/A

  Path Information
    Interface Type      : FC
    Remote Array ID     : 85022345
    Remote Path Name    : Array_85022345
    Bandwidth [0.1 Mbps] : 15
    iSCSI CHAP Secret   : N/A

    Path  Status      Local      Remote      Remote Port      TCP Port No. of
    0     Normal      0A       0A        N/A              Remote Port
    1     Normal      1A       1B        N/A              N/A
                                           N/A

%
```

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
                0A | 0B | 0C | 0D | 0E | 0F | 0G | 0H |
                1A | 1B | 1C | 1D | 1E | 1F | 1G | 1H
          -path1 1A | 1B | 1C | 1D | 0E | 0F | 0G | 0H
                0A | 0B | 0C | 0D | 0E | 0F | 0G | 0H |
                1A | 1B | 1C | 1D | 1E | 1F | 1G | 1H |
          -band bandwidth
```

- 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
```

- 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 ]
```

- To set the array type:

```
aurmtpath -unit unit_name -set
          [ -distributedmode hub | edge ]
```

Options

Table 2-4: Options for aurmtpath -set

Options	Description
-unit <i>unit_name</i>	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.
-set	Sets the remote path information.
-remote array_id	Specify the remote array ID.
-remotename remote_path_name	Specify the remote path name. When the specification is omitted, the following name adds. Array_xxxxxxx xxxxxxx: Remote array ID remote_path_name : Remote path name (See Note 2)
-path0 local_path remote_path	Specify the local path 0 port number and remote path 0 port number.
-path1 local_path remote_path	Specify the local path 1 port number and remote path 1 port number.
-initiator	Specify when setting the initiator information.
-path0 0A 0B 0E 0F	Specify the path 0 information for iSCSI.
-path0_addr inet_addr	Specify the IP address of path 0 for iSCSI. inet_addr: IP address
-path0_tcpportnum port_num	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
-path1 1A 1B 1E 1F	Specify the path 1 information for iSCSI.
-path1_addr inet_addr	Specify the IP address of path 1 for iSCSI. inet_addr: IP address
-path1_tcpportnum port_num	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
-secret enable disable	Specify whether to set the Secret input to enable or disable.
-band bandwidth	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.
-newremotename new_remote_path_name	Specify the changed remote path name. new_remote_path_name : Remote path name (See Note 2)
-distributedmode hub edge	Specify whether to set the Distributed mode. hub : hub array edge : edge array

- 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

```
% aurmtpath -unit array1 -set -initiator -remote 85000002
      -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

```
% aurmtpath -unit array1 -set -remote 85000002 -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.
%
```

Define, 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:

```
aurmtpath -unit unit_name -set -target
          -local array_id
          -secret
```
- To delete the CHAP secret:

```
aurmtpath -unit unit_name -rm [ -target ]
          -remote array_id | -remotename remote_path_name
```

Options

Table 2-5: Options for aurmtpath -target

Options	Description
-unit <i>unit_name</i>	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.
-set	Sets the remote path information.
-target	Specify this option to set or delete target information.
-local array_id	Specify the local array ID of target information.
-secret	Sets the CHAP Secret.
-rm	Deletes the remote path.
-remote array_id	Specify the remote array ID.
-remotename remote_path_name	Specify the remote path name. remote_path_name: Remote path name

Returned values

- Normal termination: 0.
- Abnormal termination: Other than 0

Example

```
% aurmtpath -unit array1 -set -target -local 85022345 -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 2-6: Options for aurmtpath -reconst

Options	Description
-unit <i>unit_name</i>	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.
-reconst	Reconstructs the remote path.
-remote array_id	Specify the remote array ID.
-remotename remote_path_name	Specify the remote path name. remote_path_name: Remote path name
-path0 -path1	Specify the path to reconstruct.

Returned values

- Normal termination: 0.
- Abnormal termination: Other than 0

Example

```
% aurmtpath -unit array1 -reconst -remote 85000002 -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 2-7: Options for `aurmtpath -rm`

Options	Description
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols "-", "_", ".", "@", or " " (space). Space in front and back of the character string is removed.
-rm	Deletes the remote path.
-remote array_id	Specify the remote array ID.
-remotename remote_path_name	Specify the remote path name. remote_path_name : Remote path name

Returned values

- Normal termination: 0.
- Abnormal termination: Other than 0

Example

```
% aurmtpath -unit array1 -rm -remote 85000002  
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

Table 2-8: Options for `autruecopyopt -refer`

Options	Description
-unit unit_name	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.
-refer	Causes TrueCopy option information to display.

Returned values

- Normal termination: 0.
- Abnormal termination: Other than 0

Example

```
% autruecopyopt -unit array1 -refer
Cycle Time[sec.]           : 300
Cycle Over Report          : Disable
%Remote Replication Write Control Mode : 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 2-9: Options for `autruecopyopt -set`

Options	Description
-unit <i>unit_name</i>	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 "-", "_", ".", "@", or " (space)". Space in front and back of the character string is removed.
-set	Sets the TrueCopy option information.
-cycletime <i>time</i>	Specify the cycle time. time: cycle time in seconds.
-cycleoverreport enable disable	Sets whether to enable or disable the cycle over report.
-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

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.
%
```

```
% autruecopyopt -unit array1 -set -writecontrolmode enable
Are you sure you want to set the TrueCopy options?(y/n [n]): y
If Remote Replication Write Control Mode is set enabled, the performance of
I/O from hosts to P-VOL and to the logical units in the same RAID group or
DP pool as S-VOL while the pair status is synchronizing may be deteriorated.
The TrueCopy options have been set successfully.
%
```

Create pairs

Command name

aureplicationremote -create

Description

The aureplicationremote -create option is used to create a pair.

Syntax

- **TrueCopy**

- To create a pair that is not in a group:

```
aureplicationremote -unit unit_name -create -tc
                    -pvol lun -svol lun [ -pairname pair_name ]
                    -remote array id
                    [ -pace prior | normal | slow ]
                    [ -fencelvl never | data ]
                    [ -nocopy ]
```

- To create a new group and create a pair belonging to the group:

```
aureplicationremote -unit unit_name -create -tc
                    -pvol lun -svol lun [ -pairname pair_name ]
                    -gno group_no
                    [ -pace prior | normal | slow ]
                    [ -fencelvl never | data ]
                    [ -nocopy ]
```

- To create a pair and add the pair to an existing group:

```
aureplicationremote -unit unit_name -create -tc
                    -pvol lun -svol lun [ -pairname pair_name ]
```

```

-gname group_name
-remote array_id
[ -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
                    -pvol lun -svol lun [ -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
                    -pvol lun -svol lun [ -pairname pair_name ]
                    -gname group_name
                    -remote array_id
                    [ -localpoolno pool_no ]
                    -remotepoolno pool_no
                    [ -pace prior | normal | slow ]
                    [ -nocopy ]

```

Options

Table 2-10: Options for aureplicationremote -create

Options	Description
-unit <i>unit_name</i>	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.
-create	Specify this option to create pairs.
-tc	Specify for TrueCopy pairs.
-tce	Specify for TCE pairs.
-pvol <i>lun</i>	Specify the logical unit number to be the P-VOL.
-svol <i>lun</i>	Specify the logical unit number to be the S-VOL.
-pairname <i>pair_name</i>	Specify the pair name (see note). When this option is omitted, Navigator 2 adds the following name. • TrueCopy pair: TC_LUXXXX_LUYYYY • TCE pair: TCE_LUXXXX_LUYYYY • XXXX: Logical unit number of the P-VOL (4 digits with 0) • YYYY: Logical unit number of the S-VOL (4 digits with 0)

Table 2-10: Options for aureplicationremote -create (Continued)

Options	Description
-gno <i>group_no</i>	Creates pair(s) in the specified group. When the group does not exist, a new group is created.
-gname <i>group_name</i>	Creates a pair and add the specified group. When the specified group already exists, created pairs add to the specified group see note).
-remote array_id	Specify the remote array ID.
-pace prior normal slow	Specify the copy pace at the time of initial copy or restore copy. When this option is omitted, Navigator 2 sets Normal. prior: Fast normal: Medium slow: Slow
-fencelvl never data	Specify the fence level when creating a TrueCopy pair. When this option is omitted, Navigator 2 sets never.
-nocopy	Specify when not copying from the P-VOL to the S-VOL after the pair creation.



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: %, *, +, -, ., /, =, @, _, :, [,].

The pair name and group name are seen in the local array only.

Returned values

- Normal termination: 0
- Abnormal termination: Other than 0

Example

```
% aureplicationremote -unit localarray -create -tce -pvol 0 -svol 0
                        -gno 0 -remote 85000002 -remotepoolno 0
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.

Syntax

- To split a pair by specifying the pair name:

```
aureplicationremote -unit unit_name -split -tc | -tce
                    -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 | -tce
                    -pvol lun -svol lun
                    -remote array_id
```
- To split the pairs in a group:

```
aureplicationremote -unit unit_name -split -tc | -tce
                    -gno group_no | -gname group_name
                    [ -svolrw r | rw ]
```

Options

Table 2-11: Options for aureplicationremote -split

Options	Description
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols "-", "_", ".", "@", or " " (space)". Space in front and back of the character string is removed.
-split	Specify this option to split pairs.
-tc	Specify for TrueCopy pairs.
-tce	Specify for TCE pairs.
-pvol <i>lun</i>	Specify the logical unit number to be the P-VOL.
-svol <i>lun</i>	Specify the logical unit number to be the S-VOL.
-pairname <i>pair_name</i>	Specify a pair name pair (see note).
-gno <i>group_no</i>	Splits pairs in the specified group. When the pair name is not specified, all pairs in the specified group are split.
-gname <i>group_name</i>	Splits pairs in the specified group. When the pair name is not specified, all pairs in the specified group are split (see note).
-remote <i>array_id</i>	Specify the array ID of the remote array.

Table 2-11: Options for aureplicationremote -split

-svolrw <i>r</i> <i>rw</i>	Specify the access limit to the S-VOL after pair split. When this option is omitted, Navigator 2 sets rw. r: Read only rw: Read/Write
------------------------------	---



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 -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:

```
aureplicationremote -unit unit_name -resync
                    -tc | -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
                    -pvol lun -svol lun
                    -remote array_id
```

- To resynchronize the pairs in a group:

```
aureplicationremote -unit unit_name -resync
                    -tc | -tce
                    -gno group_no | -gname group_name
```

Options

Table 2-12: Options for aureplicationremote -resync

Option	Description
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols "-", "_", ".", "@", or " " (space). Space in front and back of the character string is removed.
-resync	Specify to resynchronize pairs.
-tc	Specify for TrueCopy pairs.
-tce	Specify for TCE pairs.
-pvol <i>lun</i>	Specify the logical unit number to be the P-VOL.
-svol <i>lun</i>	Specify the logical unit number to be the S-VOL.
-pairname <i>pair_name</i>	Specify the pair name. When this option is omitted, all pairs in the specified group are resynchronized (see note).
-gno <i>group_no</i>	Resynchronize pairs in the specified group. When the pair name is not specified, all pairs in the specified group are resynchronized.

Table 2-12: Options for aureplicationremote -resync

Option	Description
-gname <i>group_name</i>	Resynchronize pairs in the specified group. When the pair name is not specified, all pairs in the specified group are resynchronized (see note).
-remote array_id	Specify the remote array ID.



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 0Example:

Example

```
% 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:

```
aureplicationremote -unit unit_name -swaps -tc  
                    -pairname pair_name  
                    -gno group_no | -gname group_name
```
- To swap a pair for the specified S-VOL:

```
aureplicationremote -unit unit_name -swaps -tc  
                    -svol lun
```
- To swap the pairs in a group:

```
aureplicationremote -unit unit_name -swaps -tc | -tce  
                    -gno group_no | -gname group_name
```

Options

Table 2-13: Options for aureplicationremote -restore

Options	Description
-unit <i>unit_name</i>	Specify the remote array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols "-", "_", ".", "(", ")", "@", or " " (space). Space in front and back of the character string is removed.
-swaps	Specify to swaps pairs.
-tc	Specify for TrueCopy pairs.
-tce	Specify for TCE pairs.
-pairname <i>pair_name</i>	Specify the pair name. When this option is omitted, all pairs which belong to the specified group are swapped (see note).
-gno <i>group_no</i>	Restore pairs in the specified group. When the pair name is not specified, all pairs in the specified group are swapped.
-gname <i>group_name</i>	Restore pairs in the specified group. When the pair name is not specified, all pairs in the specified group are swapped (see note).
-svol <i>lun</i>	Specify the logical unit number of the S-VOL.



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 0Example:

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, 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 1-23](#)).

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 `-simplex` option on the remote array, the S-VOL is deleted forcibly.

When executing the `-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  
                    -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  
                    -locallun pvol | svol  
                    -remote array_id
```

- To delete the pairs in a group:

```
aureplicationremote -unit unit_name -simplex -tc | -tce  
                    -gno group_no | -gname group_name
```

Options

Table 2-14: Options for aureplicationremote -simplex

Options	Description
-unit <i>unit_name</i>	Specify the local array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols "-", "_", ".", "(", ")", "@", or " ". Space in front and back of the character string is removed.
-simplex	Specify to release pairs.
-tc	Specify for TrueCopy pairs.
-tce	Specify for TCE pairs.
-locallun pvol svol	Specify whether the local lu is the P-VOL or S-VOL.
-pvol <i>lun</i>	Specify the logical unit number to be the P-VOL.
-svol <i>lun</i>	Specify the logical unit number to be the S-VOL.
-pairname <i>pair_name</i>	Specify the pair name. When this option is omitted, all pairs in the specified group are deleted (see note).
-gno <i>group_no</i>	Delete pairs in the specified group. When the pair name is not specified, all pairs in the specified group are deleted.
-gname <i>group_name</i>	Delete pairs in the specified group. When the pair name is not specified, all pairs in the specified group are deleted (see note).
-remote array id	Specify the remote array ID.



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 0Example:

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  
                    -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  
                    -locallun pvol | svol  
                    -pvol lun -svol lun  
                    -remote array_id  
                    [ -newpairname new_pair_name ]  
                    [ -pace prior | normal | slow ]
```

Options

Table 2-15: Options for aureplicationremote -chg

Options	Description
-unit <i>unit_name</i>	Specify the array unit name. Specify the name in less than or equal to 64 characters using alphanumeric characters, special symbols "-", "_", ".", "@", or " (space)". Space in front and back of the character string is removed.
-chg	Changes group or pair information.
-tc	Specify for TrueCopy pairs.
-tce	Specify for TCE pairs.
-locallun pvol svol	Specify whether the local lu is the P-VOL or S-VOL.
-pvol <i>lun</i>	Specify the logical unit number to be the P-VOL.
-svol <i>lun</i>	Specify the logical unit number to be the S-VOL.

Table 2-15: Options for aureplicationremote -chg (Continued)

Options	Description
-pairname <i>pair_name</i>	Specify the pair name (see note).
-gno <i>group_no</i>	Changes the pair information in the specified group.
-gname <i>group_name</i>	Changes the pair information in the specified group. *
-pace prior normal slow	Changes the copy pace. prior: Fast normal: Medium slow: Slow
-newgname <i>new_group_name</i>	Changes the group name to the specified new name. **
-newpairname <i>new_pair_name</i>	Changes the pair name to the specified new name (see note).
-remote array id	Specify the remote array ID.



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 0Example:

Example

```
% aureplicationremote -unit localarray -chg -tc -locallun pvol -pvol 0 -svol 0
                        -remote 85000002 -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 1-23](#)

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 2-16: Options for aureplicationmon -syncwait

Options	Description
-unit <i>unit_name</i>	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.
-syncwait	Checks if the write is reflected in the S-VOL immediately after the command, or gets the current sequence number of the P-VOL.
-tce	Specify for TCE.
-pairname <i>pair_name</i>	Specify the pair name (see note).
-gno <i>group_no</i>	Specify the group number (see note)
-gname <i>group_name</i>	Specify the group name (see note)
-nowait	Gets the current status of the pair or the group (see Table 2-17).
-timeout <i>time</i>	Specify time-out time. When this option is omitted, the time-out time set 3 seconds. time = time-out time (0 to 180)
-pvolsequence <i>sequence_no</i>	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.



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 2-17: Return Values for the `-nowait` Parameter

	Status	Returned Values	Description
When the <code>-nowait</code> option is specified	NOWAIT	1	Successfully obtained the current sequence number of the P-VOL.
When the <code>-nowait</code> option is not specified	DONE	10	Write data to the P-VOL has been updated to the S-VOL.
	TIMEOUT	11	A timeout has occurred.
	BROKEN	12	Out of synchronization because of splitting pair, failure, etc.
	CHANGED	13	The pair has been resynchronized.

Example

```
% 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
```

CLI, CCI commands for remote-replication

Table 2-18: Comparison with CCI Commands

Description	CLI Command	CCI Command
Display pair information	aureplicationremote -refer	pairdisplay
Create pairs	aureplicationremote -create	paircreate
Split pairs	aureplicationremote -split	pairsplit
Resynchronize pairs	aureplicationremote -resync	pairresync
Swap pairs	aureplicationremote -swaps	pairresync -swaps
Delete pairs	aureplicationremote -simplex	pairsplit -S
Synchronous wait	aureplicationmon -syncwait	pairsynctwait



Glossary

This glossary provides definitions for replication terms as well as terms related to the technology that supports your Hitachi Adaptable Modular Storage array. Click the letter of the glossary section to display the related page.

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

A

array

A set of hard disks mounted in a single enclosure and grouped logically together to function as one contiguous storage space.

asynchronous

Asynchronous data communications operate between a computer and various devices. Data transfers occur intermittently rather than in a steady stream. Asynchronous replication does not depend on acknowledging the remote write, but it does write to a local log file. Synchronous replication depends on receiving an acknowledgement code (ACK) from the remote system and the remote system also keeps a log file.

B

bps

Bits per second, the standard measure of data transmission speeds.

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.

CCI

See command control interface.

CLI

See command line interface.

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

Glossary–2

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.

consistency group (CTG)

A group of two or more logical units in a file system or a logical volume. When a file system or a logical volume which stores application data, is configured from two or more logical units, these multiple logical units are managed as a consistency group (CTG) and treated as a single entity. A set of volume pairs can also be managed and operated as a consistency group.

CTG

See Consistency Group.

cycle time

A user specified time interval used to execute recurring data updates for remote copying. Cycle time updates are set for each storage system and are calculated based on the number of consistency groups CTG.

D

data pool

One or more disk volumes designated to temporarily store un-transferred differential data (in the local storage system or snapshots of backup data in the remote storage system). The saved snapshots are useful for accurate data restoration (of the P-VOL) and faster remote takeover processing (using the S-VOL).

data volume

A volume that stores database information. Other files, such as index files and data dictionaries, store administrative information (metadata).

differential data control

The process of continuously monitoring the differences between the data on two volumes and determining when to synchronize them.

differential data copy

The process of copying the updated data from the primary volume to the secondary volume. The data is updated from the differential data control status (the pair volume is under the suspended status) to the primary volume.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
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Differential Management Logical Unit (DMLU)

The volumes used to manage differential data in a 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.

differential-data

The original data blocks replaced by writes to the primary volume. In Copy-on-Write, differential data is stored in the data pool to preserve the copy made of the P-VOL to the time of the snapshot.

disk array

An enterprise storage system containing multiple disk drives. Also referred to as “disk array device” or “disk storage system.”

DMLU

See Differential Management-Logical Unit.

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

entire copy

Copies all data in the primary volume to the secondary volume to make sure that both volumes are identical.

extent

A contiguous area of storage in a computer file system that is reserved for writing or storing a file.

F

failover

The automatic substitution of a functionally equivalent system component for a failed one. The term failover is most often applied to intelligent controllers connected to the same storage devices and host computers. If one of the controllers fails, failover occurs, and the survivor takes over its I/O load.

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

fallback

Refers to the process of restarting business operations at a local site using the P-VOL. It takes place after the storage systems have been recovered.

FC

See fibre channel.

fibre channel

A gigabit-speed network technology primarily used for storage networking.

firmware

Software embedded into a storage device. It may also be referred to as Microcode.

G**Gbps**

Gigabit per second.

granularity of differential data

Refers to the size or amount of data transferred to the S-VOL during an update cycle. Since only the differential data in the P-VOL is transferred to the S-VOL, the size of data sent to S-VOL is often the same as that of data written to the P-VOL. The amount of differential data that can be managed per write command is limited by the difference between the number of incoming host write operations (inflow) and outgoing data transfers (outflow).

GUI

Graphical user interface.

I**I/O**

Input/output.

initial copy

An initial copy operation involves copying all data in the primary volume to the secondary volume prior to any update processing. Initial copy is performed when a volume pair is created.

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

initiator ports

A port-type used for main control unit port of Fibre Remote Copy function.

IOPS

I/O per second.

iSCSI

Internet-Small Computer Systems Interface, a TCP/IP protocol for carrying SCSI commands over IP networks.

iSNS

Internet-Small Computer Systems Interface, a TCP/IP protocol for carrying SCSI commands over IP networks.

L

LAN

Local Area Network, a computer network that spans a relatively small area, such as a single building or group of buildings.

logical unit

See logical unit number.

logical unit number (LUN)

An address for an individual disk drive, and by extension, the disk device itself. Used in the SCSI protocol as a way to differentiate individual disk drives within a common SCSI target device, like a disk array. LUNs are normally not entire disk drives but virtual partitions (or volumes) of a RAID set.

LU

See logical unit.

LUN

See logical unit number.

M

microcode

The lowest-level instructions directly controlling a microprocessor. Microcode is generally hardwired and cannot be modified. It is also referred to as firmware embedded in a storage subsystem.

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

Glossary–6

mount

To mount a device or a system means to make a storage device available to a host or platform.

mount point

The location in your system where you mount your file systems or devices. For a volume that is attached to an empty folder on an NTFS file system volume, the empty folder is a mount point. In some systems a mount point is simply a directory.

P

pair

Refers to two logical volumes that are associated with each other for data management purposes (e.g., replication, migration). A pair is usually composed of a primary or source volume and a secondary or target volume as defined by the user.

pair splitting

The operation that splits a pair. When a pair is "Paired", all data written to the primary volume is also copied to the secondary volume. When the pair is "Split", the primary volume continues being updated, but data in the secondary volume remains as it was at the time of the split, until the pair is re-synchronized.

pair status

Internal status assigned to a volume pair before or after pair operations. Pair status transitions occur when pair operations are performed or as a result of failures. Pair statuses are used to monitor copy operations and detect system failures.

paired volume

Two volumes that are paired in a disk array.

point-in-time logical copy

A logical copy or snapshot of a volume at a point in time. This enables a backup or mirroring application to run concurrently with the system.

pool volume

Used to store backup versions of files, archive copies of files, and files migrated from other storage.

primary or local site

The host computer where the primary volume of a remote copy pair (primary and secondary volume) resides. The term "primary site" is also used for host failover operations. In that case, the primary site is

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

the host computer where the production applications are running, and the secondary site is where the backup applications run when the applications on the primary site fail, or where the primary site itself fails.

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).

P-VOL

See primary 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.

remote or target site

Maintains mirrored data from the primary site.

remote path

A route connecting identical ports on the local storage system and the remote storage system. Two remote paths must be set up for each storage system (one path for each of the two controllers built in the storage system).

resynchronization

Refers to the data copy operations performed between two volumes in a pair to bring the volumes back into synchronization. The volumes in a pair are synchronized when the data on the primary and secondary volumes is identical.

S

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.

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

Glossary–8

SATA

Serial ATA is a computer bus technology primarily designed for the transfer of data to and from hard disks and optical drives. SATA is the evolution of the legacy Advanced Technology Attachment (ATA) interface from a parallel bus to serial connection architecture.

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.

SMPL

Simplex.

snapshot

A term used to denote a copy of the data and data-file organization on a node in a disk file system. A snapshot is a replica of the data as it existed at a particular point in time.

SNM2

See Storage Navigator Modular 2.

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".

suspended status

Occurs when the update operation is suspended while maintaining the pair status. During suspended status, the differential data control for the updated data is performed in the primary volume.

S-VOL

See secondary volume.

S-VOL determination

Independent of update operations, S-VOL determination replicates the S-VOL on the remote storage system. This process occurs at the end of each update cycle and a pre-determined copy of S-VOL data, consistent with P-VOL data, is maintained on the remote site at all times.

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

T

target copy

A file, device, or any type of location to which data is moved or copied.

V

virtual volume (V-VOL)

In Copy-on-Write, a secondary volume in which a view of the primary volume (P-VOL) is maintained as it existed at the time of the last snapshot. The V-VOL contains no data but is composed of pointers to data in the P-VOL and the data pool. The V-VOL appears as a full volume copy to any secondary host.

from the host.

volume copy

Copies all data from the P-VOL to the S-VOL.

volume pair

Formed by pairing two logical data volumes. It typically consists of one primary volume (P-VOL) on the local storage system and one secondary volume (S-VOL) on the remote storage systems.

V-VOL

See virtual volume.

W

write order guarantee

Ensures that data is updated in an S-VOL, in the same order that it is updated in the P-VOL, particularly when there are multiple write operations in one update cycle. This feature is critical to maintain data consistency in the remote S-VOL and is implemented by inserting sequence numbers in each update record. Update records are then sorted in the cache within the remote system, to assure write sequencing.

write workload

The amount of data written to a volume over a specified period of time.

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



Index

C

CLI commands vs CCI's for local repl [1-25](#)

CLI commands vs CCI's for remote repl [2-31](#)

Commands

aupool [1-8](#)

aureplicationlocal -availablelist [1-4](#)

aureplicationlocal -chg [1-21](#)

aureplicationlocal -create [1-9](#)

aureplicationlocal -refer [1-2](#)

aureplicationlocal -restore [1-17](#)

aureplicationlocal -resync [1-15](#)

aureplicationlocal -simplex [1-19](#)

aureplicationlocal -split [1-12](#)

aureplicationmon -evwait [1-23](#)

aureplicationmon -syncwait [2-29](#)

aureplicationremote -availablelist [2-5](#)

aureplicationremote -chg [2-27](#)

aureplicationremote -create [2-16](#)

aureplicationremote -refer [2-2](#)

aureplicationremote -resync [2-21](#)

aureplicationremote -simplex [2-25](#)

aureplicationremote -split [2-19](#)

aureplicationremote -swap [2-23](#)

aureplicationvvol [1-6](#)

aurmtpath -delete [2-13](#)

aurmtpath -reconst [2-12](#)

aurmtpath -refer [2-6](#)

aurmtpath -set [2-8](#)

aurmtpath -target [2-10](#)

autruecopyopt -refer [2-14](#)

autruecopyopt -set [2-14](#)

Cycle Over Report [2-14](#)

cycle time [2-14](#)

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